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INEXPENSIVE WELFARE WORK

A long-established custom abroad is to serve tea, chocolate or some other beverage free of charge to the employees, either at some stated time or throughout the day when desired. The cost of this practice is a small item but it has been found to bring an ample return in the better physical and mental tone of the operating force. Less attention has been given in the United States to this form of welfare work, although some of the more progressive companies make it a point to serve hot meals en route to crews engaged in the removal of snow. The possibilities for extension along this line are indicated by the recent announcement of the Portland (Ore.) Railway, Light & Power Company that every noon it will serve free a cup of hot coffee to those who bring their lunch to work. This innovation indicates how a railway by doing things of like character on a large scale can give its employees much more than if it offered them the equivalent amount in money. For instance, the actual cost of a cup of really good coffee is not more than one or two cents. This practice, however, has a more significant feature than the saving of a few cents, inasmuch as it is a sign of kindly thoughtfulness which is sure to be appreciated by most of the men.

THE USE OF THE FRONT EXIT

It is generally conceded that the use of the front platform as an exit ameliorates crowded car conditions in proportion to its application. To this end many companies post signs and other tokens which direct the passengers to leave via the motorman's platform. Nevertheless, it is a fact that some of the railways which are most desirous of seeing the front exit in extensive use actually make it inconvenient for the passenger to comply with their wishes. Thus it is not unusual to find that the front exit doors are held closed by the small thumb latches which are in common use for locking blind side doors. At best these doors are difficult to unlatch and the primitive arrangement compels the motorman to leave his position in order to close the door. The latter procedure not only involves a certain amount of delay, but as the motorman generally feels that extra work is being imposed upon him he naturally will treat the departing passenger with scant courtesy. This condition in itself is enough to discourage many passengers from leaving at the front of the car, and as a result they join the crowd which always tends to collect near the rear exit, blocking the passageway for incoming passengers and so preventing the car from carrying its full load. It is idle to expect a passenger to comply with a printed request once he has discovered that the mechanical arrangements of the car are inconsistent with the railway's expressed policy and that his very willingness to comply leaves him open to the disagreeable experience of an implied rebuff from the motorman.

CO-OPERATION OF ELECTRIC LIGHT AND RAILWAY MEN

The meeting of the public policy committees of the American Electric Railway Association and the National Electric Light Association, together with several prominent guests, at Tuesday evening's get-together dinner, which is reported elsewhere in this issue, is significant of even more than a highly desirable spirit of co-operation. It is, we believe, indicative of a conviction that there is so much more to do in the way of improving public relations that it is impossible to have too many oars in the boat or too many hands at each oar. The men who participated in the meeting referred to are not merely the heads of great industries; they are men of public spirit and high ideals; they are working under the burden of public misunderstanding, which it is one of the first and most important duties of the electric light and railway associations to remove. In a footnote in one of the school histories of our childhood we were told that at the moment when there was some hesitation about signing the Declaration of Independence a Massachusetts patriot exclaimed: "Let us all hang together, for if we do not we are likely to hang separately." This, and the even more weighty reasons affecting the good of the industry and the duty that is owing to the stockholders of utility companies together with the public which they serve, should be the highest incentive toward activity on the part of the co-operative committee of the two associations in the effort to bring about an era of better understanding of the corporations by the public, for upon a good understanding mainly depends the future welfare of the public and its servants, the corporations.

RESPONSIBILITY FOR THE COMFORT OF PASSENGERS

In recent issues note has been made regarding the campaign of the Philadelphia Rapid Transit Company against the use of tobacco on its cars. This in itself is by no means unusual, although one feature of the rules covering the matter is, notwithstanding its importance, almost

invariably overlooked. This is the inclusion of the carrying of partly consumed but unlighted cigars or cigarettes among the list of proscribed acts. It is a rule which in general will be welcomed by smokers and non-smokers alike, for the reason that the half-smoked, unlighted cigar which is preserved by its owner for reasons of economy is usually the most malodorous article in existence. There is, however, another feature which is of interest to electric railways. The Philadelphia Rapid Transit Company has not contented itself with the mere statement that the smoking and spitting nuisance is a violation of the company's rules or that spitting in the cars is contrary to the orders of the Board of Health of the city. It has struck out independently for itself and has included in its notice the statement that passengers who offend against the rules dealing with smokers will be ejected. Too much praise can hardly be given to the company for its courageous stand in safeguarding the comfort of its patrons. Nevertheless, it must be borne in mind that ejectments, even of the most proper kind, always leave an opening for a "spite" damage suit, inaugurated by a complainant whose code of ethics does not prevent him from exaggerating, to say the least, the injuries sustained to mind and body. Rules looking toward the comfort of passengers can and should be backed up by city ordinances, but, even when a community grants this protection, it is always well where possible to let actual ejectments be made by a public officer, who thus relieves the railway company of any charge that undue or unnecessary force was used.

INCREASE IN FARE IN NEW JERSEY

The increase in fare approved by the New Jersey commission in the case of the New Jersey & Pennsylvania Traction Company was possible, according to the decision published in abstract elsewhere in this issue, only because provisions of local franchise ordinances were rescinded or litigated. Apparently the local authorities recognized the inadequacy of the fares fixed by the ordinances, because they agreed to submit the establishment of "just and reasonable rates" to the commission. A willingness to rescind onerous rates is an unusual attitude, and the case is notable for the additional reason that in deferring to the judgment of the board the local authorities paid the organization and methods of the state supervising body a high compliment. The ordinary local official is jealous of interference from state authorities. The report upon which the commission based its findings contains one or two points of special interest. The commission appears to regard the valuation made for the receivers as careful and conservative and to approve an appreciation allowed for right-of-way. Although the amount of appreciation determined is small, if the increase in value exists it is in physical property that is an asset of the company, and credit for it should be allowed. Even the higher rates of fare which are to be established by order of the commission for an experimental period of one year are low. Passengers who travel the maximum distance in all of the three proposed 5-cent zones will pay an average rate per mile about as follows: first zone, 1.22 cents; second zone, 1.11 cents; third zone, 1.27 cents. For the full trip the fare of 15 cents averages 1.19 cents per mile. As the commission provides for special traffic situations by overlapping two of the zones and by directing the sale of tickets between certain points, the rates named will not apply to all classes of the business, but they affect a large part of the traffic and are enough above the old rates to lead to an improvement in the returns without much likelihood of a reduction in the number of actual revenue passengers.

NEEDED AMENDMENT OF THE ERDMAN LAW

In the course of the negotiations that have been going on for several months between the Eastern railroads and their firemen regarding readjustment of wages and conditions of employment the fact has been very sharply brought out that the Erdman act is in need of amendment in at least one particular. This is in respect to the number of arbitrators, which is now limited to three, one appointed by each of the parties to a dispute and a third designated by the other two or by some independent authority. The railroads object to an arbitration under this law on the ground that too much power is given to the third arbitrator, who in practice is the sole judge, his two associates exercising no judicial functions but being in fact advocates of their respective sides of a controversy.

Past experience with the law has justified these objections. It is, furthermore, known by everyone who has had experience with labor arbitrations under conditions similar to those imposed by the Erdman law that what happens is that the arbitrator having the deciding vote rarely delivers a decision on the merits of the case; he simply arrives at a compromise between the extreme positions taken by the employers and the employees. Perhaps substantial justice is done by such awards, but it is rather farcical to call the process by which they are attained "arbitration." And it is easy to understand why in a case so important as the firemen's demands there should be unwillingness to place the fate of fifty-five railroads in the hands of one man. It is doubtful if the Erdman act was ever intended to be applied to a matter of such magnitude. This seems to have been in the mind of Mr. Morrissey, the former president of the Brotherhood of Railway Trainmen, who some time ago suggested that the act might be amended so as to provide for three, five, seven or nine members, "depending upon the magnitude and importance of the issue, with neutral representatives holding the balance of power."

On the part of the firemen it was objected that if they were to consent to a variation of the terms of the Erdman law so far as the number of arbitrators is concerned the arbitration would be conducted wholly without the law and there would be no check upon perjury by witnesses for the railways or upon the submission of improper testimony. The recent engineers' arbitration is pointed to as an example of unfair arbitration, the principal grounds for this charge being that evidence was put in by the railways and independent investigation carried on by the arbitrators after the case was supposed to be "in the hands of the jury." The fact seems to be overlooked that it is the duty of arbitrators in any case to discover the truth wherever it may be and by whatever means are available. It is furthermore rather ridiculous to find labor men insisting upon the trial of their case by strict rules of evidence, for they have always been foremost in demanding

that the widest latitude should be allowed in the presentation of testimony in labor disputes.

But whether the railways or the firemen were right, the one in objecting to and the other in advocating the application of the Erdman law to this particular dispute, it is evident from the viewpoint of the public that the law does not provide the measure of insurance against railway strikes that is needed. The objection to placing in the hands of one man the deciding vote in matters that involve millions of dollars and the rights of thousands of men is probably as strongly felt by the men as by the railroads, only in the firemen's case it was to their immediate advantage to hold out for the letter of the Erdman law. If this is a fair statement of the attitude toward the law by all the parties in interest, including the public, effective steps cannot too soon be taken to secure amendment of the law in such a way as to provide for a larger number of what Mr. Morrissey calls "neutral representatives" on labor arbitration boards.

Throughout the communications of the firemen to the railways and in the firemen's statements in the press there is a strong undercurrent of objection to any proposition that tends in the direction of making arbitration of railway labor disputes compulsory. But the steam railways and the public have, we believe, made up their minds that fair arbitration is better than strikes which paralyze industry, and labor must also eventually submit to this decree.

COMMUTATION-RATE REDUCTION IN NEW YORK

Restoration of the commutation rates of fare which existed on the New York Central and the New Haven systems prior to the general advances made in 1910 will have a direct effect on the New York suburban traffic as well as on the revenues of those properties. It will have an indirect but more serious effect on the business of the New York, Westchester & Boston Railway, the new subsidiary of the New Haven system which was built to serve Westchester County.

The effect upon the two systems directly involved, if the commission is accurate in its judgment that the increased rates operated unfavorably to the communities affected, should be a restoration of the conditions of residential and traffic development that prevailed several years ago in Westchester County, although a development of this character is likely to acquire momentum slowly. We think, however, that the failure of the suburban traffic to increase at a normal rate during the past two years is due in part to other considerations than the higher commutation rates. One of these is the unfortunate shortage of water from which some of the Westchester County communities have suffered and another is the fact that in many sections of that suburban district real estate was over-boomed, the last two or three years having seen a natural reaction from the artificial values reached when the advance was in progress.

The problem which the decision of the commission raises for the New York, Westchester & Boston Railway lies in the fact that the line of this company is located largely in undeveloped districts, that its rates were made a little lower than the advanced schedules of rates on the established roads, and that the declared purpose of the New Haven management was to divert some of the suburban business from the main line to the new road, which is not handicapped by a heavy terminal charge. The new line does not have as good terminal facilities as the old properties, and if it loses all or part of the advantage at competitive points that it has held by reason of lower rates of fare, it will have a longer time to wait for the upbuilding of the unsettled land through which it largely operates before obtaining the needed volume of business.

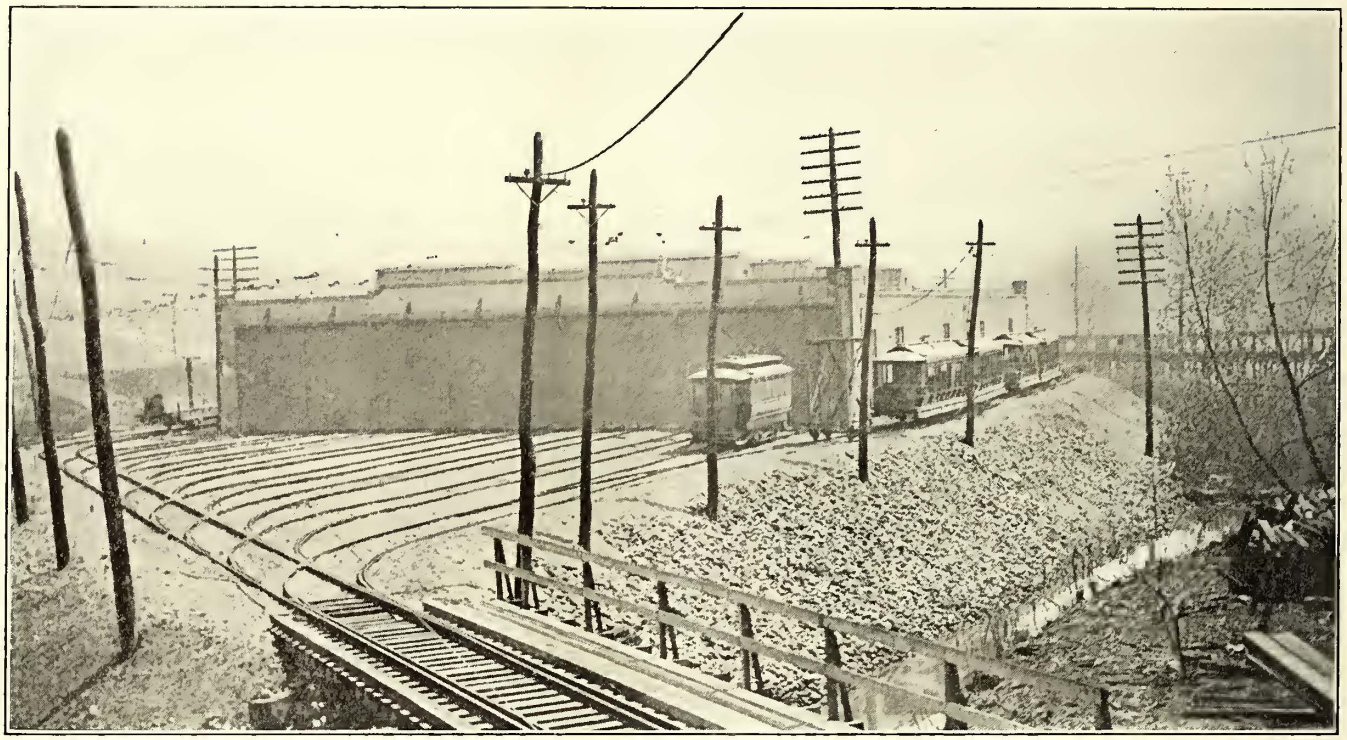
The decision of the commission, which was abstracted on page 309 of last week's issue, appears to be based largely on considerations that are primarily of a public-policy character. While the commission did not deny the increased costs of operation claimed by the companies, it made no allocation of expenses or capital costs and evidently was not greatly impressed with the argument of the New Haven management that the heavy Grand Central Terminal expense per passenger should be recognized as a factor in rate making in the commutation zone. The problem before the commission, as stated so clearly in its abstract of the decision, relates to the point at which the rate "should be placed in order to enlarge the commutating business, increase the suburban population and thereby increase the general prosperity. Of course this point must be fixed with proper reference to the fair and reasonable returns to which the corporation is entitled over and above the actual out-of-pocket expense involved in performing the service." It seems, therefore, that the commission is satisfied that the lower rates of fare furnish a return above the "out-of-pocket" cost of performing the service. This definition of cost is manifestly different from cost as it was defined by the railway companies in the proceeding, including all of the elements of expense that could be charged against service of this class. The decision of the commission, however, expresses the definite opinion that the allocation of the terminal cost to the particular traffic handled cannot be sustained. It regards the payment by the New Haven company to the New York Central company on account of the use of terminal facilities as in the nature of a rent and the method of accounting therefor as a detail. In other words, outside of the question of public policy which it raises, the commission is disposed to regard the business and revenues of the railroads in their entirety as a factor to which much weight should be given, if not more weight than the results shown by a segregation of revenues and expenses pertaining to one class of the many classes of traffic handled.

The question of public policy raised by the commission—that is to say, the duty and necessity imposed upon the companies of doing what will best serve the needs of workers in New York for convenient and reasonable means of transportation to places outside of the city where homes may be found—is one that may be applied to railways of large mileage and diversified traffic where it could not reasonably be applied to a short railway which served one community or group of adjoining communities or was dependent upon one class of traffic. If the railways carry the commuter business at a loss, they do so only because they are able to make up the deficit by a profit from other traffic or operations which is larger than the average profit on all business handled.

The Derby Carhouse of the Connecticut Company

Description of a Structure for Storing Cars Which Is Built Upon the Bed of a Diverted Stream and Designed to Exert the Minimum Weight Upon Its Foundations Consistent with Permanent Construction

A carhouse of unusual construction, intended solely for the storage of spare equipment, has recently been completed by the Connecticut Company. The operating conditions which necessitated its erection involved a location in the vicinity of the twin towns of Derby and Ansonia, both of which are well-known manufacturing centers of Connecticut. Under such circumstances the matter of securing land for the building was complicated by the fact that real estate in the desired location was of considerable value with every indication of a continued increase in future years. The company possessed some land adjoining the existing carhouses of the division in the town of Derby, but it was located on a low flat which at certain seasons was partly inundated by a stream running through it. It was decided, however, that the utilization of this property would be preferable to the purchase of new land upon which the building might be more easily built, and in consequence a structure was erected upon it after diverting the stream which ran through it and filling to the desired grade.



Derby Carhouse—View Showing Entrance Tracks Laid Upon Filled Ground

GENERAL ARRANGEMENT

The carhouse is 182 ft. long x 104 ft. wide and will hold thirty-two of the large cars of the type now practically standard on the Derby division, or forty cars of the small type. Eight tracks are located longitudinally with the center line of the building, and these are spaced alternately on 12-ft. and 13-ft. centers. All lead directly from a single straight ladder track. At the east side of the building an additional space of approximately 2 ft. between the track and the wall is provided, this aisle being available for inspection or repair of such minor parts of the car equipment as may be removed from the cars in the course of very light repairs.

The carhouse is not intended, however, as a repair shop in any sense of the word, but instead is to be used only for housing spare equipment. For this reason the height has been limited, the roof framing beginning at a point 16 ft. above the rail. This limited height naturally prevents jacking up cars. Since the building is to be used for storage purposes only, no pits are provided, the floor being laid flush between the T-rails which are used inside of the building, the flange groove being molded in the concrete on the inside of each rail.

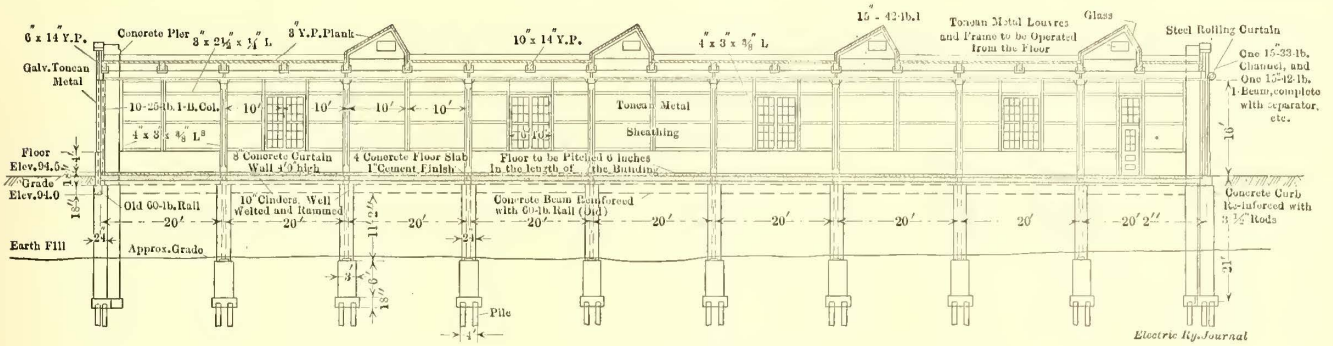
The house itself is constructed with a concrete curtain wall rising some 4 ft. above the surface of the adjoining ground, with corrugated galvanized Toncan metal siding between this and the mill construction roof.

FOUNDATIONS

Since the building is located on the bed of a diverted stream, the question of the weight of the structure was of serious importance in the design, owing to the twofold necessity for very deep foundations and for piling whatever foundations were installed because of the low bearing value of the original soil. The foundations take the form of a series of concrete piers under each of which three piles were driven with two extra piles installed at each corner of the building. The center piers have bases 4 ft. square and 18 in. high, the piles extending up into the concrete for about 9 in. Along the building walls the width of the pier bases is decreased to 3 ft. and the longitudinal dimension is increased to 4 ft. 6 in. The piers are set in rows spaced on 20-ft. centers longitudinally, and to conform with the framing of the building they are spaced transversely on centers varying from 25 ft. for the two center spans to 28 ft. for the span at the aisle side of the building. For approximately 7 ft. above the bases of the piers the dimensions are reduced to 3 ft. square, the wall piers being reduced to

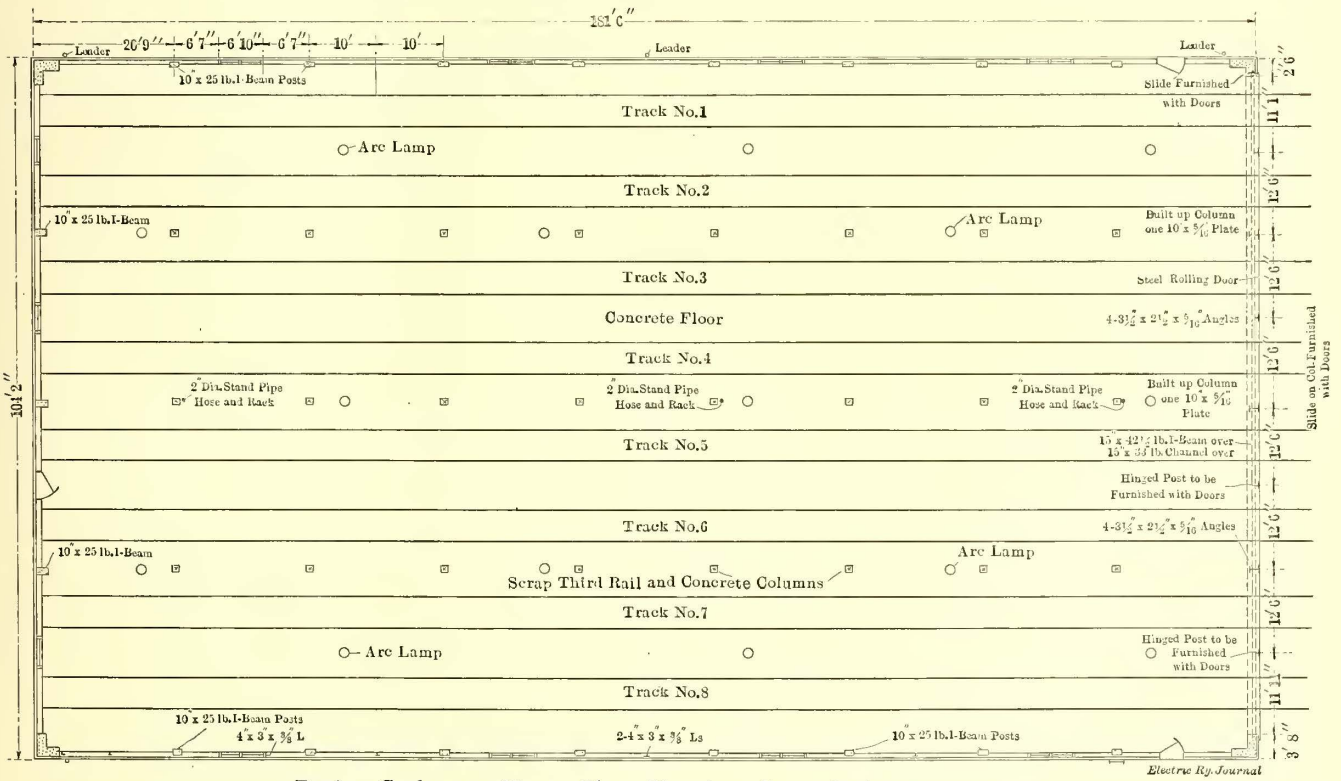
dimensions of 2 ft. x 3 ft. At this point, or about elevation 80, which was the level of the original ground, the piers are again reduced to the dimensions of about 2 ft. square and are extended approximately 12 ft. to elevation 92.5.

The fill which was made around the piers to bring the finished ground level up to that required by the track levels for the older structures near by was made with gravel



Derby Carhouse—Longitudinal Cross Section on Line A A

containing a large percentage of boulders. This material, which has proved very satisfactory, exists in large quantities in the vicinity, as the valley of the Naugatuck River, in which the carhouse is located, is of glacial character. The fill brought the final grade up to elevation 94, and at this height a concrete beam 18 in. deep and 12 in. wide, reinforced with a single piece of 60-lb. rail, was extended between the piers around three sides of the building. This beam carries the curtain wall, which rises 4 ft. above the surface of this ground. At the other end of the building, where the entrance doors for the cars are located, the concrete beam is omitted and is replaced by a reinforced concrete door sill 22 in. wide and 17 in. high reinforced with three ½-in. round rods.



Derby Carhouse—Floor Plan Showing General Arrangement

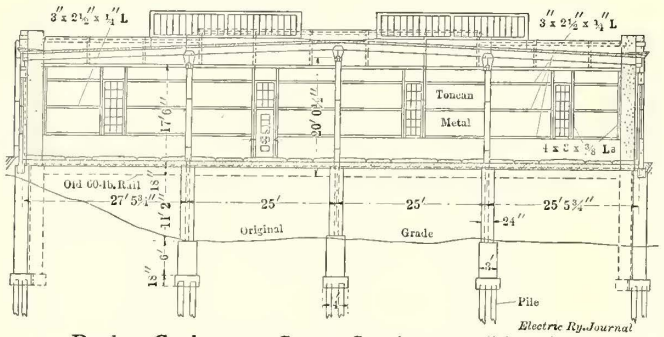
WALL AND ROOF FRAMINGS

The low roof of the building is supported throughout on concrete columns resting upon the foundation piers. Except along the walls all of these columns are composed of two rolled shapes originally used as the central third-rail on the old Hartford-Bristol line of the New York, New Haven & Hartford Railroad, the pioneer steam railroad electrification. These scrap third-rails are utilized as cores for the columns by bolting them back to back. The metal center thus formed is wrapped with No. 10 gage expanded metal and the whole is then cast in concrete to make a column 12 in. square with the corners beveled. Along the walls of the building the columns are made up of standard 10-in., 25-lb. I-beams wired with expanded metal and cast in concrete to make posts 8¾ in. x 14 in. in cross-section. The roof load is transmitted to the rail columns by longitudinal 15-in. I-beams which serve as girders, to the side and rear end columns by 12-in. I-beams, and to the front column by the 15-in. I-beam and channel lintel. The girders are carried on cast-iron saddles which cap the columns and are extended up to inclose the rafters above the girders, holding them rigidly against overturning.

All columns are spaced longitudinally on 20-ft. centers and the rafters or roof beams are spaced on 10-ft. centers so that every second rafter rests upon the middle points of the girders. The rafters are carried in cast-iron shoes at the points intermediate between columns, and those which pass over the tops of the columns are supported in extensions of the cast-iron saddles for the girders.

The spacing of the rafters on 10-ft. centers, together with the long span of over 25 ft., necessitates the use of 10-in. x 14-in. timbers, although this construction was found to be in the end lighter than the more customary arrangement of lighter rafters spaced on considerably shorter centers. The roof sheathing is composed of 3-in. yellow pine planks splined together and spiked to the rafters.

The side wall framing consists of 4-in. x 3-in. x ⅜-in.



Derby Carhouse—Cross Section on Line B B

angles set back to back and located on a 10-ft. spacing except at windows, where additional vertical angles are added to form supports for the window frames. These vertical angles are riveted to the 12-in. I-beams which extend around the top of the walls and are set into the concrete of the curtain wall at the bottom. Three horizontal angles are run between the vertical angles on the closed sides of the building. One of these rests upon the top of the curtain wall and the other two are spaced above so that one comes at the top line of the window frame and the other at the center point of the window frame. To this wall framing a metal siding of Toncan metal is attached.

At the entrance of the building on the same level as the 12-in. I-beam extending around the top of the walls are one 15-in., 42-lb. I-beam and one 15-in., 33-lb. channel, coupled together with separators and carrying the rolling steel doors. These pairs of beams are supported by built-up columns each composed of one 10-in. x 5/16-in. plate riveted between four 3½-in. x 2½-in x 15/16-in. angles. The columns are located between alternate pairs of tracks. Each pair of beams is able to carry the weight of the doors and its share of the roof on a clear span of 25 ft. Additional posts are placed at the center of each beam so that there is a guide for the door on each side of each track. The latter post is, however, not intended to carry any of the load as it is hinged at the top and can be swung out to give additional entrance space between those tracks which are located on 12-ft. centers. This arrangement is for the purpose of permitting the ingress and egress of specially wide equipment.

Aside from the cast-iron saddles at the tops of the columns, which have a 2-ft. side bearing on the rafters and are in addition bolted to them, the only sway bracing which is employed in the building consists of 2½-in. x 2-in. x ¾-in. angles extending diagonally between the wall posts on each side of the building and each purlin. These reach out about 3 ft. from the center line of each wall post.

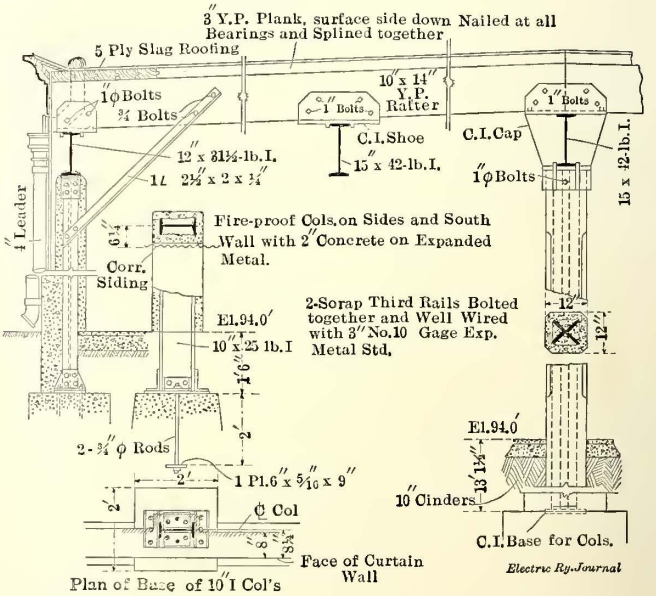
BUILDING DETAILS

The concrete floor of the building is entirely separate from the curtain wall and from the posts on account of the necessity for provision for settlement of the fill. It is pitched 6 in. from the rear of the building to the front, a distance of about 180 ft. In addition the floor has a pitch toward each track from the center line between each pair. This should prove ample to keep the floor clear of water even when the washing of cars is being carried on. The floor is made up of 1 in. of wearing surface on top of a 4-in. concrete slab, the latter being poured on a 10-in. layer of cinders carefully rammed.

The most unusual detail of the building construction is the use of the corrugated galvanized Toncan metal for the building wall. Its installation in place of the customary brick or concrete was made with the object of reducing the weight of the building to the greatest degree. The method of attachment is to clip the metal by means of galvanized wire of about No. 10 gage to the angles which form the wall framing of the building. These clips are hooked around the framing angles, being passed through holes punched in the metal and headed on the outside end. They are spaced approximately 1 ft. apart. At the points where the metal is in contact with the concrete corner posts of the building or with the curtain wall a groove has been cut in the concrete and the edge of the metal set into it, the groove being afterward filled with neat cement, this holding the sheet firmly in place and making a perfect rainstop.

The roof is peaked along the approximate center line and slopes ½ in. to 1 ft. toward each side. It is sheathed with 3-in. yellow pine planks set with the surfaced side down and nailed at all bearings and is covered with five-ply tar and slag roofing. Eight saw-tooth skylights, each 25 ft. long, 10 ft. wide and exposing 4 ft. 6 in. of glass to the north, provide light for the interior. The sills, 4 in. x 8 in. at the lower end and sized to the pitch of the roof, rest over main girders and carry end frames and a center frame on 12-ft. centers. The frames consist of a 4-in. x 10-in. rafter and a 4-in. x 6-in. supporting strut. The top and sides are 3-in. splined plank with five-ply slag roofing, and the ends, which are sheathed with ⅞-in. siding, have galvanized Toncan metal louvers, adjustable from the floor for ventilation.

The window and small door frames are made of wood, the side windows being 6 ft. 3 in. wide and 8 ft. 3 in. high; the end windows are the same height and 3 ft. wide. The main entrance doors are of steel of the Kinnear rolling type with outside housings. Each door is 12 ft. 6 in. wide and slides between one of the permanent built-up columns previously described and the adjacent hinged columns, which may be swung out of the way to admit extra wide equipment. Operation is by hand from the floor level, a spring practically balancing the weight.

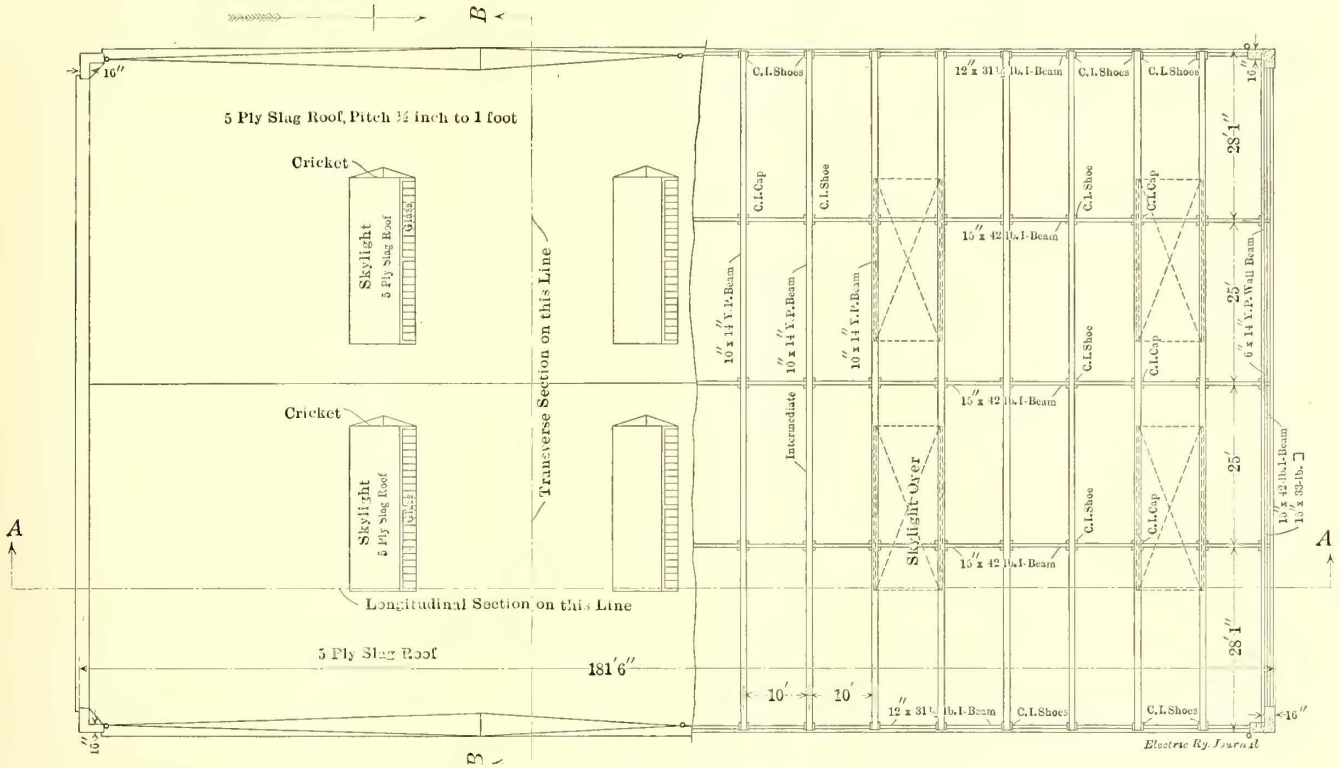


Derby Carhouse—Details of Columns and Roof

Outside leaders are installed, the connection through the eaves being broken just outside of the wall so that the drip from the roof is dischargd into a bowl-shaped top on the vertical portion of the main leader. Three of these are on each side of the building and they discharge onto the ground at the bottom of the wall.

An ornamental effect to the building has been introduced by installing a molded cornice around all of its four sides. This is made of galvanized Toncan metal and takes the place of the metal gutter usual with outside leaders. In addition, the ends have been provided with low parapet walls with a raised portion in the center, and at the corners

ing construction permitting the omission of aisle sprinklers without increasing insurance rates. This eliminates the serious and unavoidable interference which such aisle heads cause with the work of the car cleaners. Sprinkler heads have been installed 9 ft. 6 in. apart in the center of each bay of the roof and in each of the skylights, pipes extending



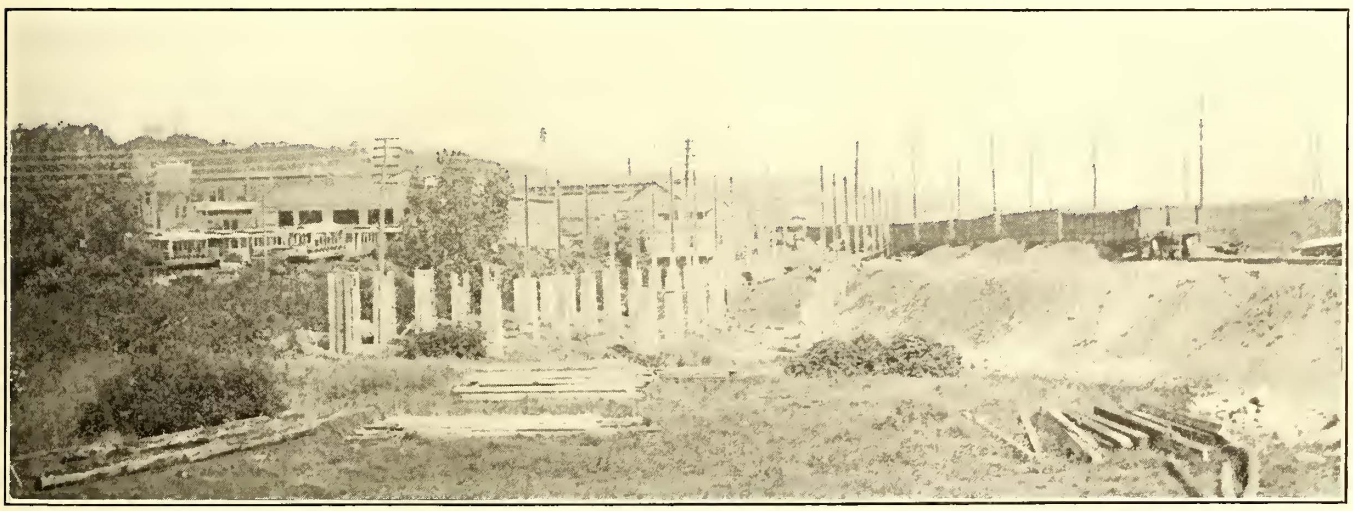
Derby Carhouse—Roof Plan and Roof Framing

of the building concrete columns have been extended up slightly above the level of the parapet walls. These concrete columns are L-shaped in cross-section and measure 3 ft. 8 in. in both of the outside dimensions.

EQUIPMENT

Lighting is provided by both arc and incandescent lamps, the latter being used only along the walls. All of the lighting equipment was installed in conduit by the building department of the New York, New Haven & Hartford Railroad Company. No heating equipment has been installed in view of the fact that no repair work is to be done in the building.

A complete ceiling sprinkling system operated on the dry-air principle has been installed, the low roof of slow-burning construction permitting the omission of aisle sprinklers without increasing insurance rates. This eliminates the serious and unavoidable interference which such aisle heads cause with the work of the car cleaners. Sprinkler heads have been installed 9 ft. 6 in. apart in the center of each bay of the roof and in each of the skylights, pipes extending longitudinally with the skylight and close under its roof boards. The dry-air valve which keeps the water supply shut off from the system while the air pressure remains on it is located in a small concrete house at one side of the building, and inside of the main building next to the valve house is a small air pump operated by an electric motor for the purpose of maintaining an air pressure of from 50 lb. to 60 lb. on the system, thus keeping the dry-air valve shut unless an open sprinkler head should happen to reduce the air pressure.



Derby Carhouse—Foundation Piers in Process of Construction Prior to Completion of Fill

Service water for washing cars is furnished at three points along the center line of the building from taps on risers beside the columns. At each of these points a 2-in. standpipe terminates in a valve and a fire hose mounted on

a rack and connected to the city water system is furnished as an additional protection against fire. There is also a hydrant with 50 ft. of 1½-in. hose in an underwriters' hydrant house in front of the carhouse which controls the yard.

The overhead construction is the Connecticut Company's standard. Outside the building No. 00 round wire is used, while inside the structure there is a steel angle 2 in. x 2½ in. x ¼ in. with the long leg down, bolted along the center of a backing board 1¾ in. x 12 in., this width preventing contact between angle and trolley pole if the latter slips from its hook. The outside and inside systems end in composition pans at either side of the rolling doors, and the doors have fiber runners on the bottom to guide the trolley wheel between the pans, a series of fiber breaks insuring that no arc is drawn across.

The carhouse was designed by and erected under the supervision of the construction department of the Connecticut Company.

INCREASE IN FARE ORDERED BY NEW JERSEY COMMISSION

Brief mention was made in the issue of the Electric Railway Journal for Jan. 25, 1913, of the increase in the rate of fare authorized by the Board of Public Utility Commissioners of New Jersey on the line of the New Jersey & Pennsylvania Traction Company between Trenton and Princeton, N. J. The order of the commission increases the rate of fare from 10 cents to 15 cents for one year. In part the report upon which the order is based stated that the New Jersey & Pennsylvania Traction Company, acting for itself and the three companies it controlled, a consolidation known as the Johnson trolley, accepted an ordinance passed by the borough of Princeton on Dec. 3, 1901, and a similar ordinance passed by Princeton Township on Jan. 6, 1902. These ordinances provided that the fare for a through trip between Trenton and Princeton should be 10 cents. Up to the present time this fare has prevailed between the points named.

Largely by reason of the rising cost of operation, the operating company had not been able properly to maintain the property and the service had frequently been inadequate. Until recently even the safety of travel had been imperiled, and the board, upon report of its engineers, had repeatedly required expenditure to be made upon the company's plant so as to secure safe, adequate and proper service. On Feb. 29, 1912, the traction company was adjudged insolvent, and Alfred Reed and Sydney L. Wright were appointed receivers.

The board's power by statute to fix just and reasonable rates had not been interpreted as superseding an extant contract fixing rates where such contract was operative prior to the statutory vesting of power to fix rates in the board. Accordingly, in order that the proceeding might be brought, the ordinances, which were essentially contracts establishing rates of fare, had first to be rescinded. The borough of Princeton on Oct. 1, 1912, and the township of Princeton on Dec. 2, 1912, rescinded their ordinances so far as rates of fare were concerned and agreed to submit to the board the establishment of just and reasonable rates of fare. An ordinance passed by the city of Trenton involving rates of fare to be charged by the traction company had also been litigated, and the case was decided by the Court of Errors and Appeals in the June term of 1912. The effect of this decision, taken together with the rescinding of the two ordinances first referred to, removed all legal obstacles to the board's determination whether the existing rates, tolls or charges were or were not sufficient and permitted the board to set just and reasonable rates for service over the trackage of the Princeton division.

VALUATION OF THE PROPERTY

Upon the appointment of the receivers, a careful inventory and valuation was made of the traction company's properties, including the so-called "Johnson trolley line" between Trenton and Princeton. The original costs of large parts of the company's property were reduced by the appraiser in many instances by reason of the accrued and existing depreciation. In some instances items were depreciated by as much as 90 per cent, and in all instances the percentage of original cost written off for depreciation appeared to be extremely liberal, thus affording a very conservative estimate of the value of the property. The cars on the so-called "Johnson trolley line," which cost originally $42,000, were valued at only $5,500.

The final estimate put upon the entire property of the division between Princeton and Trenton was $373,378. The receivers had expended upon the division for rehabilitation and re-equipment up to Dec. 26, 1912, the total sum of $54,968 and estimated the additional expenses required for the complete restoration of the Princeton division at $20,000. This made the eventual value of this division $448,346. To this sum had to be added an estimate for a part of the power plant at Yardley, Pa. This plant generates current for the entire system, including the branches operated in Pennsylvania, which have a trackage about double that of the Princeton division. The original cost of the power plant was $183,750 and of the remaining property accessory to the power plant $51,250, making the total cost of power house and associated items $235,000. The appraiser put upon it a value of $192,000.

The board assumed one-third of this amount as representing the part of the power plant installed for operating the cars on the Princeton division, or approximately $64,000. Roughly speaking, therefore, the entire property of this division represented an investment of about $500,000. The report stated that a return at the rate of 6 per cent on this base would not be excessive or unreasonable and that a net profit of $30,000 over and above all expenses for operation, repairs and maintenance was amply warranted.

The gross receipts of the Princeton division of the company for the past twelve months (December being estimated) amounted to $43,789 for passengers and $10,026 for freight, a total of $53,815. The operating expenses for passenger service were $35,863, and for freight service were $5,438, making a total of $41,301. The gross receipts were the actual receipts upon the Princeton division; the operating expenses were estimated upon the car mileage on this division as compared with the car mileage on the entire system. The excess of receipts above expenses on the Princeton division was in consequence only $12,514. The car-mile results were as shown in the table published herewith.

The operating expenses during the last year did not include a large part of what would be ordinary outlay for maintenance of road, apparatus and equipment, as these expenses were largely covered by the money the receivers expended upon the rehabilitation of the property.

LOW RATES PER MILE

A comparison of the rate per mile charged by this company with the rates per mile charged by other companies showed that while on this division the company charged 8.1 mills per car mile, the rate charged per mile upon a number of other roads in the adjacent sections of this State and Pennsylvania ranged from 14 to 25 mills per car mile.

It appeared therefore that the present rates of fare on this division were lower, generally speaking, than similar charges for comparable service elsewhere, and that they failed to accord a just and reasonable return upon the value of the property of the Princeton division.

The receivers, by petition filed on Dec. 17, 1912, requested that the board would declare the present rates of fare to be inadequate and insufficient, and that the board would

fix just and reasonable joint rates for passenger travel on the Princeton division.

On the ground recited above, the board found that the present rates of fare upon the Princeton division operated by the traction company were insufficient and did not afford fair or reasonable return. In place of the present fare of 10 cents between Trenton and Princeton, the board fixed for an experimental period of twelve months beginning

CAR-MILE RESULTS OF OPERATION DURING 1912

	Cents
Receipts, passenger	19.1
Operating expenses, passenger	15.6
Receipts, freight	68.3
Operating expenses, freight	37.0
Combined receipts	22.0
Combined operating expenses	16.9
Apparent excess of receipts over operating expenses	5.1

Feb. 5, 1913, a rate of fare for a continuous through trip between Trenton and Princeton, in either direction, of 15 cents.

The board was also of opinion that to set reasonable and just rates of fare for passengers traversing only a part of the line between Trenton and Princeton it was proper and necessary that there should be three zones between these two termini, instead of two zones, as at present. The rate of fare for traversing any one of these three zones, or a part thereof, should be 5 cents. By reason of the considerable volume of daily passenger traffic between Eldridge Park and Lawrenceville, the board was of the opinion that but one fare of 5 cents per passenger should be charged between these two stations, and to this extent would establish an overlap which would provide for this. The board was also of the opinion that the company should sell bunches of tickets, or block tickets, not less than twelve tickets in a bunch or on a block, at an aggregate price of $1 for the twelve. These tickets should be good for passage between Lawrenceville and either Trenton or Princeton. The reason for this last provision was that with an inflexible three-zone system, and with a 5-cent fare in each zone or part thereof, rates of fare between Lawrenceville and either terminus would be exactly doubled, whereas the rate of fare for the through trip between Trenton and Princeton was increased only 50 per cent. Regular commuters between Lawrenceville and either terminus should not be required to bear a disproportionate increase in fare. Selling blocks of tickets, twelve for $1, would relieve the company from the necessity of collecting single cash fares of less than 5 cents, and inasmuch as the great bulk of travel on this division, estimated roughly to be 80 per cent or more, was through travel from one terminus to the other, this provision for block tickets good between Lawrenceville and either terminus would not very materially lessen the gross revenues of the company below what they would have been with three nickel zones and no overlaps or block tickets.

The board emphasized the fact that the increased fares were largely experimental. It was, however, in the interest both of the traction company and the traveling public that the advance in fare should not be so heavy as to tend to drive passengers to other avenues of travel.

NEW YORK ELECTRIC RAILWAY ASSOCIATION

The executive committee meeting of the New York Electric Railway Association was held in New York at the office of the American Electric Railway Association, 29 West Thirty-ninth Street, on Tuesday, Feb. 18, at 2 o'clock p. m.

Those present were W. H. Collins, president; H. M. Beardsley, treasurer; Charles C. Dietz, secretary, and Charles H. Smith, James F. Hamilton and Joseph K. Choate. Various matters were taken up, and it was decided to hold the next quarterly meeting at the Fort William Henry Hotel, Lake George, on March 11 and 12. The program will be announced later.

PUBLIC POLICY COMMITTEES IN CONFERENCE

Upon the initiative of the public policy committee of the National Electric Light Association and the invitation of its chairman, Arthur Williams, the members of the public policy committee of the American Electric Railway Association met the other committee at dinner at the Union League Club on the evening of Feb. 18. The event must be recorded as historical in many ways and cannot but be of value in shaping the future of the two industries for which these national bodies speak authoritatively.

The dinner was attended by President George H. Harries of the American Electric Railway Association and President F. H. Tait of the National Electric Light Association. The two public policy committees were very fully represented. From the National Electric Light Association the following members were present: Chairman Arthur Williams, E. W. Burdett, H. L. Doherty, C. L. Edgar, W. W. Freeman, T. E. Murray, S. Scovil and C. A. Stone, and from the American Electric Railway Association Chairman T. N. McCarter, Patrick Calhoun, O. T. Crosby, James H. McGraw and W. H. Heulings. In addition to these highly representative men there were present as representing important public utility systems or groups Frank Hedley, J. H. Pardee, H. G. Bradlee, E. A. Maher, C. C. Peirce, John W. Lieb, Jr., and C. Loomis Allen. Judge E. P. Matthews was also present, and the societies were represented by their respective secretaries, T. C. Martin and H. C. Donecker, while the dinner and other arrangements of the conference were in the hands of Walter Neumuller.

While for several years with increasing intimacy and relationship the two national bodies have been working together on matters of common technical interest, this was the first attempt to bring under joint consideration what may be termed the larger questions which affect the service of the public, the condition of employees and the attitude toward the new regulating element which has come into such active play in recent years in the shape of public service commissions. From time to time during the past six or seven years there have been tentative efforts toward co-operative consideration of these highly important matters, but this dinner is the first occasion upon which anything really definite has been accomplished, as before its close it was unanimously voted to form a joint committee of five, each association to select two from the sister body and these four members to elect the fifth. It was felt in this way that a harmonious, cohesive and useful joint committee could act and speak for both bodies whenever necessary, with unquestioned influence and at short notice.

The meeting was addressed during the evening by Presidents Harries and Tait and by Messrs. McCarter, Williams, Edgar, Hedley, Scovil, Maher and Burdett with an evident realization of the significance of the occasion. Toward the close of the evening attention concentrated upon the action of the National Civic Federation in framing a model form of public service commission and regulation bill which when complete is to be commended to states which have not yet placed their utilities under such a governing body. The feeling was generally voiced and unanimously approved that, while such efforts should necessarily have the cordial support of the two great associations, it was the duty of their public policy committees, and indeed of every member, to assist in the shaping of such measures that the greatest good should be secured alike for the public, the employee and the investor.

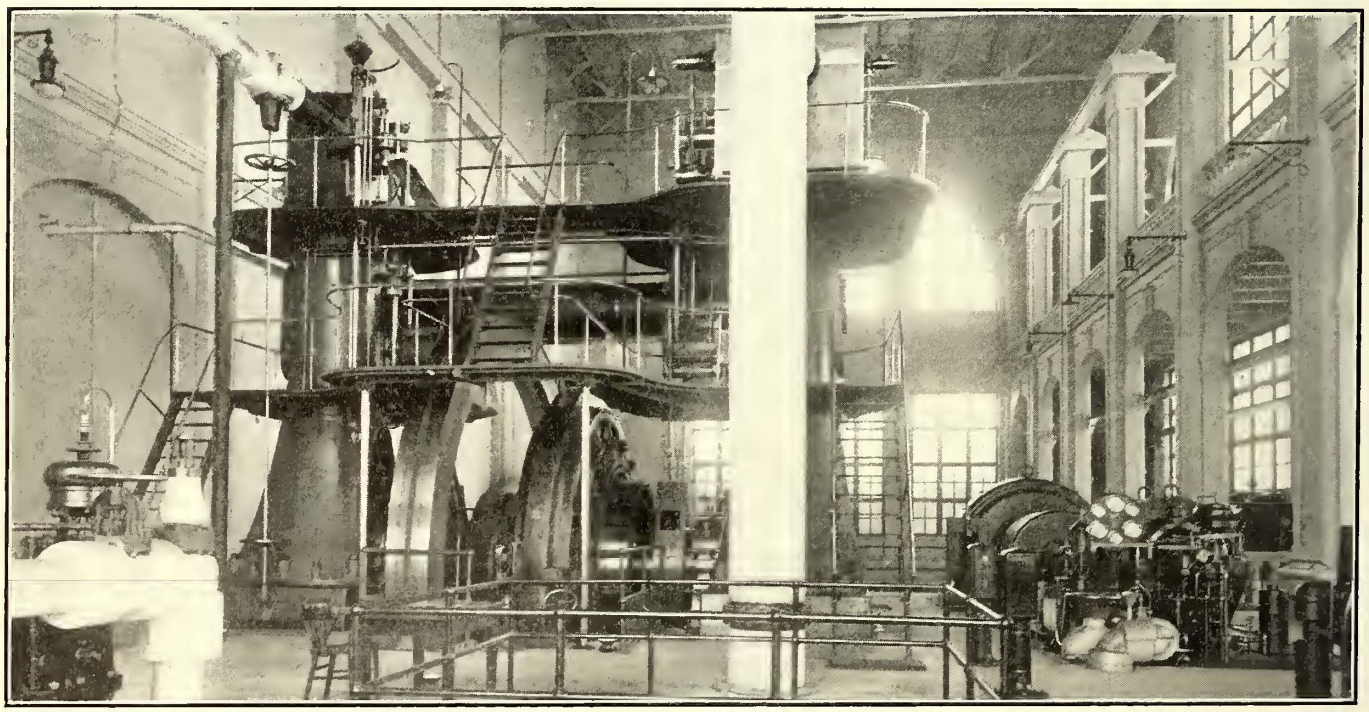
The dinner, which began at 8 o'clock, lasted until 1:30 a. m., and even then the interest in the general subjects of discussion was so great that it was with reluctance the party broke up. It is understoood that the joint committee will take form immediately and will at once assume the vital duties intrusted to it.

Direct-Current Turbo-Generators with Reduction Gears for Railway Service

A Description of the Two Types of Reduction Gears Which Have Recently Made the Use of the Turbine for Driving Direct-Current Railway Generators a Commercial Possibility—Examples of Existing Installations on Street Railways Are Cited

During the last decade the introduction of the steam turbine in this country has effected a practical revolution in methods of generating power. The high efficiency, low cost, compact form and practical freedom from repair charges of the turbine have met with prompt recognition in all quarters, and to-day it is exceptional to find any other type of prime mover installed, at least for the production of electrical energy in large amounts. The turbine is of course essentially a high-speed machine. Its design for low speed involves massive construction and a sacrifice of two of the most important advantages—low cost and small bulk.

Naturally a turbine coupled to an alternating-current generator makes a practically ideal combination, as both machines are at their best when operated at high speeds, but with a d.c. generator the turbine has been at a disadvantage. In the smaller capacities, and especially at low voltages, direct-connected d.c. turbo-generators have been in successful operation for some time, but limitations in speed have been imposed upon large units by the difficulties in designing commutators to withstand the centrifugal force set up at high peripheral velocities. This, together with the fact that the problem is complicated in 500-600-volt service by the excessive commutator diameters involved by the large number of bars, has practically kept the d.c turbo-generator out of the electric railway field. The advantages of the turbine are, however, so marked that persistent efforts have been made to develop a reduction gear which would be suitable for transmitting large amounts of power at the necessary high rotative speeds, and in this way make the turbine available for driving slow-speed apparatus.



Geared D. C. Generators—View in Engine Room of San Diego Electric Company Showing Relative Sizes of 1000-kw Geared Turbine and 1250-kw Engine, Both Driving D. C. Generators

THE FLOATING-FRAME REDUCTION GEAR

Up to the present time the commercial development of high-speed gears for turbines has resulted in the construction of two radically different types, both of which are successful. These are the rigidly aligned helical gears, as developed with the original De Laval turbine, and the more recent Westinghouse "floating-frame" helical gear.

The latter consists of a pair of pinions cut with right-hand and left-hand spiral teeth in the shaft which is supported in bearings, the bearings being integral in a single continuous block called the pinion-bearing frame. In the underside of this pinion-bearing frame three cylinders are cored out and accurately bored, one of them being located under each bearing. Into each cylinder extends a short stationary piston, resting upon a supporting pad which is part of the gear box or housing, and all three cylinders are equipped with interconnecting oil passages.

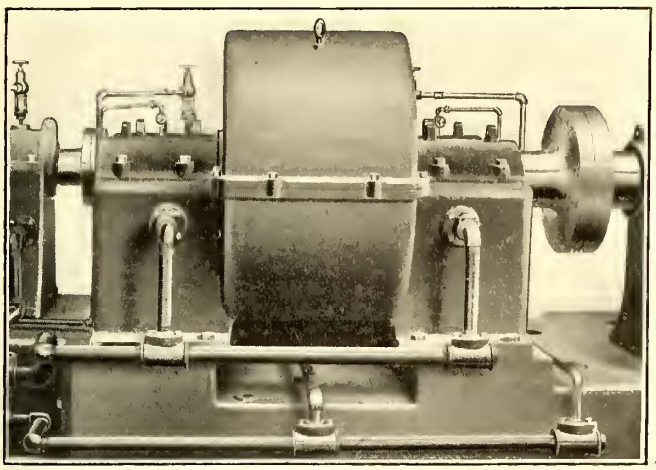
In service the cylinders are supplied with oil and the pinion-bearing frame is supported on these oil-filled cylinders, but the pinion frame can oscillate freely in a vertical plane, since the pressing down of one end of the frame simply causes the piston at that end to displace enough oil to raise the cylinder an equal amount at the opposite end. In effect, the pinion with its bearing frame and cylinders "floats" on the oil.

The opportunity for oscillation allows the pinions to shift their positions with respect to the gears in a vertical plane, and this permits the effects of microscopic irregularities in the spacing of the teeth in either one of the gears to be neutralized by the raising or lowering of the pinion in mesh with it.

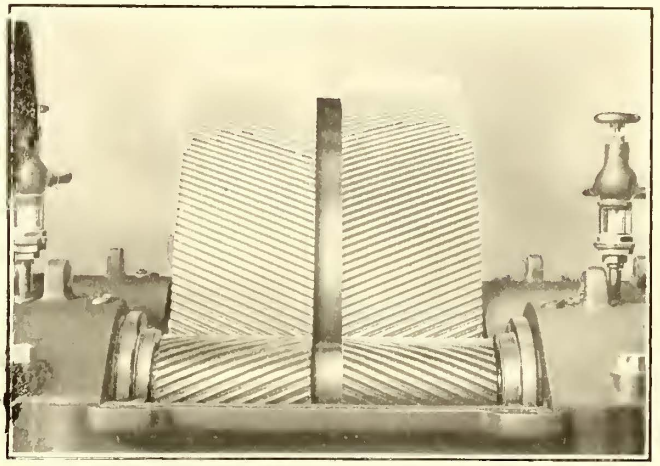
The oil cylinders can be readily piped to a pressure

gage and the oil pressure so indicated. This pressure gage when multiplied by suitable constants forms a convenient and reliable dynamometer, showing at all times the power transmitted.

Flexibility for the connection between turbine and pinion is obtained by the use of a flexible coupling, and in addition to this a slender turbine shaft extension is carried through the hollow pinion shaft, driving it through a connection at the end opposite to the turbine, and through its flexibility permitting wide variations in alignment. Vertical adjustment of gear and pinion is effected through variations in the quantity of oil contained in the cylinders over the pistons. Horizontal adjustment of the pinion shaft to bring the two pitch lines of gear and pinion in exact coincidence is effected by two horizontal screws, one at each end of the pinion-bearing frame, which may be run in or out by hand, thus moving the gears and pinions closer together or further apart. The toothed retaining wheels on the ends of these adjusting screws can be seen in the illustration on the following page showing the floating-frame gear with cover removed.



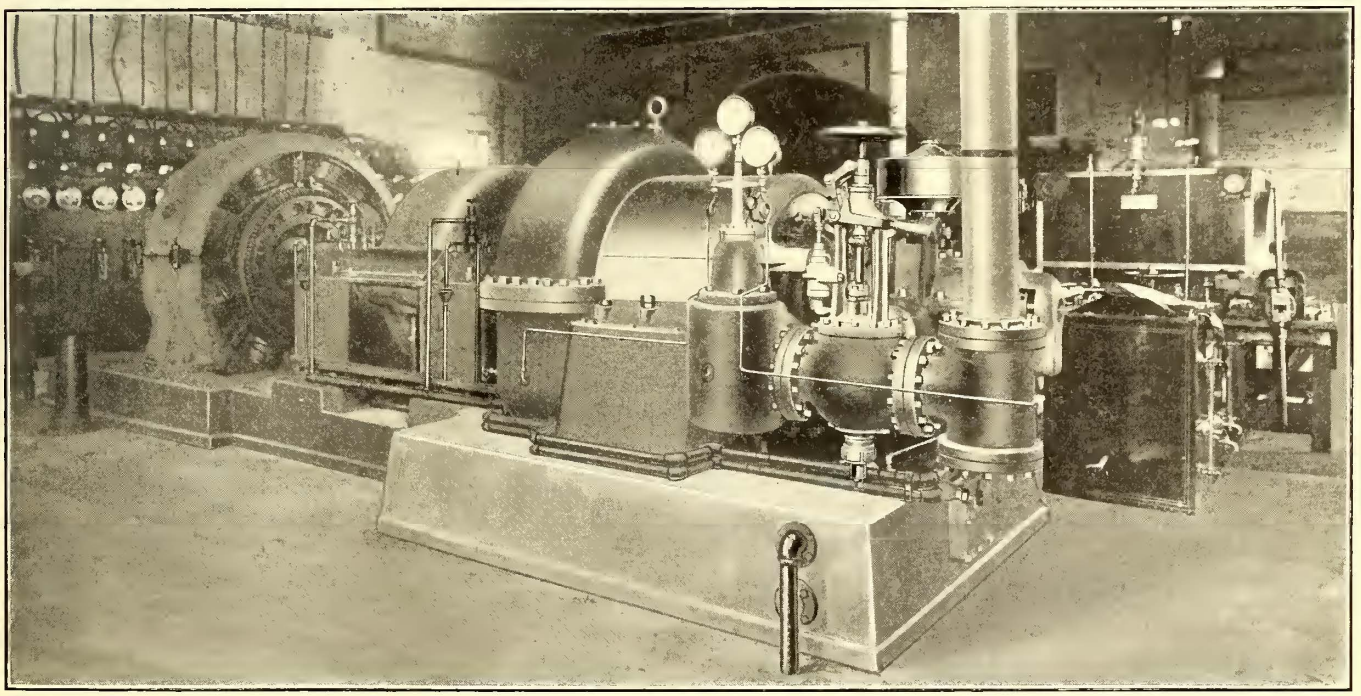
Geared D. C. Turbo-Generators—General View of Rigidly Aligned Type of Gear, Showing Casing and Oil Piping



Geared D. C. Turbo-Generators—Rigidly Aligned Gear with Cover Removed to Show Ends of Split Pinion Shaft Bearings

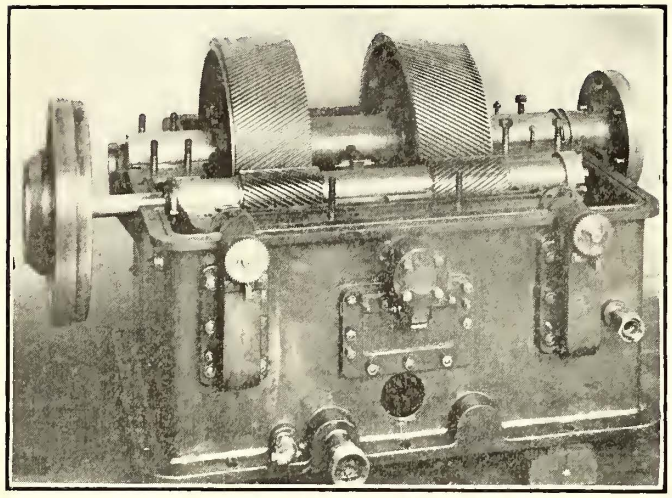
This type of reduction gear has been under process of development during a considerable period by the Westinghouse Machine Company. The first installations were made for the propulsion of ships, but later the possibilities of application to electric generation became apparent and about two years ago the first turbine driving a direct-current generator through reduction gearing was built. Since that time a considerable number of such units have been sold, and several have seen fifteen to eighteen months' service, affording a good opportunity for observation of their serviceability and operating characteristics.

The distinctive feature of the new gear is the maintenance of correct tooth contact whatever the exigencies of operation. Torsional strains, settling of foundations, misalignment and the like are automatically corrected in the gears themselves by the use of the flexibly supported frame which carries the pinion shaft, the latter being flexibly coupled to the turbine. The results of maintaining this correct contact will, of course, be high initial and sustained efficiency, quiet operation and minimum of wear and adjustment.



Geared D. C. Turbo-Generators—750-kw Unit Installed in Trenton Power Station of Trenton & Mercer County Traction Corporation

Of the first gears installed, eight are driving direct-current generators. Two of these units, of 1000 kw capacity, are at the plant of the San Diego Electric Railway Company. One of the turbines operates on high-pressure steam. The other uses the exhaust from a 1250-kw reciprocating-engine unit. The relative size of the engine and turbine, which are of equal maximum capacity, is shown by the



Geared D. C. Turbo-Generators—Floating Frame Gear and Casing with Flexible Shaft Couplings

illustration on page 326. The high-pressure unit is held as a reserve against extraordinary overloads and has, therefore, seen comparatively little continuous service. The low-pressure unit, however, has been in constant service since Sept. 1, 1911, carrying an average of about 600 kw and a maximum of 1250 kw with the usual violent fluctuations of railway service, swings of 700 kw having been observed.

At the Bridgeport power plant of the Connecticut Company there is another 1000-kw low-pressure unit using steam from a cross-compound Corliss engine previously operated condensing. This machine carries an average of 500 kw of street railway load eighteen to twenty hours per day.

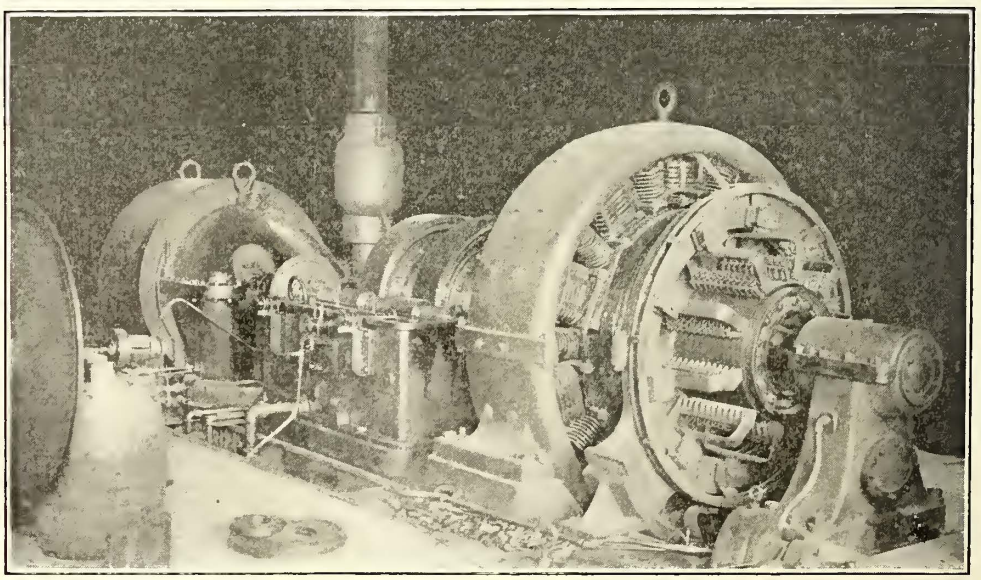
An inspection of all the gears of this type in service has recently been made. The significant facts developed are that they may be depended upon for continuous twenty-four-hour service, that they sustain their original efficiency and that adjustments are unnecessary except at infrequent intervals. On the oldest gear in point of service no appreciable wear has taken place, indicating that the function of the floating pinion frame, the equalization of pressure along the line of tooth contact, is being properly performed, and at the same time that the teeth are meshing with correct rolling action. Similar observations were made at each of the other installations, justifying the acceptance of this device as thoroughly standardized and reliable for even the largest sized units. Thus far the largest gear-driven d. c. generator in any service is one which has been installed by the Cleveland Illuminating Company and is rated at 3750 kw. This machine is driven through gears giving a speed reduction of 10 to 1, the peripheral speed at the pitch line being 4700 ft. per minute.

THE RIGIDLY ALIGNED GEAR

The use of geared turbo-generators in extremely small sizes is, as mentioned before, by no means new. In fact the gear drive was forced upon the builders of the original De Laval single-stage turbine on account of the abnormally high rotative speed, in some cases reaching 30,000 r.p.m., which was required to give sufficient speed to the buckets on the single wheel. While this type of turbine was limited to an absolute maximum capacity of about 700 hp, on account of the enormous centrifugal forces set up by the high peripheral velocities, its development afforded to its manufacturers many years of experience with high-speed gearing of the rigidly aligned helical type, and since the De Laval multi-stage turbine was developed for large powers the use of similar reduction gears with it has been a natural sequence.

This type of gear has helical teeth cut at such an angle that several of the teeth on both gear and pinion are always in contact and the transition of pressure from one tooth to the next is, in consequence, gradual. The tooth form is a true involute, and the teeth are cut by specially constructed hobbing machines to give an extreme degree of accuracy of pitch and uniformity for all teeth, the only finishing process being a polishing which merely removes the tool marks.

The gears are of the twin type, with spiral teeth inclined in opposite directions to neutralize end thrust, and the shafts upon which they are carried are held rigidly in the same plane and at the proper distance between centers by a heavy cast-iron gear case the bearing seats of which are finished only by a light scraping to preserve the alignment. A great deal of attention has been devoted by the designers to the matter of establishing and maintaining the gear and pinion in such positions that their pitch lines exactly coincide. This is accomplished by supporting the shafts of both gear and pinion in cast-iron shell bearings the exteriors of which are ground to limit gages and which in consequence fit exactly into recesses in the solid frame



Geared D. C. Turbo-Generators—1000-kw Installation of Connecticut Company at Bridgeport, with Gear Cover Removed

of the gear case. The interiors of the shell bearings are reamed to the size of the shaft, and they are scraped only enough to secure a full bearing area, thus providing opportunity to secure by mechanical means exact alignment and location of the pinion and gear shafts when they are resting in their bearings.

The bearings are babbitt-lined, the shell being tinned

before the babbitt is applied. The areas of the bearings are made unusually large to reduce the unit bearing loads to an exceedingly low figure, and the wear upon the bearings is in consequence reported to be negligible. However, when the inevitable wear does take place or in case the bearing is damaged, the makers do not countenance having it rebabbitted but furnish, instead, a duplicate shell bearing finished complete, which, on account of the interchangeability provided by the process of finishing to limit gages, can be slipped into place without necessity for hand work in the field.

The oiling system for the reduction gear provides a spray of oil projected on the gear teeth at the line of contact on the entering side, the pinion shaft bearings being oiled through gravity sight-feed oil cups and the gear shaft bearings by a ring oiling system. Circulation is assured through the oil pump, driven by a worm from the main shaft, which supplies the main turbine bearings.

These precautions to maintain alignment of gear and pinion were believed by the designers to be a necessity for the best economy with high-speed gearing, and a normal efficiency between 98 and 99 per cent is claimed for this arrangement by the makers. The method used to establish this figure is to measure the heat generated by the friction of the gears under load through observation of the temperatures and quantity of oil supplied and the temperatures of the gear case, which radiates a certain amount of heat depending on the difference in temperature between it and the surrounding air. The gears are reported to run invariably at temperatures only slightly higher than those in the turbine room and an oil-cooling device is not found to be necessary, thus indicating that the heat generated by friction is inconsiderable.

The gear case is made of a single heavy casting to hold the gear and pinion absolutely rigid in place and is supported on a heavy bedplate so that the opportunity for distortion is minimized. On both sides of the reduction gears, however, flexible couplings are installed to prevent strains on the shafts in case they should get out of line.

The life of the new type of bearing, as differentiated from that which used to be furnished with the original De Laval helical gear, is expected to be about ten years. None has as yet become sufficiently worn in service to call for replacement, the first one installed having been in operation for about three years.

The illustration on page 327 shows a 750-kw, 575-volt geared generating set installed in the Trenton power station of the Trenton & Mercer County Traction Corporation. A similar machine but of double the capacity, or 1500 kw, is now being installed in the same power station.

NOTES ALONG THE LINE

BY E. W. GOSS, SUPERINTENDENT MONTGOMERY TRANSIT COMPANY, NORRISTOWN, PA.

It is interesting to see the different ways in which different companies and their employees carry on construction and maintenance work. For example, a practice which seems to be quite general, in the fitting out of work cars, is to consider any old car or discarded equipment good enough, when in reality the cars and equipments should be the equal of any on the line. To have a gang of from fifty to a hundred men, more or less, depending on the old style of equipments and being held up for material frequently would easily pay a large return on the cost of modern cars and motors. Usually the passenger cars are fitted with whistles for blowing warning at crossings, and these cars run regularly, so that they are looked out for by the people using the crossings, while work cars come along with nothing but a discarded foot gong that can scarcely be heard the length of the car.

On many of the smaller and medium-sized roads, and on some good-sized roads too, the shop facilities are not suitable to take proper care of the cars. Such special wrenches and other tools as are necessary will always be found a profitable investment. The writer has in mind a carhouse where the entire track gang of about a half-dozen men were brought in from the roadway to assist the shopmen in changing a set of wheels under a car. Every time that a commutator had to be turned up, which was frequent, the armatures were rolled out on a plank and along the floor, and the shopmen then lifted them on to a car or wagon, and they were taken to a machine shop, where they suffered the same treatment. This operation took the best part of a day. The addition later of a few tools enabled the regular shop force to change a set of wheels in about half the time formerly required and also at a saving of the extra men. The armatures also are now handled without being rolled on the floor and are swung directly from the pit jack into the lathe, and the commutators can be turned up and the armatures quickly returned to their place with little manual labor.

The chipping of car wheels, when cast-iron wheels are used, is a serious problem to many roads. The steel wheel overcomes this trouble, but to the small road which does not have the facilities to do its own wheel turning the steel wheel means extra expense and work outside of the additional first cost of the wheels. A "one-wear" wheel for the small road is much to be preferred, and there is now an alloy for use in cast iron that will lessen chipping.

The trolley wheel also comes in for attention. The wheel placed in the harp on the top of a car hardly ever has the contacts and copper washers in place to help carry the current. In consequence the current has to go through the bushing, with the result that in a short time the bushing is burned and worn out of round, and a new one is required before the wheel is half gone. Trolley wheels should be replaced at the workbench where the repair man has the tools and the time to put them in properly. A large wheel with a wide groove has been found to be the most satisfactory and economical. A narrow-grooved wheel of large diameter is apt to come off the trolley wire at curves unless the curve has been carefully erected with a large number of pull-offs, although a wheel of small diameter will take the same curve on account of its lesser angle at the point of contact. When a change is made from a trolley wheel of small diameter to one of large diameter care should be taken to increase the tension in the springs in the trolley base sufficiently to overcome the extra weight of the wheel and harp. The springs in some of the older types of trolley stands will not allow enough tension to be put in them to provide for this increased weight, and in that case new stands must be installed. Trolley bases which are not fitted with a ball bearing or roller bearing must be oiled frequently, especially after a rain, because if the stand does not swing easily, the wheel will rub the wire so hard on the sides that it will come off, even on comparatively straight track.

For interurban and suburban lines the retriever for holding the trolley rope is much to be preferred to the catcher. The catcher requires the trolley pole to strike an arm or span wire to throw it down, and many times the wire is pulled down or the stand is pulled off the car, or both. Retrievers, when working properly, will pull the pole down at once, but sometimes they are condemned by crews and other operatives who do not understand them, and in some cases the devices are not properly installed.

Every road should provide itself with a good telephone system of its own, with telephones placed in boxes or booths at every switch. A competent man should be placed in charge at the central office to see after the running of the cars. He should be held responsible for this work and he should not have a lot of extra work to do unless he can drop it at any time.

Report on Cincinnati Terminal Possibilities

Bion J. Arnold Recommends Alternative Plans for the Erection of Individual Joint Terminals for Freight and Passenger Service Respectively, a Subway Line Using the Bed of the Miami & Erie Canal and Several Connections to Steam and Electric Lines

Bion J. Arnold has made a report to the Cincinnati Rapid Transit Commission on a proposed interurban railway terminal system for the city of Cincinnati. The commission was composed of William Cooper Proctor, chairman; W. A. Julian and Herman Schneider. It was appointed by Henry T. Hunt, Mayor of Cincinnati, in accordance with a resolution passed by the City Council. The letter of the commission to the Mayor, transmitting the report of Mr. Arnold, says in part:

"The problem presented to your commission and its expert was to devise a terminal system which would afford feasible connections for the interurban lines and insure rapid transit for these lines within the city limits. It was assumed, of course, that any plan presented would have to be financially possible. It was also a part of our problem to show the practicability of connections from the present termini of the various interurban systems to the terminal system, together with the cost of such connections; but we have not assumed these connections to be essential parts of the terminal system immediately to be built; they are really extensions of the interurban roads to the terminal, and whether they should be built by the city or by the interurban roads is a matter for future consideration.

"The canal right-of-way already acquired by the city offers a direct and almost level entrance to the business district through thickly settled portions of the old city and the newer manufacturing and suburban districts, north and northwest. The topographic conditions which seem, upon superficial observation, to present unusual difficulties in reality simplify the solution, for the right-of-way to be acquired is cheap, the streets to be crossed are few, there are few sewer and water pipes to be replaced, there are no streets to be torn up and resurfaced, and a private right-of-way insuring speedy and direct entrance for interurban and suburban cars is easily obtainable.

"The terminal system proposed is a two-track belt line (with four tracks on Canal Street) entering the heart of the business district, providing interurban entrance from any direction, except the southwest, and furnishing rapid transit from one suburb to another and from the suburbs to the business district, the cars moving in both directions around the belt line.

"We recommend the adoption of plan No. 4 or plan No. 5 submitted by Mr. Arnold, both of which possess the following basic essentials:

"1. A belt line from Canal Street through Mount Adams to Torrence Road, to Norwood, to Bond Hill, to St. Bernard, and thence through the canal to Canal Street. The estimated cost of this line, including right-of-way, tracks, stations, power plant and overhead expenses, ready for operation, but not including rolling stock, is $7,000,000.

"2. Two tracks throughout the system with a third track at stations for express service and four tracks from Twelfth Street south to Canal Street and west to Sycamore Street. Two tracks, with an automatic block system and a third track at local stations to permit the passage of express cars, will carry the traffic for many years. Four tracks in the Canal Street terminal will give ample station, storage and switching facilities.

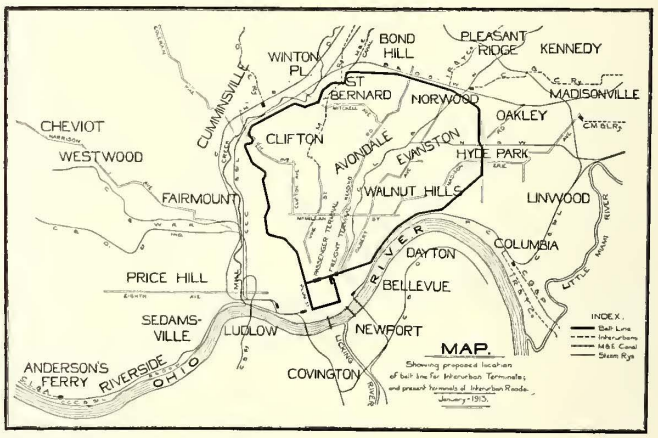
"3. An interurban subway passenger station on Canal Street between Sycamore and Plum Streets. Our recommendation is merely for a subway waiting room and ticket office at a point on Canal Street to be determined later. We see no necessity for an expensive surface station.

"4. An interurban surface freight station at Cheapside Street. The property upon which the freight station would stand is a part of the city's canal property. A surface station for freight has much lower operating expenses than a subway station.

"5. A covered subway on Canal Street from Broadway to Plum Street and on Plum Street from Canal Street to Liberty Street; the remainder of the two-track system on the canal right-of-way we recommend be in an open cut with a boulevard on each side. For reasons of comfort and economy, we recommend that the open cut be used as much as possible. Should the future growth of the city make a covered subway necessary north of Liberty Street, provision can be made by sinking fund to cover an additional mile, say, every ten years. A two-track open cut would still permit a 30-ft. boulevard on each side of it.

"Your attention is directed to an obvious extension of the system above described by means of a 'downtown subway loop.' This is not recommended as an immediate and essential part of the system.

"Your commission has given much thought to the franchise features of this project, but is not prepared at this time to present any recommendations; nor is it evident that the resolution of City Council contemplated such



Cincinnati Report—Map of Cincinnati and Environs, Showing Proposed Belt Line for Interurban Terminals

recommendations. However, if your honor desires to continue the commission in being, the commission will submit a supplemental report at a later date."

SUMMARY OF MR. ARNOLD

The letter of Mr. Arnold, transmitting the report, says in part:

"Owing to the rugged topography of the country surrounding the city of Cincinnati, the avenues of easy entrance are limited in number, and these have been already pre-empted by steam railroads and by city street car lines.

"There are at present nine interurban railway lines operating into and out of the city. The cars from five of these lines come into the center of the city over the local street car tracks, running from 3 to 8 miles over them at an average speed of about 6 m.p.h. In addition to receiving and distributing their regular interurban passengers within the city limits, these cars also operate as city cars. The cars of four of the lines stop at or near the city limits, and the passengers to complete their trip transfer to city street cars.

"The service to the suburbs is entirely 'local,' requiring

from forty-five minutes to one hour and fifteen minutes for a trip from 4 to 8 miles long from the city limits to the center of the city.

"On the lines of the city system the gage is 5 ft. 2½ in., and the five interurban lines operating over these tracks have the same gage, while the other four interurban lines have a standard gage of 4 ft. 8½ in.

"The interurban lines coming into the city have no common or other adequate terminal.

"At present several of the interurban lines are not paying a fair return upon the capital invested in them.

PRESENT NEEDS

"1. Adequate terminal located in the heart of the city.

"2. Rapid transit radial lines from this terminal to or near the city limits, thus forming a comprehensive terminal system which should be large enough to take care of present needs and be susceptible of enlargement to provide for future requirements.

"3. High-speed limited 'express service' to all suburbs, at least during the morning and evening rush hours. This means that all lines, both city and suburban, should have a uniform gage, or certain portions of the terminal system be provided with a double gage by using three rails, so that all lines could use the terminal system for 'express service,' in order that the capacity of the terminal system may be fully utilized and the investment in it justified.

"Rapid transit is one of Cincinnati's greatest needs, and its interurban lines must be financially successful if they are to fulfil their proper purpose, viz., the development of the territory in which they operate and the consequent growth and upbuilding of the city.

"I wish to emphasize the fact that the interests of the people of Cincinnati, the operators of the city system and the interurban companies are mutual, and that co-operation is necessary if the best results are to be obtained. Furthermore, the people have a right to demand the best possible service, but when the revenue from such service will not justify the expense necessary to secure it they should either be willing to pay more for the service or assist in providing it.

RECOMMENDATION

"If a comprehensive interurban and suburban terminal system for Cincinnati is built and the boulevard feature of the canal embodied, I recommend that it finally conform to plan No. 1, discussed in the report, consisting of the following elements:

"1. A subway terminal on Canal Street between Plum and Sycamore Streets, with a freight and passenger station located between Race and Walnut Streets. In this terminal provision is made for a terminal yard which, when completed, can if necessary embrace six tracks for a distance of nearly 2700 ft., thus providing ample storage capacity during the day for such interurban and city cars as may be needed to handle the morning and evening rush hour traffic.

"2. A double-track subway loop for receiving and distributing passengers in the downtown district extending on Plum Street from Canal to Fourth Street; on Fourth from Plum to Sycamore Street, and on Sycamore from Fourth to the terminal in Canal Street, with passenger stations located about midway of each side of the loop. This loop is to be provided with a suitable connection to the new steam railway passenger station when its location is definitely determined, and a connection for bringing in the interurban cars from Kentucky when required.

"3. A radial trunk line extending from the subway terminal on Canal and Sycamore Streets east to Carrel Street, where it connects with the Cincinnati, Georgetown & Portsmouth Railway, the Cincinnati & Eastern and the suburban divisions of the Interurban & Terminal Company.

"4. Branches extending northeast from Torrence Road to East Norwood, connecting there with the Cincinnati & Columbus Traction Company's line near where it crosses the Pennsylvania Railroad's Chicago line, and where the Rapid division of the Interurban Railway & Terminal Company and the Cincinnati, Milford & Loveland Traction Company will also make a connection.

"5. A four-track subway trunk line, occupying the site of the Miami & Erie Canal, extending from the terminals at Canal and Plum Streets as far as Queen City Avenue. At this point the subway construction will end and the trunk line will branch into two double-track roads, one continuing as an open-cut subway along the site of the Miami & Erie Canal to Carthage Pike, where it will connect with the Mill Creek Valley division of the Ohio Traction Company. About midway between Queen City Avenue and Carthage Pike the Cincinnati, Dayton & Toledo division of the Ohio Electric company will connect with this branch. The other double-track branch from Queen City Avenue will extend westward on a viaduct across the Mill Creek Valley and connect with the Cincinnati & Westwood Road at Fairmount, thence following the latter road to the city limits at Westwood, where the Cincinnati, Lawrenceburg & Aurora line can best be connected by the construction of a new line between Westwood and Cleves.

"6. If during the development of the interurban terminal system it should be deemed advisable to provide a belt line upon which could be operated high-speed cars for the purpose of connecting certain outlying districts of the city between which there are now no direct transit facilities, this can be accomplished by extending tracks along the canal bed from Carthage Pike, northeasterly, easterly and southeasterly, to a connection with the lines 'east of terminal' in the vicinity of Norwood.

"If it is found impracticable at the present time to finance the entire cost of the system as outlined in plan No. 1, to which might be added a belt line now or in the future, the belt line alone, together with the extension from Beech Avenue, Norwood, to East Norwood, as shown in plan No. 6, could be constructed at a greatly reduced cost, and if constructed would form the nucleus of the comprehensive interurban system of plan No. 1 and retain about 75 per cent of the revenue to be immediately expected from the latter. Branches to Westwood and Carrel Street and the loop in the downtown district could then be built when more urgently needed and when they could be more easily financed.

"The comprehensive plan when completed will provide ample terminal facilities and afford an entrance into the heart of the city for all existing interurban lines as well as for any other interurban lines that are likely to be built in the future.

"If this project is executed along conservative financial lines, the new life infused into the interurban systems will in all probability not only increase their earning capacity sufficiently to place them upon a paying basis but also remove one of the principal causes for the city's retarded commercial and corporate growth."

GENERAL CONSIDERATIONS

In his general discussion of the subject Mr. Arnold says in part:

"There are nine lines of interurban electric railways with an aggregate length of 342.85 miles of road operating out of Cincinnati.

"Five lines, having a total of 141.71 miles (including tracks of the city system over which they operate under a traffic agreement), come into the heart of the city—four lines having freight and passenger terminals on Sycamore Street, while the fifth line operates within the city as a part of the city street car system, being owned by the same company.

"Four lines, with a total of 201.14 miles, stop at or near the city limits, passengers transferring to city cars in order to reach the city. This transfer is made necessary

on account of the difference in gage, and not because of inability to make a satisfactory arrangement to operate over the city tracks.

"The city line and the five interurban lines operating over the city tracks have a gage of 5 ft. 2½ in., while the other four interurban lines have the standard gage of 4 ft. 8½ in. Taking the city lines into account, there are 362 miles of the broad-gage and 201 miles of standard-gage track.

"The cost of standardizing the gage will be considerable, but it seems to be ultimately inevitable, since any satisfactory solution of the rapid transit problem for Cincinnati must include suburban as well as interurban service. To accomplish this, the gage of all lines should be the same, and naturally the standard gage will be preferable, since this would allow through service over connecting lines to other cities when desirable.

"The interurban situation at Cincinnati shows a rather unsatisfactory condition. A comparison of the earnings of the various interurban lines does not indicate that the lines which reach the heart of the city over the city tracks have any great advantage over the lines which terminate at the city boundary and transfer business to the city cars. It is probable, however, that without an entrance to the city the lines which now have this advantage would show decreased earnings.

"In order to compare interurban business in Cincinnati territory with that in other cities, statistics have been compiled for Cincinnati, Columbus, Cleveland, Toledo, Fort Wayne and Indianapolis, showing density of population within a radius of 50 miles of each of these cities. [A summary of these statistics is given in Table I, published herewith.—Eds.]

Table I.—Density of Population Within 50-Mile Radii of the Cities Named

City	City Population	Radial Area, Square Miles	Population Outside of Municipal District	Population of Outside Area per Square Mile
[1]Cincinnati	363,591	7854	653,281	83
[2]Columbus	181,511	7871	542,653	69
[3]Cleveland	560,663	5069	567,958	112
[4]Toledo	168,497	6646	488,585	74
[5]Fort Wayne, Ind.	63,933	7866	499,502	64
[6]Indianapolis	233,650	7865	524,659	67

[1]Including Hamilton County outside city of Cincinnati, Kenton County outside of Covington, Ky., and Campbell County outside of cities of Belleville, Dayton and Newport, Ky.
[2]Including Franklin County outside of city of Columbus.
[3]Including Cuyahoga County outside of city of Cleveland.
[4]Including Lucas County outside of city of Toledo, and Wayne County, Michigan, outside of city of Detroit.
[5]Including Allen County outside of city of Fort Wayne.
[6]Including Marion County outside of city of Indianapolis.

"Statements showing earnings per mile of road for the various interurban lines and the average earning of all lines in each territory have also been compiled, based on reports to the Railroad Commission for year ended June 30, 1911, and covering earnings from all sources.

"In density of population the Cincinnati territory is second, with an average of 96 per square mile, while in average earnings Cincinnati is sixth, or the lowest, with $4,626 per mile of road.

"On a per capita basis, taking Cincinnati's earnings per mile of road as 100, the earnings in the various territories rank relatively as follows: Cincinnati, 100; Toledo, 143; Cleveland, 144.5; Columbus, 167.5; Fort Wayne, 169.5; Indianapolis, 177.4.

"It is not probable that the riding habit will differ materially in the various territories, therefore we must conclude that the poor showing of the interurban lines at Cincinnati is mainly due to the fact that they do not reach a suitable or common terminal within the city. It is also reasonable to conclude that the earnings are affected adversely when the interurban lines operate over city streets, and that a rapid transit entrance would increase the earnings.

"While it is true that under usual methods of analysis Cincinnati would be considered too small to justify the large expense necessary for an elevated road or a subway, it is also true that on account of the unusual topographical features of the place and the restricted area of the downtown district it may be considered an exception. Each year will largely increase the cost of building new radial lines to the suburbs, as the territory is building up rapidly, and in a few years the item of right-of-way alone will make the cost of constructing new lines on the surface almost prohibitive.

"A close study of the situation has convinced me that, with the canal site now available, steps should be taken with as little delay as possible to utilize it in such a manner as to constitute the nucleus of an interurban terminal, and my recommendations are based upon this conclusion."

USE OF CANAL

Mr. Arnold then proposes two separate plans for the use of the old Miami & Erie Canal, saying in part:

"Early in my investigation it was ascertained that use might be made of that part of the old Miami & Erie Canal which lies within the city limits, since it has been leased from the State for the city's use as a boulevard, and that under this lease there would be no objection to a subway under the boulevard. A subway along the canal will cost but little over one-half of what similar construction would cost in a city street where travel must be maintained, sewer, water, paving and buildings taken care of, and this, too, without taking into account the saving to the city on account of not having to fill the canal."

The estimated cost of plan No. 1 is $13,089,858, or $256,322 per mile of single track. The estimated cost of plan No. 2 is $12,704,617, or $251,089 per mile of single track. Methods by which these costs could be reduced are also outlined in the report. Mr. Arnold, continuing, says:

"After effecting all possible saving the initial cost of an adequate interurban terminal system will be large, so large that for a few years it will not be able to earn operating costs and fixed charges, and it would appear that the city is not yet ready for it, unless its citizens feel that the need for it is great enough to warrant an undertaking which will have to be carried for some time until it becomes self-supporting.

"The retarded growth of Cincinnati indicates that such a need exists. In 1880 Cincinnati was the eighth city in rank in population in the United States. In 1890 it had fallen to the ninth place; in 1900 to tenth place and, according to the census of 1910, it ranks thirteenth, having been passed by Pittsburgh, Detroit, Milwaukee, Buffalo, Cleveland and San Francisco since 1880. But for the fact that in 1898 Brooklyn lost its identity and became a part of greater New York, Cincinnati's rank to-day would be fourteenth.

"From 1880 to 1910 the population of Cincinnati increased 42.5 per cent, while in area the increase was 107.8 per cent.

"Taking all cities in the United States with a population of 25,000 and over, the increase for the last three decades is as follows: 1880 to 1890, 49.5 per cent; 1890 to 1900, 32.6 per cent; 1900 to 1910, 34.3 per cent. These statistics, taken from the United States census, show that Cincinnati's increase in population for the past thirty years has been only about 30 per cent of that of cities of its class and approximately the same percentage when compared with the increase of all cities with a population of 25,000 and over."

EARNINGS AND OPERATING COSTS

The section of the report dealing with probable earnings and cost of operation says in part:

"Taking into consideration the fact that this is a terminal system, the operating expenses of the terminal will be relatively low, because the car equipment, together with the expenses of operating the cars (exclusive only of power), will be furnished by the companies using the term-

inal and not by the terminal company itself. For this reason, I believe the distribution of charges shown in Table II, published herewith, measured in per cent of the first cost of the property, may be considered applicable to the first year of paying operation, which will occur about 1923 for plan No. 1, assuming the terminals are completed and placed in operation by the year 1914.

TABLE II.—DISTRIBUTION OF EXPENDITURES; PER CENT OF FIRST COST OF PROPERTY

1. Operating expenses including (a) accidents, (b) taxes, (c) maintenance, (d) depreciation reserve.	3.87
2. Fixed charges	4.00
3. Reserve for amortization fund which will retire the investment in a reasonable period, assumed in this case to be fifty years.	1.00
Total per cent of first cost	8.87

"This distribution shows that it will be necessary for this property to earn at least 8.87 per cent on an investment cost of $13,089,858 in order to become self-supporting; that is, a total annual income of $1,161,504.

"These earnings are to be derived from a fixed terminal rental assumed as 25 cents per car mile, and the total volume of car traffic for this year (1923) was estimated as 4,600,000 car miles. On the basis of the present annual car movement, all lines tributary to the terminal property would aggregate slightly over 2,000,000 car miles, from which terminal earnings may be derived. This present car traffic is, therefore, less than half of the amount required to support the investment, including taxes and amortization charges. The interurban lines could hardly be expected to pay over 25 cents per car mile, especially during the early lean years. Possibly a sliding scale of charges might be installed by which a higher rental would be justified after the properties have begun to pay well, but again these charges would have to be reduced when the volume of traffic became remunerative, so that, all things considered, an average fixed rental of 25 cents per car mile for a city the size of Cincinnati is the most reasonable figure upon which to base these estimates.

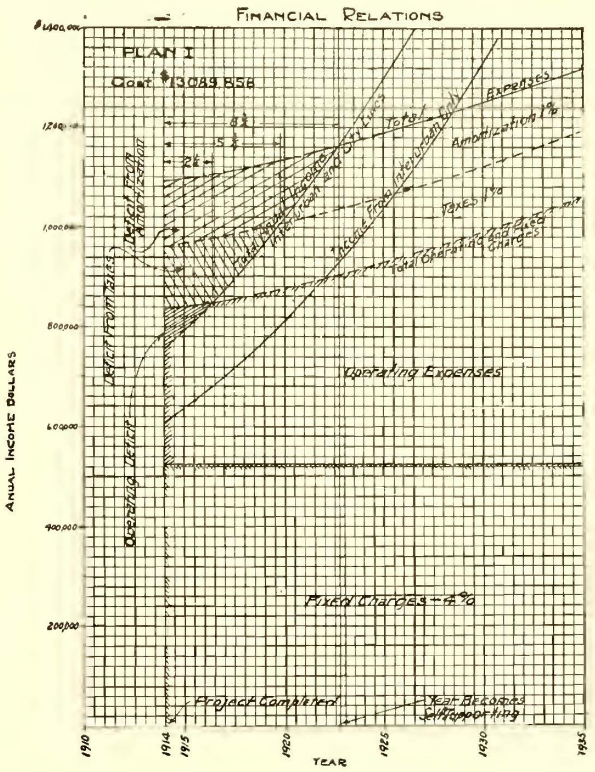
"Included in these earnings is a certain proportion of earnings from high-speed suburban lines of the city system, provision for which has been made in the interurban terminals. It may be confidently expected that there will be a demand for this improved service between city and suburbs which the city lines are not now in position to furnish, and which they cannot afford to ignore as soon as facilities are offered them. Even though express service to the suburbs is maintained only during morning and evening rush hours, this would in all probability add 25 per cent to the revenue to be derived from interurban traffic, which increase has been incorporated in these estimates.

"In all previous estimates of probable income no revenue has been considered from light freight and express business handled by the terminal, except on a car-mile basis, viz., 25 cents per car mile. This I consider a most conservative basis, for it is entirely probable that after the terminal has been in operation long enough to enable this light freight and express business to become well established it will be possible to make an additional charge for terminal service over and above the car-mile rate, and the revenue derived therefrom will materially exceed the cost of handling; consequently, the net earnings will exceed those estimated herein.

"All of the above discussion is based upon the assumption of a complete operating property aggregating $13,089,858 in investment cost, known as plan No. 1. If the complete terminals are not built at the start but various opportunities for reducing first cost are taken advantage of, the fixed charges will obviously be reduced and the operating ratio to fixed charges will be materially changed. Thus, plan No. 1-A, the most simplified of those presented, costing $8,491,803, will only require earnings amounting to $830,000, or 9.78 per cent of the investment, to become self-supporting, which will occur in the year 1916, or a little less than two years after the completion of the terminals.

"Referring to the graphical analysis, published herewith, each of these projects will begin to pay after the expiration of a certain non-earning period, the length of which depends entirely upon the relative investment incurred. In order to show this relation of non-paying periods to earnings, plan No. 1 has been illustrated as typical, the maximum investment of the complete project has been assumed and the minimum investment is taken.

"The probable income of the system has been estimated upon a basis of an increase of 5 per cent per year com-



Cincinnati Report—Graphical Representation of Future Earning Power of Proposed System

pounded. This will probably be too high a rate if projected many decades into the future, but within the period shown it is conservative at least for the first ten years. It is further assumed, and I believe conservatively, that this interurban business will increase over present business about 10 per cent immediately upon the opening of the terminal property.

"Referring to the curves in the illustrations, the point of intersection of the curve 'total income from interurban and city lines' and that of 'operating and fixed charges' indicates the end of the period of operating deficit only, which deficit will accrue for a period of two years in the case of the complete project, No. 1.

"If tax assessments are levied, a deficit will occur for five and three-quarter years in the case of plan No. 1.

"If amortization reserve is charged against the project from the beginning, a deficit will exist for eight and three-quarter years in the case of plan No. 1. However, beyond the maximum terms, it is estimated that the property will begin to accumulate a continuous surplus which may be used to offset the deficits of the early years.

"In the case of a property of this permanent nature whose function is so beneficial to the entire city, it would seem quite justifiable for the city to relieve the property during the early years of the burden of amortization and

possibly of taxes for the entire period. In the above engineering estimates taxes have been included in order that the project may 'stand upon its own feet' and the true financial results therefrom may be apparent. However, as a municipal project the elimination of taxes would evidently constitute a considerable relief. Similarly for an amortization reserve of so long a period as fifty years it would be entirely proper to defer the annual payments for a few years until the property has begun to pay for itself. Any relief from amortization charges during the early years will operate to increase the annuity rate during the later years, but this is not considered serious, as the property will in all probability rapidly accumulate surplus after the first eight or ten years' operation.

"On the other hand, if the project is found to be one which the city does not itself undertake, and private capital is willing to undertake it, conditions as regards taxation and amortization should be made liberal enough to insure that both the construction and operation of the property shall be commercially feasible. At the same time, the city should unquestionably retain effective control and supervision of the project from the date of its inception.

PRESENT FINANCIAL STATUS OF INTERURBANS

"Table III, published herewith, shows the percentage of increase or decrease in operating results for all of the interurban roads operating out of Cincinnati for the year ended June 30, 1908, and the year ended June 30, 1912.

Table III.—Percentage of Increase or Decrease in Operating Results

	Year Ended June 30, 1908	Year Ended June 30, 1912	Per Cent Increase
Miles of road	353.09	356.19	0.88
Passengers carried	12,645,029	14,946,878	18.20
Passengers per mile of road	35,812	41,963	17.18
Passenger revenue	$1,250,645.81	1,425,880.76	14.01
Freight revenue	154,229.75	238,842.69	54.86
Total transportation revenue	1,404,875.56	1,664,723.45	18.50
Average fare per passenger	0.0989	0.0954	*3.54
Transportation revenue per mile of road	3,978.80	4,673.70	17.47
Passenger car miles	5,529,320	6,428,241	16.26
Freight car miles	487,212	767,997	57.63
Total car miles	6,016,532	7,196,238	19.61
Passenger revenue per passenger car mile	0.2262	0.2218	*1.95
Freight revenue per freight car mile	0.3166	0.3110	*1.77
Total transportation revenue per total car miles	0.2335	0.2313	*0.94
Passengers carried per passenger car mile	2.29	2.33	1.75
Total car miles per mile of road	17,040	20,203	18.56

*Decrease.

"For the three years from 1909 to 1912 the business of the Indianapolis interurban terminal increased as follows: Passengers carried 24.4 per cent; passenger trains 30 per cent; freight trains 27.6 per cent. At Cincinnati from 1908 to 1912 the increases were as follows: Passengers carried 18.2 per cent; passenger car miles 16.3 per cent; freight car miles 57.6 per cent. This comparison shows that interurban lines at Cincinnati are suffering from the lack of adequate terminals.

"The ratio between the revenue 'per mile of road' and 'per car mile' is the 'car miles per mile of road' or the 'density factor.' The line with the smallest earnings per car mile shows the largest revenue per mile of road because it makes the largest use of its tracks, while the line with the largest earnings per car mile has the next to the lowest revenue per mile of track, owing to the fact that its use of its tracks is very small.

"Neither of these particular conditions is satisfactory; With low earnings per car mile and large mileage per mile of track the platform expense will be disproportionately large and therefore a heavy burden. Neither will the large earnings per car mile of the other line offset the loss occasioned by the infrequency of its service, which shows that its tracks are not being utilized to an extent that will afford sufficient revenue, and therefore the fixed charges will in this case become a burden.

"In Table IV are shown the 'car miles per mile of track,' 'gross revenue per car mile,' 'operating expenses per car mile,' 'net revenue per car mile,' the operating ratio and also the rank of each group of lines as to each of these items.

"In use of their tracks, i.e., density of car traffic or

Table IV.—Operating Statistics of Interurban Lines of Various Cities.
Year Ended June 30, 1911

Cities	Car Miles per Mile of Road	*Gross Revenue per Car Mile, Cents	Operating Expense per Car Mile, Cents	Net Revenue per Car Mile, Cents	Operating Ratio, Operating Expense to Gross Receipts
Cincinnati, Ohio	19,382	23.33	15.17	8.16	65.0
Columbus, Ohio	18,981	29.34	18.30	11.04	62.3
Cleveland, Ohio	25,210	30.98	16.76	14.22	54.1
Toledo, Ohio	16,096	31.67	18.14	13.53	57.3
Fort Wayne, Ind.	20,252	25.82	15.57	10.25	60.3
Indianapolis, Ind.	18,034	31.77	18.12	13.65	57.0
Average	19,578	29.83	17.23	12.60	57.7

*Revenue from all sources.

'density factor,' the Cincinnati interurban lines rank third although they are but 1 per cent below the average of all lines, which shows that in this one respect they are about normal.

"In 'operating expense per car mile' the Cincinnati lines rank first, but their 'gross earnings' and 'net earnings' per car mile rank sixth. In net revenue they show but 65 per cent of the average of all lines of the cities enumerated.

"In 'net revenue per car mile' Cleveland ranks first with 14.22 cents, with Indianapolis second at 13.65 cents, but it must be remembered that in the Cleveland territory there are 112 people to the square mile, while at Indianapolis there are but sixty-seven.

"Finally, in regard to operating ratio, Cincinnati ranks sixth, the same as in 'relative net revenue per car mile.' In other words, its roads occupy the lowest position as earning properties.

"The only conclusion to be drawn from the foregoing statistics is that unless some relief is afforded them the interurban lines will continue to be financially unproductive and therefore unable to do their share in developing and building up the territory in which they operate. These interurban lines are entitled to earnings which will not only show a good return on the capital invested but also keep the properties in first-class physical condition, otherwise they will not fulfil the purpose for which they were built."

ALTERNATIVE PLANS

In the concluding section of the report alternative plans are submitted with the statement that, if concessions are made in the conditions mentioned for plans Nos. 1 and 2, a terminal system may be built at a lower cost than the plan involving all of the features recommended by Mr. Arnold. The alternative suggestions are designated as plans Nos. 3, 4, 5 and 6. Under plan No. 3 the estimated cost is $10,608,075, or $221,694 per mile of track, while further modifications are outlined which would reduce the cost below that figure. The estimated cost of plan No. 4 is $6,478,940, or $203,894 per mile of track. Plan No. 5 involves an estimated cost of $6,926,053, or $203,900 per mile of track. Plan No. 6 shows an estimated cost of $7,055,680, or $204,060 per mile of track. Concerning plans Nos. 4 and 5, which, as shown in the foregoing, are recommended by the Cincinnati Rapid Transit Commission, Mr. Arnold says:

"Plan No. 4, at a cost of $6,478,940, should begin to accumulate a surplus in three and three-quarter years after the project has been completed, with interest at 4 per cent, or in six and one-quarter years at 5 per cent. At the end of three and three-quarter years the accumulated deficit would be about $195,000, and it should require the surplus for three and one-half years to cover this deficit.

"Plan No. 5, at a cost of $6,926,053, shows a deficit for five years with bonds at 4 per cent and for seven and one-half years at 5 per cent. The deficit at the end of five years should amount to approximately $305,000, which should be eliminated by the surplus during the next four and one-half years."

COMMUNICATIONS

T-RAIL CONSTRUCTION IN PAVED STREETS

Kentucky Traction & Terminal Company
Lexington, Ky., Feb. 5, 1913.

To the Editors:

I have read with interest the article on page 61 of the Electric Railway Journal of Jan. 11, relative to the matter of paving between the rails on the Illinois Traction System, and also the article on page 209 of the issue of Feb. 1 by A. Swartz.

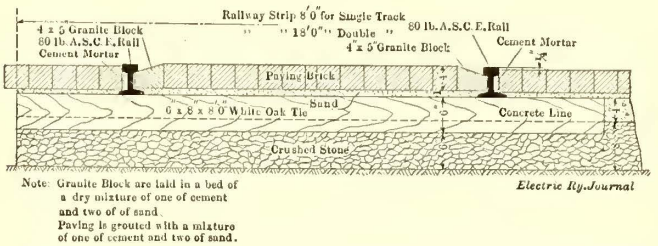
This company's construction prior to 1911 was practically the same as that described as the standard T-rail construction in paved streets of the Illinois Traction System, with the exception that we carried the concrete 6 in. below the tie instead of surfacing on gravel as in the Illinois Traction plan. Our method of laying the brick pavement was identical with that which is recommended in the Illinois Traction System article. On Jan. 1, 1911, we abandoned this plan because we found that the brick which was carried under the head of the rail, and which of necessity took the wheel wear of all the vehicular traffic, wore out and gave way in the course of three or four years. This allowed water to get into the sand cushion, and during the cold weather of the winter it lifted the remainder of the paving, thereby destroying its value. We also found that the plan of carrying the concrete below the ties made the track construction so rigid that bright spots on the receiving rail and general destruction of the joint occurred much more quickly than we believed would be the case if a more flexible form of construction was used.

In view of these defects we laid several miles of paving in this city in 1911 according to the method illustrated by the accompanying illustration. This construction consisted in first rolling the sub-grade with a 10-ton road roller and spreading over the sub-grade 6 in. of broken stone, which was then compacted by being rolled with the road roller. On this as a foundation were laid 6-in. x 8-in. x 8-ft. white oak cross ties, which carried the track of 80-lb. A.S.C.E. rail. The track was surfaced by tamping under the ties, during preliminary operation, about 2 in. of broken stone. This broken stone was carried to a point between the ties 2 in. above the base of the tie or 4 in. below the base of the rail. After about two weeks of operation, during which time inequalities of surface were tamped out as they showed up, a 4-in. layer of concrete was laid between the ties, up to the base of the rail, and over this was spread evenly a sand cushion on which the pavement was placed.

Lexington Track—View of Standard Pavement Between T-Rails

This paving consisted of 4-in. by 5-in. specially cut red Missouri granite blocks laid next to and extending under the head of the rail. This block was laid in a bed composed of a dry mixture of one part of cement and two parts of sand. Between these blocks standard vitrified paving bricks were laid parallel with the rail, so that the tops of all the bricks were level with the top of the rail. On the outside of the track and in the devil-strip the bricks were all parallel with the rail and ¼ in. below the top. The entire paving was grouted with a mixture composed of one part of Portland cement and one part of sand.

This structure was laid in the spring and summer of 1911, and up to this writing we have found absolutely not one case of failure in the track or in this paving. We have



Lexington Track—Section of Standard T-Rail Construction

been unable to discover a single crack in any of the paving blocks, notwithstanding the fact that the winter of 1911 was very cold, the thermometer on several occasions being below zero, with a minimum of 17 deg. below. The granite blocks are taking the wear of the vehicular traffic without any appreciable depreciation.

The accompanying halftone, from a photograph taken Feb. 1, 1913, shows a section of this track on Main Street in the city of Lexington. This track is used not only by the cars of all the city lines, but also by the 35-ton cars of the four interurban lines entering Lexington. You will note that we use no drain tile in the center of the track, such as is used by the Illinois Traction System, because our subsoil is of a gravelly clay nature and is self-draining.

George MacLeod, Chief Engineer.

CONSTRUCTION OF AMERICAN AND PRUSSIAN ACCUMULATOR CARS

Accumulatoren-Fabrik Aktiengesellschaft
Berlin, Jan. 27, 1913.

To the Editors:

The information given by Le Roy Scott in the Electric Railway Journal for Aug. 31, 1912, which has but recently come to my attention, is undoubtedly of great interest on account of the figures which he presents relative to the self-propelled cars of the American railways on which Edison batteries are employed. It will probably be of interest to many of your readers to compare his figures with the corresponding ones on the cars of the Prussian State Railways, the batteries of which have been supplied by my firm, the Accumulatoren-Fabrik Aktiengesellschaft, Berlin-Hagen.

The Beach-Edison cars show an energy consumption of 31 watt-hours per ton mile, which is equal to 18.8 watt-hours per ton kilometer on the level. Mr. Scott expresses the opinion that the special design of the car axles is responsible for the low figures. He will therefore be interested to learn that the average energy consumption of the accumulator cars of the Prussian State Railways is less than 18 watt-hours per ton kilometer, and that many of them run on tracks with steep up-grades and frequent stops. The cars in question have the standard design of axle which is usual on European railways.

Mr. Scott is undoubtedly right in asserting that there is no reason why accumulator cars should not be able to take up-grades. It is not at all clear why up-grades should tend to prevent such operation, for it is only a question of employing motors of the right size. The effect of steep gradients on the accumulator car is simply a corresponding decrease in the radius of action. Of course, when up-grades are taken, the voltage of the accumulator sinks in proportion to the increase in the discharging current. Mr. Scott will probably agree with me in saying that in this case the lead accumu-

lator has a considerable advantage over all alkaline batteries, because the voltage of the former does not sink at anything like the rate that it does in the latter. It follows naturally that the car fitted with alkaline cells can take upgrades only at a much lower speed than one fitted with lead cells. This is also the reason why electric automobile users in Europe have dropped the Edison accumulator in a number of cases and taken up the lead accumulator again.

Mr. Scott also states that a trial car developed a capacity of 280 miles in eighteen hours, when charged only four hours during the night at the normal rate and for four hours intermittently during the day at an increased rate. He points out that this method of charging is one of the important features of the Edison battery. As a matter of fact, however, this practice is also very frequently employed in Europe in connection with lead accumulators having large-surface positive plates, and it is also followed in the case of the self-propelled cars of the Prussian State Railways when the working conditions demand such treatment. The normal charge in the latter case is only two hours compared to four hours for alkaline batteries.

At this point I would like to rectify an error made by Mr. Scott with regard to the first cost of the Prussian accumulator cars. They do not cost $20,000 but only $18,000 each. It is a pity that Mr. Scott does not state what the battery in the Beach-Edison car costs. It would have been most interesting to know this figure, as all calculations have hitherto shown that on account of its high price the Edison accumulator cannot be seriously looked upon as an earnest competitor in European acccumulator car work even when we neglect its high internal resistance and its excessive voltage drop at starting and when taking up-grades. Knowledge of the price is also important in order to judge the probable cost of maintenance, for Mr. Scott does not by any means clearly show how he arrives at 0.8 cent per car mile.

One must bear in mind that it is not such an easy matter to compare the life of a lead accumulator and an Edison battery. In the case of the lead accumulator for self-propelled cars about 40 per cent of the first cost is accounted for by the high value of the hard-rubber jars, which are subject only to minimum wear and tear, that is to say, breakage during battery repairs and in collisions. The replating of a battery is also an inexpensive matter, especially when one considers that the old plates can be employed again as raw material for making new ones. It is therefore possible for the contracting firm to carry out the maintenance at a comparatively low figure amounting to 8½ pfennigs per car-kilometer (3.4 cents per car mile) including a maintenance man, or somewhat more than 6½ pfennigs per car kilometer (2.76 cents per car mile) without a maintenance man.

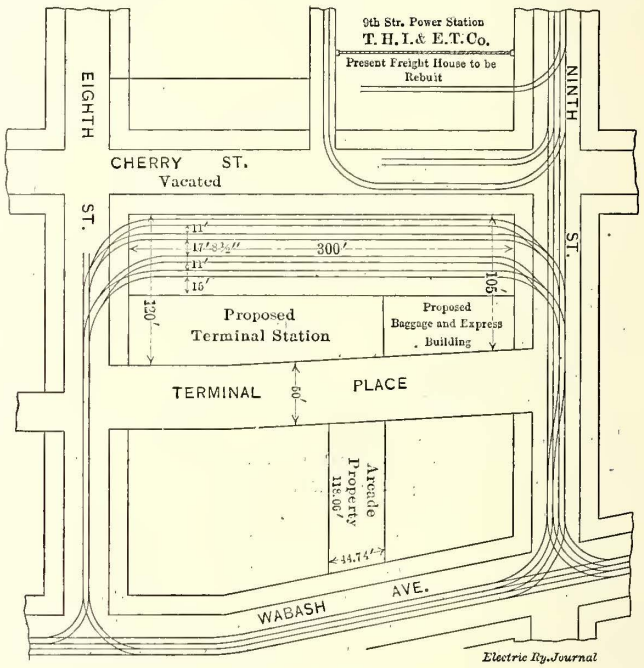
In the case of the Edison battery, however, a complete renewal of the battery is undoubtedly necessary, so that when the original one is worn out the entire first cost must be duplicated.

Mr. Scott calculates the maintenance expenses of the battery at 0.8 cent per car mile, including an item of 0.2 cent for battery maintenance, flushing, etc. It therefore follows that 0.6 cent remains for mere cell repairs. This figure is given under the condition that the battery is renewed after four years of service, with an output of 130 miles to 170 miles per diem. Taking 150 miles as the mean daily output and 330 working days per annum, we get a total output of 200,000 miles within four years, after which time the battery will require renewal, according to Mr. Scott's own statement. As he reckons 0.6 cent for battery renewals, it follows that 200,000 times 0.6 cent, or $1,200, represents the cost of replacing a battery. If we allow 10 per cent to 15 per cent of this figure for the value of the old material, we find that the new battery must cost about $1,400 to $1,500. Mr. Scott has therefore based his calculations on an extremely low price for the battery. This price is only a small fraction of that hitherto demanded by Mr. Edison. I can only assume, therefore, that Mr. Scott's figure of 0.8 cent per car mile is erroneous. It would be extremely meritorious of Mr. Scott if he would clear up the matter somewhat by giving more detailed particulars.

Dr. A. Büttner.

PROPOSED TERMINAL OF TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY AT TERRE HAUTE, IND.

A comprehensive interurban terminal layout for the Terre Haute, Indianapolis & Eastern Traction Company at Terre Haute, Ind., is now in the construction stage. A block of property 155 ft. by 300 ft. just outside the business district has been purchased for this purpose. To provide proper approaches to this property and at the same time segregate the terminal traffic from vehicular traffic between Eighth and Ninth Streets, between which the terminal property lies, Cherry Street, a 65-ft. cross street adjacent to the property, has been vacated by the city. In its place the alley separating the terminal property from the rest of the



Plan of Terre Haute Terminal Property and Track Arrangement

block has been widened to 50 ft. to provide a driveway to the proposed terminal station and baggage and express building. An attractive entrance to the terminal property has been provided by the purchase of a 44-ft. lot fronting on Wabash Avenue, one of the principal business streets, and the building of an arcade building on this property. This arcade building is two stories high and occupies the entire property, 114¼ ft. deep. It has a glazed white terra-cotta front, and the space on each side of the arcade has been arranged for a number of small shops.

The terminal property and trackage are shown in the illustration. At the present time the tracks are in place and are being used for passenger and freight terminal purposes. A remodeled store building, situated at the Ninth Street end of the property, serves as a passenger station. The express and freight station occupies the northwest corner of Ninth and Cherry Streets. This building formerly served as a carhouse and was partially remodeled into a freight house some time ago. The present traffic has outgrown these quarters, however, and further additions and remodeling are contemplated.

The existing trackage includes four tracks on the termi-

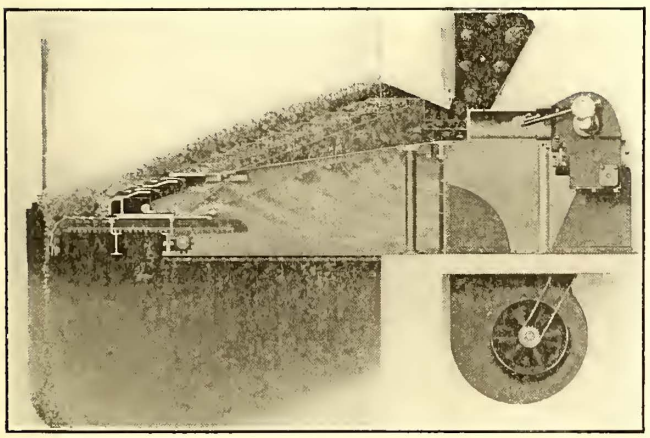
nal property, and these tracks are being used for storage of passenger and express equipment. The two tracks in Cherry Street are being used as team tracks for car-load freight, and one also serves as a lead to the coal track which reaches the old power station directly north of the freight house. This old station is being held in reserve in case of an emergency shutdown at the new generating station. The boiler equipment, however, is connected to the steam-heating system which this company operates, and it requires firing during the winter season.

The existing schedules on interurban lines operating in and out of Terre Haute include eighty trains each way. Four lines enter the city from as many different directions and serve the territory between Terre Haute, Clinton, Indianapolis and Sullivan, Ind., and Paris, Ill. An average of 5000 passengers is handled at the proposed terminal each day. Express and freight service include two express trains handling United States Express Company's business and eight scheduled freight trains which receive and deliver less than car-load shipments. As stated, the arcade building is complete, and it is contemplated that the terminal building, plans for which have been prepared, will be erected in the near future.

A NEW TYPE OF UNDERFEED STOKER

The Sanford Riley Stoker Company, of Worcester, Mass., has just placed a new type of mechanical stoker upon the market after a year of operation of trial installations. The most conspicuous difference between the new stoker and the usual underfeed type is that it has moving fuel-bearing grates in place of stationary tuyères, and moving overfeed grates extending across the entire width of the furnace. These moving grates carry the fuel down an incline of about 20 deg. The positively forced feed, made up of the combined motion of a plunger in the retort and the moving grates, distributes the coal evenly. The nearly uniform thickness of fuel insures active combustion over the whole fire surface by providing a much freer and more uniform passage of air through the coal than is possible when the coal heaps in large masses with adjacent thin spots.

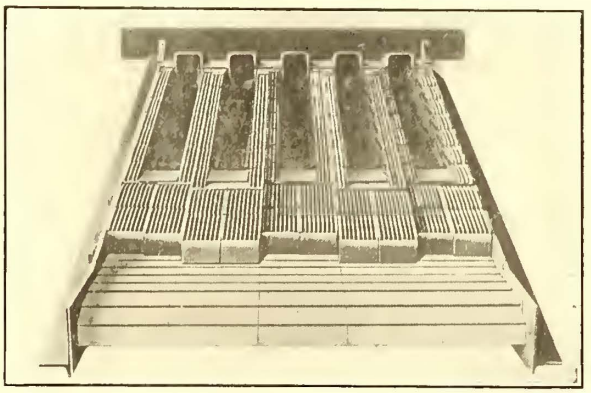
The discharge of refuse is continual and automatic, not periodic, thus avoiding the discharge of large masses of fuel with the refuse. At the lower end of the overfeed grates are pusher noses which force the refuse slowly but continuously toward the bridge, then on and over the ash-supporting plates, which are hinged together in the form



New Underfeed Stoker—Sectional Side View

of an apron. The plates of this apron hang down over the ends of a rack which controls the size of the opening and is adjustable by hand power. The discharge capacity can be regulated by the amount of travel given to the pusher noses. The discharge of refuse is at such a rate that the fuel is thoroughly burned out and practically cold before discharge.

The new stoker is reported to be able to break up all clinkers. The continual reciprocating motion of the moving grates, which is in opposite directions for adjacent retorts, forms a shearing line between each pair. This action prevents the formation of clinkers above the air openings. The crusher action of the pusher noses at the bottom of the overfeed grates is effective in preventing the



New Underfeed Stoker—View from Rear End Showing Retorts and Moving Grates

accumulation of clinker of large size at this point, and any obstruction caught in front of a plunger will block that plunger only and, furthermore, it cannot do damage more serious than the shearing of a pin which forms the safety device. This arrangement not only reduces the amount of fire area temporarily deprived of fresh fuel but also by its use the fuel in only one retort has to be overhauled.

NEW HYDROELECTRIC DEVELOPMENT

The Kuhn interests of Pittsburgh, Pa., which control the West Penn Electric Company, are preparing to put in three dams on the Cheat River, Va., each of which will produce 50,000 hp and, provided the necessary permission shall be obtained, the first will be in operation about Jan. 1, 1914. Certain dams will also be established on Sandy Creek, in West Virginia, which will provide additional power. The same interests also control the fall at Ohiopyle, Pa., where there is a drop of 110 ft., together with reservoir rights on the Youghiogheny River, so that ultimately about 250,000 hp will be available for commercial rights around Pittsburgh. The West Penn Electric Company has at the present time a steam station at Connellsville, rated at 52,000 hp and operating with coal costing about $1 a ton. The energy is transmitted as far as Butler, Pa., 120 miles away, and at the present time there are some 110 coal mines with connected loads ranging from 200 hp to 5000 hp being supplied from the company's system, not to mention the numerous municipalities centering around Connellsville. With the establishment of the hydroelectric plants referred to a tension of 110,000 volts will be adopted.

INVITATION TO INSPECT SIGNAL SYSTEM

In connection with the forthcoming meeting of the Central Electric Railway Association, which is to be held at Indianapolis on Feb. 27 and 28, C. L. Henry, president of the Indianapolis & Cincinnati Traction Company, has extended to the members of the association and to other attendants at the meeting, both ladies and gentlemen, an invitation to take a trip over the Shelbyville division of his line to inspect the Simmen system of signaling and train dispatching. This apparatus has now been fully installed and is in operation over the entire division. It is announced that the special cars provided by Mr. Henry will leave the Traction Terminal, Indianapolis, on Friday, Feb. 28, at 2:30 p. m., arriving at Indianapolis 6:30 p. m.

News of Electric Railways

Preliminary Draft of Chicago General Merger Ordinance Being Prepared

As a result of the meeting of the local transportation committee of the Chicago City Council on Feb. 13, at which the representatives of the surface and elevated railways presented their outline of a plan for unification and a comprehensive system of subways, a subcommittee co-operating with the corporation counsel has been instructed to prepare a tentative draft of a merger ordinance.

From the outline submitted by the representatives of the railways it would appear that their plan of consolidation conformed in principle to the eleven suggestions made by the local transportation committee. These suggestions were published in the Electric Railway Journal for Dec. 21, page 1242. The outline presented by the representatives of the railways is as follows:

1. The existing street and elevated railways to be consolidated or merged into one company under appropriate legislation to be sought from the General Assembly authorizing the merger and the construction of subways, and all the lines, including those in subways, to be operated as a unified system.

2. One 5-cent fare to be established for a single continuous ride in any one general direction, with free transfers at all reasonable points to be agreed upon between the various lines of the unified system, whether surface, elevated or subway lines.

3. As far as practicable, downtown terminals to be abolished and through routing of cars and trains to be effected. Routing of cars and trains to be such as to afford the best transportation facilities to and from all parts of the city, the elevated and subway lines to be used for express service so far as practicable.

4. A comprehensive system of rapid transit subways to be constructed and equipped as follows: (a) Subways for the congested downtown district as soon as possible, for trains of the elevated lines. (b) After the completion of the downtown subways, additional rapid transit subways extending in various directions throughout the city as the conditions of traffic and population shall require and warrant. The work of constructing subways to be let to the lowest responsible bidders under duly approved contracts.

5. The combined capital valuation of the merged properties at the outset to be fixed by taking the valuation of the street railways as determined by existing ordinances and adding thereto an amount to be agreed upon as the value of the elevated railroads.

6. The company to provide all moneys required for the subways, as well as for extensions and improvements of existing lines and for equipment, except that the city's "traction fund" shall be applied as far as it will go toward the cost of the downtown subways. The moneys provided by the company, plus an agreed percentage for brokerage, to be added to the capital valuation.

7. The city to have the right to require the existing elevated "loop" to be taken down as soon as the downtown subways shall be completed and ready for operation.

8. The construction and equipment of subways, the additions to capital valuation and regulation of service to be supervised by a board of engineers or otherwise, as may be agreed upon, to the end that the interests of the public, of the city and of the company in the properties, and in the operation thereof, may be properly protected and safeguarded.

9. The city at all times to have representation on the company's board of directors.

10. The earnings of the properties to be applied as follows:

From the gross receipts there shall first be deducted all operating expenses, taxes, renewals and maintenance charges, and out of the resulting net receipts the company to be allowed 7 per cent per annum on the capital valuation.

Of the remaining net receipts (for convenience called "divisible net receipts") 70 per cent to go to the city and be applied as a sinking fund for the amortization of the capital valuation, and 30 per cent to go to the company; provided that if in any year the city's 70 per cent of the divisible net receipts shall be less than $2,000,000, then all the divisible net reeeipts for such year up to $2,000,000 shall go to the city for the sinking fund and only the balance, if any, above $2,000,000 shall go to the company; and provided further, that the company's percentage of the divisible net receipts shall be decreased proportionately as the capital valuation, including all additions thereto, shall show a net decrease by the application of the sinking fund, and that if, after a decrease, the capital valuation shall again increase, the company's percentage shall be proportionately inereased, but shall never exceed 30 per cent.

11. Upon the amortization of the entire capital valuation through the operation of the sinking fund, the properties to be transferred to the city free and elear of debt.

12. The city to have the right at any time to purehase the properties free and clear of debt by paying to the company an amount equal to the face of the capital valuation as it shall then exist, plus 10 per cent thereof.

Following his presentation of the proposed merger outline, W. G. Beale, counsel for the elevated roads, called the attention of the committee to certain features in the outline which were to a certain extent new and had not been discussed before by the committee or the company's representative. The first difference came under the question of a system of subways. Heretofore there has been some contention to the effect that following the completion of a subway whieh would permit the removal of the Loop structure one should be built along Halsted Street to relieve congestion there. The railways did not believe in binding themselves to any particular location for the construction of subways following the completion of the one in the Loop district. The subject of its location is left entirely to the discretion of the city, and it is probable that the first extension to the proposed subway system may be required at some other point to relieve congestion.

Under paragraph 6 provision is made that the city shall participate in the construction fund as far as the present traction fund will apply. The outline provides that the companies shall provide the balance of the fund required and an agreed percentage for brokerage shall be allowed. Mr. Beale said that possibly 5 per cent for brokerage would be enough, but from past experience in obtaining construction funds it might be necessary to pay more than this amount. The proposition was left open, however, and it will be necessary for the city and the representatives of the companies to agree on some definite per eent before the final draft of the ordinance is made.

Under paragraph 10 of the outline, the fair return to the companies on the capital valuation is set at 7 per cent. Mr. Beale said that he knew the companies would deal with the city on this basis, but as it stood the amount was merely tentative and it may be agreed later that 6 or 6¼ per cent will be suffieient. It will not be hard, however, to draw conclusions, as the fair return on capital invested has been discussed and the committee can consult the different authorities on this particular subject. He said that in the end, however, the subject must be passed on by the stockholders, who in reality were the people with whom the city was dealing.

In reply to a question as to 7 per cent being in excess of what the elevated railways were earning on the approximately $80,000,000 valuation set on the property, Mr. Beale said that they were earning approximately 6 per cent on that valuation at this time. He said further, however, that the gross earnings were limited by the Loop structure, which was taxed to its full capacity at this time. If it were possible to relieve congestion in the Loop, he said he did not believe that there could be a question in anyone's mind that the elevated roads would return as much as 7 per cent on the capital invested. The purpose of the downtown subways is to relieve the Loop situation, whieh when complete will allow an increase in the traffic on the rest of the elevated structure.

Mr. Beale said that the total capital liabilities, based on $80,000,000 for the elevated roads and $134,000,000 for the two surface railways, would be $214,000,000. After totaling the expected earnings for the surface and elevated railways for the current year, the gross income would be about $40,000,000. Setting aside 60 per cent for operating expense, the profits remaining for the merged companies would approximate $16,000,000. Figuring 7 per cent on the $214,000,000, the capital valuation, a balance would be left for the city in excess of $1,000,000.

In expressing his views to the committee on the merger proposition, L. A. Busby, president of the Chicago City Railway, said there was not the least doubt in his mind that the city and the railway companies were near enough together to draft a tentative ordinance, and that the few points in question could be left blank, the final draft of the ordinance resolving itself into a mere question of phraseology, which he believed could be readily settled in a way satisfactory to both sides.

At a conference between corporation counsel, the Mayor and the sub-committee, following this meeting of the local transportation committee, corporation counsel were instructed to draft an ordinance along the general lines agreed upon by the city and the companies, and James J. Reynolds, of the harbor and subway commission, was instructed to take up at once with the engineers of the railways the question of routes for downtown subways. He was also requested to prepare figures on prospective earnings of the combined railroads and estimate what the net profits would be to the city on the basis of $214,000,000 capital valuation with 7 per cent to the railways.

Municipal Ownership Ordinance in Detroit

Corporation Counsel Lawson of Detroit and Attorney General Grant Fellows have completed a simplified draft of the old home rule act which was declared unconstitutional by the Michigan Supreme Court before it was put into effect. This draft provides for the revision of city charters piecemeal and contains a clause enabling mayors of cities to appoint commissions with power to condemn public utility properties. In cases of condemnation by such commissions, however, their work must be approved by the electors before it becomes legal.

Public hearings will be held on the proposed new ordinance framed by Attorney Alfred Lucking for the purpose of removing legal barriers to municipal ownership.

Assistant Corporation Counsel Penniman has prepared an ordinance to require the Detroit United Railway to put on additional cars. This ordinance would limit the number of passengers to be carried by each car.

Interurban Railway Construction in Texas

The Commercial Secretaries & Business Men's Association of Texas has recently conducted an investigation of the amount of new electric railway work in progress in Texas. According to the association the electric railways in 1912 constructed and placed in operation in Texas 85 miles of line and graded an additional 143 miles. The new interurban projects now under construction aggregate 445 miles and the interurban electric railways in operation in the State at the present time total 267 miles. One mile of interurban railway was built to every two miles of track laid on steam railroads in Texas in 1912, and the interurban mileage of the state increased 214 per cent compared with an increase of 1 per cent in steam line mileage during the year. Sixty-three miles of interurban railway were constructed during the year in northern Texas, while 22 miles were constructed in the southern part of the State. At the present time 228 miles of additional interurban track are under construction in southern Texas and 217 miles are being built in northern Texas.

The most important lines opened during the year were the Dallas-Waxahachie and the Fort Worth-Cleburne interurbans. Both of these lines traverse portions of the most densely populated and best agricultural sections of the State. The location and length of Texas interurban lines follows: Dallas to Sherman and Denison, 76 miles; Dallas to Fort Worth, 35 miles; Belton to Temple, 13 miles; Bryan to College Station, 6 miles; Galveston to Houston, 50 miles; Forth Worth to Cleburne, 32 miles; Dallas to Waxahachie, 31 miles; San Benito to Rio Grande Valley, 14 miles, and Riviera to Riviera Beach, 10 miles; total, 267 miles.

Interurbans	Terminals	Mileage Under Construction	Track Laid	Grading Completed	Date Completed
Anna-Blue Ridge	Anna-Blue Ridge-Greenville	12	0	12	June, '13
San Benito-Rio Grande	Santa Benito to Santa Maria	240	14	39	*
East Texas Traction	Dallas-Greenville	85	0	14	March, '13
Riviera Interurban	Riviera-Beach	10	8	10	Jan., '13
Southern Texas Traction	Waxahachie-Waco-Corsicana	120	0	90	Sept., '13
Southern Texas Traction	Dallas-Waxahachie	31	31	31	Sept., '13
Fort Worth Southern Trac	Fort Worth-Cleburne	32	32	32	Aug., '13
		530	85	228	

*Indefinite.

The accompanying table shows the interurban projects under construction at the present time and those completed in the State during 1912.

Decision Soon in Regard to New York Contracts

Edward E. McCall, the new chairman of the Public Service Commission for the First District of New York, devoted most of the week ended Feb. 15, 1913, his first week in office, to the consideration of the proposed subway contracts with the Interborough Rapid Transit Company and the New York Municipal Railway Corporation. Clarence J. Shearn, attorney for William R. Hearst, who represented John J. Hopper in the latter's application for an injunction to restrain the commission from executing these contracts, applied to Chairman McCall for a reopening of the public hearings on the contracts. This application was made on Feb. 11, 1913, immediately after the Appellate Division had handed down its decision vacating the temporary injunction obtained by Mr. Hopper. Chairman McCall and the other commissioners granted the application and reopened the public hearings on Feb. 13 at the City Hall. The hearing occupied all of the afternoon of Feb. 13 and most of Feb. 14, and during this time the commissioners heard arguments from Mr. Shearn and several other citizens in opposition to the contracts. George McAneny, borough president of Manhattan, and other citizens appeared in favor of the contracts. At 6.30 p. m. on Feb. 14, after all had been given a chance to be heard, Chairman McCall closed the proceeding and took the matter under advisement. It is expected that the commission will reach a decision as to the contracts within the next fortnight.

On Feb. 16, 1913, Public Service Commissioner Maltbie and John Purroy Mitchel sent to Chairman McCall of the Public Service Commission a plan mapped out for new subways to be built by the city and, if necessary, operated by the city, without the aid of private corporations, and to do nearly all that the dual system would accomplish. Their letter to the commission follows in part:

"As you know, we have always believed that an independent, city-built system of subways is preferable to any arrangement with existing companies for construction in partnership. Feeling that you would like to know the alternative to the dual plan which we have to suggest in case the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company declined to accede to a revision of the proposed contracts in a manner fully to protect the city, and believing that an appreciation of the fact that the city has at its command resources that put it in a position of independence will strengthen your hands in dealing with the question which is now before you, we transmit a statement of the alternative which we have to suggest, in the form of a map and a brief outline, descriptive of an independent, city-built system and the

method of financing it. The detailed estimates, calculations, and figures which support the statements and conclusions in the outline sent you herewith are in our possession. We need not tell you that we shall be glad at any time to place these in your possession and to discuss with you, in the fullest manner, all phases of the plan which we now present."

President Harmer on Worcester Power Situation

In a press statement issued at Worcester, Mass., on Feb. 14, 1913, J. T. Harmer, president of the New England Railways & Investment Company, discussed the power situation on the Worcester (Mass.) Consolidated Street Railway, and outlined the company's plans for bettering the conditions in this branch of the service. Mr. Harmer stated that contracts have been placed which will increase the capacity of the Millbury steam turbine station from 5000 kw to 10,000 kw, through the addition of a new 5000-kw unit, and that hydroelectric energy from the system of the Connecticut River Transmission Company should be delivered to the Worcester lines in about two months. A tie line carried on steel towers is under construction between Greendale and Millbury, and the supply of energy from the plants of the Connecticut River Transmission Company and its affiliated New England Power Company will be an important factor in the future operation of the Worcester lines. President Harmer said that the proposal to utilize machinery at the old Faraday Street station of the Worcester Electric Light Company was impracticable on account of the lack of suitable converting equipment, and that new apparatus for this purpose could not be obtained sooner than the Millbury station can be enlarged. New substations are being built at Greendale and Millbury, and within the last two years over $400,000 has been expended on the Millbury steam plant, and in addition to the order duplicating the present turbine equipment contracts for more power to the amount of $125,000 have been signed.

Progress on the Salt Lake & Utah Railroad

Walter C. Orem, president and general manager of the Salt Lake & Utah Railroad, New House Building, Salt Lake City, Utah, has made the following statement in regard to the progress on the construction of the company's proposed road between Salt Lake City and Payson, via Provo:

"The company has made splendid headway in acquiring rights-of-way for the line, especially in Utah County. Rails and ties and other equipment are being accumulated along the line, especially at American Fork, Lehi and Provo, and there are at least 15 miles of rails and ties on the scene, with more being received daily. Orders have been placed by the company for almost all the supplies which will be needed for the road, and what remains to be secured will be purchased in the very near future.

"Contracts for grading the road will be let during the coming month, and by April 1, 1913, the company will have upward of 500 teams at work on the grade. From that hour on the line will be pushed to completion as fast as men and money can do the work. Barring unforeseen delays, the company will have the line in operating condition between Salt Lake City and Provo by November, 1913.

"The line will be exceptionally well located, the heaviest grade being six-tenths of 1 per cent and the greatest curve 8 deg."

Governor Foss on the Need for a Utilities Commission

Governor Eugene N. Foss of Massachusetts reiterated the need for the creation of a public utilities commission in Massachusetts in an interview with him which appeared recently in the Boston *Transcript*. The Governor was quoted in part as follows:

"We must have a public utilities board. We need uniformity, machinery, mandatory powers, adjudication and written decisions in the case of all our quasi public service corporations. The same great principle underlies them all. We want to reduce the number of our State commissions by consolidating several of them. We are away behind the times. Thirty out of forty-eight states now have public utilities boards. We have not got the proper machinery, inspectors, accountants, auditors, etc. Therefore our commissions are overworked—that is to say, the men who compose them have to spend their time in detail which should be delegated to subordinates, so that the commissioners themselves could devote their time and energy to passing upon the important questions that come before them. I would have the public utility commission take in the Railroad Commission and the Gas and Electric Light Commission. I would place in its charge the supervision of telephones and telegraphs which the highway commission has and leave to that commission those other duties which it now has but which never should have been imposed on it."

"Seven Sisters" Bills Signed by Governor Wilson

The anti-trust bills introduced in the Legislature of New Jersey which have come to be known as the "seven sisters" were passed by the House on Feb. 19. They were immediately sent to the Senate, which approved them, and were then placed before the Governor, who signed them. All the bills go into effect at once with the exception of one, the main bill defining trusts and prohibiting agreements and acts designed directly or indirectly to restrain trade and making officers and directors of corporations criminally responsible for violations of the act. This measure goes into effect on July 4. The Governor is reported to have said:

"The passage of these measures about completes my program. Of course, there are other worthy bills and I hope that they will be successful, but I was particularly interested in these measures."

Following the introduction of the "seven sisters" into the Legislature Governor Wilson gave out a statement with reference to them in which he said: "They are simply intended to apply in a business-like way what the whole country is agreed upon." The bills make many things prison offenses and it is generally regarded that they greatly restrict trade and the conduct of business affairs and that many corporations with New Jersey charters will be compelled to reincorporate elsewhere in order to carry on their work. Already the American Railways Company, as noted in the Electric Railway Journal, has taken out a charter in Delaware for the avowed purpose of surrendering its New Jersey charter and bringing its business under the laws of Delaware, as under the New Jersey laws the company, which operates electric railways in various cities, is under the necessity of advancing money to them from time to time to finance their needs, and feels that it cannot do business under the laws just enacted.

Extension of Geary Street Municipal Railway.—The construction of the extension of the Geary Street Municipal Railway, San Francisco, Cal., in Market Street, from Kearny to Sansome Street, where connection will be made with the outer tracks running to the ferry landing, has been ordered by resolution of the Board of Supervisors. The clerk of the board was directed to advertise for bids for the purchase of $120,000 of Market Street Railway bonds on March 17, 1913, at 3 p. m. The funds derived from the sale of the bonds of the special issue will be used to defray the cost of extending the Geary Street line on Market Street.

Veto of Pittsburgh Subway Ordinance Sustained.—The City Council of Pittsburgh, Pa., has sustained the veto by Mayor Magee of the ordinance to grant the Pittsburgh Subway Company a franchise to operate a subway system in that city. The Mayor in his veto declared that the control proposed to be vested with the board of supervision was insufficient. He also took exception to the fact that the subway grantee was to receive power to re-locate or alter work of other companies or individuals in Pittsburgh necessary to the construction of the subway. Prior to action being taken on the grant the Pittsburgh Subway Company divulged to members of the Council its financial ability to do the work provided for in the ordinance. Being asked subsequently to make its representation public, it issued a statement in regard to the backers of the company. According to this statement John B. Carter, 42 Broadway, New York, N. Y., was one of the principals, and a group of capitalists represented by George B. Caldwell, vice-

president of the Continental & Commercial Trust & Savings Bank, Chicago, Ill., had agreed to finance the undertaking. A. E. Anderson, of the Pittsburgh District Railroad, has intimated that the Pittsburgh District Railroad will probably renew its efforts to secure a franchise for an underground line from the Council.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

ILLINOIS

A bill has been introduced into the Legislature which stipulates that all interurban railways and railroads shall provide separate compartments for negro passengers. A bill has been introduced to provide for the installation of toilets on all cars intended for use on the interurban electric railways of Illinois.

OHIO

Mayor Hunt of Cincinnati has prepared a bill for introduction which provides that municipalities may acquire street railway property by condemnation or otherwise, and that bonds may be issued in excess of the limitations made by the Longworth law. Sufficient funds may be taken from the earnings of the property to provide for the interest on the bonds and the sinking fund.

A bill has been introduced in the House giving the electors of Cincinnati the right to determine by ballot whether the city shall issue bonds to build a high-speed electric railway loop, such as has been heretofore mentioned in the ELECTRIC RAILWAY JOURNAL. Mayor Hunt believes that these bills will enable the city to deal with the local street railway upon more favorable terms than would otherwise be possible. He states, however, that a bill should be passed to give the electors authority to decide by vote whether bonds shall be issued to provide funds to purchase the property of the Cincinnati Traction Company, and that another bill should be passed to give cities power to agree with utility companies on the surrender of their franchises.

Mayor Newton D. Baker of Cleveland has sent a similar bill to the Cleveland delegation in the Legislature. It exempts from a city's net debt bonds voted by the Council for the purchase of a public utility, provided that the utility company has sufficient revenue to meet interest and operation charges and provide a sinking fund.

Representative Bigelow has agreed to a substitute for his bill intended to revoke all franchises granted for a longer term than twenty-five years. The substitute would revoke all franchises granted under the Rogers law and continue the operation of the public service company as a tenant at will. A certain rental to be agreed upon would then be paid the city and should the city buy the property these annual payments would be taken into consideration. The city would, under this bill, have the right to control the service, and any disagreement would be referred to the Public Service Commission. Should the city determine to purchase the property, it is provided that bonds may be issued beyond the limitations of the Longworth law, and all money actually put into the property by the company or its predecessors would be returned, with the exception of taxes and license fees.

Representative Mills of Cuyahoga County has introduced a bill that will allow cities to pledge their credit in the issue of bonds beyond the limitation of the Longworth act for the purpose of building or acquiring street railway property. The bonds shall be in small denominations and they may be sold directly to the purchasers at par and interest.

Representative Capelle of Hamilton County has introduced a bill which, if made a law, will render all franchises granted to public service corporations indeterminate. Representative Duffey of Lucas County has introduced a bill to require interurban railways to pay a share of the cost of eliminating grade crossings in cities. A bill doing away with the necessity of securing consents of owners of abutting property on streets where car lines are to be built has been introduced in the House by Representative Bigelow.

PENNSYLVANIA

A public hearing on the three public utilities commission measures now in the House will be given by the judiciary general committee in the hall of the House on the afternoon of Feb. 26. The three bills, one of which has the indorsement of the legislative committee of fifteen created by the republican state convention, another emanating from the democratic party and a third being known as the state administration measure, all provide for more effective regulation by the Commonwealth of the various public service corporations operating therein, and differ only in detail. Supplementary to the republican state convention bill is a bill to regulate the issuance of stocks and bonds, known as the "blue sky law." It is believed that a composite bill will pass both branches of the General Assembly and receive the signature of Governor Tener.

Introduction of new bills into the General Assembly shows little sign of abatement, the total number before the joint body being more than 1000. Among the bills offered in the Senate on Feb. 17 was one to extend for a period of five years the time limit for beginning construction or actual operation of railroads or railways.

WISCONSIN

A number of measures affecting electric railways have been introduced in the Wisconsin Legislature recently. In the Assembly, the following bills were received: To prevent the overcrowding of street cars and to furnish better service to patrons thereof; to prohibit public utilities from increasing the rates specified in the franchises or ordinances granted to them; to give public utilities power to make complaints affecting their own product or service to the railroad commission, the municipality in which the utility operates to be notified of the hearing; to give municipalities the power to acquire public utility properties.

An important bill to restrict the jurisdiction of the Railroad Commission has also been introduced, providing that the commission shall not have power to supervise or regulate the rates or service of street railways in cities of the first, second or third class, but vesting such power in the Common Council and giving it all the powers of the Railroad Commission to hear and investigate such matters and to fix the rates.

In the Senate a bill has been introduced to give persons dissatisfied with rulings of the Railroad Commission the right to appeal from the decisions to the Circuit Court of Dane County, of which Madison is the seat. The burden of proof is placed upon the plaintiff. Another bill extends the right of eminent domain held by railroads to street and electric railways, except in regard to parks and public highways in cities and villages, unless privileges have been granted by franchise. Electric and street railways are also ordered to maintain fences and cattle guards as required of railroads.

PROGRAMS OF ASSOCIATION MEETINGS

National Fire Protection Association

The electrical committee of the National Fire Protection Association will meet in New York on March 26 and 27. Under date of Feb. 15, 1913, the secretary of the electrical committee of the association has issued a bulletin which contains the committee reports and suggestions for changes in the national electrical code which will be considered at the meeting of the electrical committee at the meeting in March in the rooms of the New York Board of Fire Underwriters.

New England Street Railway Club

The regular monthly meeting of the New England Street Railway Club will be held at the American House, Boston, Mass., on the evening of Feb. 26, 1913. Dinner will be served at 6.30 p. m. and the business meeting will be convened at 8 p. m. The speaker of the evening will be P. F. Sullivan, president of the Bay State Street Railway, Boston, Mass., who will address the members of the club on the subject, "Scientific Management: Efficiency." The special entertainment provided at the last meeting of the club proved so popular that a similar program has been arranged for the meeting on Feb. 26. Attention is called particularly to the fact that the meeting is to be held on Wednesday, Feb. 26, one day earlier than the regular meeting night of the club.

Financial and Corporate

Stock and Money Markets

February 18, 1913.

Following the opening of the market to-day in New York there was a temporary improvement, but the decline in prices was resumed before the day was over and many new low figures were reached. The decline is ascribed to the fact that no relief seems likely to be found from the combination of circumstances which has long depressed Wall Street. Quotations in the money market to-day were: Call, 3½@4 per cent, with the last loan at 3¾ per cent; sixty days, 4½@4¾ per cent.

The Philadelphia market to-day was broad but inactive except for a few issues. The demand for bonds continued good.

The Chicago market to-day was narrow and inactive. Most of the bond transactions were in the local surface railway and elevated railroad issues.

In the Boston market there was very little trading in the railroad issues to-day. The market for bonds was dull and without feature.

In Baltimore the volume of trading was light with very few sales of railway issues. The bond market continued active, the sales totaling $79,000.

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

	Feb. 11	Feb. 18
American Brake Shoe & Foundry (common)	95	92½
American Brake Shoe & Foundry (preferred)	135	133
American Cities Company (common)	47½	47½
American Cities Company (preferred)	76½	75⅛
American Light & Traction Company (common)	400	390
American Light & Traction Company (preferred)	108½	108
American Railways Company	40⅜	40⅜
Aurora, Elgin & Chicago Railroad (common)	43½	43
Aurora, Elgin & Chicago Railroad (preferred)	87	87
Boston Elevated Railway	111	109¾
Boston Suburban Electric Companies (common)	7½	7½
Boston Suburban Electric Companies (preferred)	65	65
Boston & Worcester Electric Companies (common)	7	7
Boston & Worcester Electric Companies (preferred)	44	43
Brooklyn Rapid Transit Company	89⅝	88½
Capital Traction Company, Washington	123	122¾
Chicago City Railways	150	150
Chicago Elevated Railways (common)	a35	35
Chicago Elevated Railways (preferred)	91	91
Chicago Railways, ptcptg., ctf. 1	93	90
Chicago Railways, ptcptg., ctf. 2	25	24½
Chicago Railways, ptcptg., ctf. 3	7	7
Chicago Railways, ptcptg., ctf. 4	3	3½
Cincinnati Street Railway	a119	119
Cleveland Southwestern & Columbus Ry. (common)	a6	6
Cleveland Southwestern & Columbus Ry. (preferred)	a30	30
Cleveland Railway	104½	104½
Columbus Railway & Light Company	19	19
Columbus Railway (common)	69	69
Columbus Railway (preferred)	a105	*105
Denver & Northwestern Railway	a117	a117
Detroit United Railway	a80	76
General Electric Company	140¼	139
Georgia Railway & Electric Company (common)	123	123
Georgia Railway & Electric Company (preferred)	82½	83
Interborough Metropolitan Company (common)	18½	17
Interborough Metropolitan Company (preferred)	62½	59½
International Traction Company (common)	a42	42
International Traction Company (preferred)	a95	95
Kansas City Railway & Light Company (common)	a20	20
Kansas City Railway & Light Company (preferred)	a41	41
Lake Shore Electric Railway (common)	6½	6½
Lake Shore Electric Railway (1st preferred)	a91	a91
Lake Shore Electric Railway (2d preferred)	a25½	a25½
Manhattan Railway	132⅛	132
Massachusetts Electric Companies (common)	17½	16½
Massachusetts Electric Companies (preferred)	77⅜	77
Milwaukee Electric Railway & Light Co. (preferred)	a102	102
Norfolk Railway & Light Company	26	26
North American Company	79⅝	79⅛
Northern Ohio Light & Traction Company (common)	80	80
Northern Ohio Light & Traction Company (preferred)	105	105
Philadelphia Company, Pittsburgh (common)	49	48
Philadelphia Company, Pittsburgh (preferred)	41½	41
Philadelphia Rapid Transit Company	27½	27½
Portland Railway, Light & Power Company	67	67
Public Service Corporation	116	116
Third Avenue Railway, New York	37	35
Toledo Railways & Light Company	a6	6
Twin City Rapid Transit Co., Minneapolis (common)	105½	104½
Union Traction Company of Indiana (common)	4½	*4½
Union Traction Company of Indiana (1st preferred)	81	*81
Union Traction Company of Indiana (2d preferred)	34	*34
United Rys. & Electric Company (Baltimore)	24	23¾
United Rys. Inv. Company (common)	27⅞	27
United Rys. Inv. Company (preferred)	54⅞	53
Virginia Railway & Power Company (common)	57	56½
Virginia Railway & Power Company (preferred)	93¾	93½
Washington Ry. & Electric Company (common)	86	84
Washington Ry. & Electric Company (preferred)	90	88
West End Street Railway, Boston (common)	81	81
West End Street Railway, Boston (preferred)	98	97
Westinghouse Elec. & Mfg. Company	71⅜	69¾
Westinghouse Elec. & Mfg. Company (1st preferred)	116	117

*Last sale. a Asked.

ANNUAL REPORTS

Lake Shore Electric Railway

The following is a comparative statement of the results of operation of the Lake Shore Electric Railway system (comprising the Lake Shore Electric Railway, the Lorain Street Railroad and the Sandusky, Fremont & Southern Railway) for the years 1912 and 1911:

	1912	1911
Gross income	$1,326,883	$1,275,476
Operating and taxes	754,821	683,028
Net	$572,062	$592,448
Interest	419,450	416,025
Surplus	$152,612	$176,423
Dividend, first preferred	60,000	60,000
Net surplus	$92,612	$116,423

E. W. Moore, the president, says in part:

"New 0000 grooved trolley wire was erected between the Toledo city limits and Norwalk, and Ceylon Junction and Lorain, together with new hangers and clips. This change was accomplished without expense to the company other than the cost of labor, on account of the low price at which new wire was purchased and the high price at which the old scrap trolley wire was sold.

"A new siding at Clyde known as Elmore Siding, a new siding between Lorain and Vermilion known as Erie Siding, a connection with the Wheeling & Lake Erie Railroad at Huron, and a siding between Sandusky and Slate Cut for commercial use, were installed. There was 4200 ft. of new track built through the village of Genoa (the entire length of the corporation) in advance of paving. This track is unusually well built, 100 lb. 6-in. T-rail. Carnegie and International steel ties used, together with concrete foundation extending the depth of 6 in. below the ties. There was 2500 ft. of track on First Street, Sandusky, relaid with 75-lb. T-rail with continuous splices. There were 35,250 cedar and oak ties, together with fourteen complete sets of switch ties, placed under the track. Approximately 6 miles of track was ballasted with cinders and quarry screenings. In February a contract was placed with the King Bridge Company for the erection of eight steel bridges on this property, four single track bridges on the Toledo Division to replace wooden structures, and four double-track bridges on the Cleveland Division to replace four single-track bridges which are too light for the traffic passing over them. The bridge company, on account of its inability to get steel, was able to complete and erect only one bridge, that carrying our tracks over the Wheeling & Lake Erie Railroad and the Lake Shore & Michigan Southern Railway near Bellevue. The other bridges are under construction and will be erected early in the coming year. The masonry work for the new double-track bridges on the Cleveland Division is completed and ready for the steel. These foundations are built of concrete reinforced with steel bars and old rails. Seven small openings on the Toledo Division between the Toledo city limits and Monroeville have been replaced with concrete culverts.

"A 100-kw motor-driven exciter unit was installed in the Fremont power house. Three 750-kw oil-insulated, water-cooled station transformers, together with necessary switchboard equipment and cables, were installed in Beach Park power station; also one Tirrill regulator. There was installed at Woodville one 75-kw transformer for use in furnishing light and power to the village. There was also installed at Vermilion one 75-kw transformer for the furnishing of light and power to the village of Vermilion. The 1000-kw, 16,500-volt generator at Beach Park was damaged by lightning during the summer to such an extent that it had to be rewound, and in rewinding the generating voltage was reduced to the same voltage as all the other machines in that station.

"During the year a contract was made with the Sandusky River Power Company for the purchase of its entire output. This company is installing near the Fremont plant a hydro-electric plant of 4950-kw capacity. It is anticipated that we shall receive power from this plant about March 1, 1913.

"One pair of Baldwin trucks was purchased. Electric heaters were installed in the vestibule of all cars used in limited service. M. C. B. couplers and anti-climbers were installed on two cars.

"In the shops at Sandusky there were installed one electric welding machine, one lathe, one emery grinder, one bolt cutter and one triple valve grinder; also four air hoists for use in handling cars.

"On Aug. 2, 1912, the company's franchise in Clyde, Ohio, was renewed for a period of twenty-five years.

"The double track on Broadway, Lorain, was rebuilt and paved in advance of new street paving. The suit brought by the city of Lorain some years ago attacking the rights of this company in Twenty-eighth Street and Grove Avenue, covering a distance of approximately 1 mile along the plant of the National Tube Company, was decided by the court in favor of the company, thus establishing the ownership of private rights of way claimed by this company in these two streets."

Washington Railway & Electric Company

The Washington Railway & Electric Company, Washington, D. C., reports earnings as follows for the year ended Dec. 31, 1912:

Gross earnings from operation	$4,618,328
Miscellaneous income	43,233
Gross income	$4,661,561
Operating expenses, taxes, including taxes	2,528,224
Gross income, less operating expenses and taxes	$2,133,337
Fixed charges	1,107,607
Net income	$1,025,730

After providing for fixed charges, the net income was applied as follows:

Net income		$1,025,730
Add profit on investments		1,207
Total net		$1,026,937
Payment of 5 per cent dividend on preferred stock	$425,000	
Payment of 4 per cent dividend on common stock	260,000	
		685,000
Balance		$341,937
Distribution to conductors and motormen under profit-sharing plan	$19,123	
Depreciation in equipment—railways	65,574	
Removal of abandoned tracks	1,046	
Charged off, account Glen Echo Park	1,000	
Fire loss, Thirteenth and D Streets, carhouse	22,514	
Sinking fund requirements—Potomac Electric Power Company	84,700	
Loss due to abandonment of street-lighting equipment—Potomac Electric Power Company	16,841	
Loss on other equipment sold or dismantled during the year—Potomac Electric Power Company	2,327	
		213,125
Credited to profit and loss		$128,812

After closing the accounts for the year, the profit and loss surplus of the Washington Railway & Electric Company on Jan. 1, 1913, is $1,032,516.05.

Lehigh Valley Transit Company

A comparative statement of earnings of the Lehigh Valley Transit Company, Allentown, Pa., for the fiscal years ended Nov. 30, 1912, and Nov. 30, 1911, follows:

	1912	1911
Passenger receipts	$1,242,007	$1,141,138
Operating expenses	650,079	592,458
Net earnings from railway operation	$591,928	$548,680
Miscellaneous and sale of power	269,713	190,343
Net income	$861,641	$739,023
Interest, rentals, taxes, etc	497,844	453,645
Net	$363,797	$285,378
Miscellaneous deductions	3,533	939
Surplus	$360,264	$284,439
Other income	14,178	10,237
Total surplus	*$374,442	$294,676

*From this surplus there should be deducted dividends of $99,566. Other adjustments and deductions, including depreciation, leave the final surplus at this date at $213,146.

R. P. Stevens, president and general manager of the company, says in part:

"Your company owns or controls 158 miles of railway, extending from Allentown to Philadelphia (Chestnut Hill), Norristown, Macungie, Slatington, Egypt, Siegfried, Nazareth, the Bethlehems and Hellertown.

"The rolling stock consists of forty-one open cars, 108 closed cars and thirty-six miscellaneous cars, making 185 cars in all.

"The power house equipment consists of one main station at Allentown and ten well-equipped substations operated in connection with the main power house to provide for a proper and economical distribution of power. The main power house has a maximum capacity of approximately 23,600 hp. It is equipped with modern steam turbines and the latest and most efficient auxiliary apparatus.

"The generating cost during the past year has been materially reduced, and although the total kilowatt output has increased, the total cost of production was less than in the preceding year. To the best of our knowledge the plant is producing current as cheaply as it is produced anywhere in this country under similar conditions, and it is being maintained in a state of highest efficiency.

"Numerous improvements have been made in your property during the past year, the benefits from which should be apparent in the coming year. Convenient combination passenger-freight and express stations have been erected at every important town on the Philadelphia Division and local agents provided at each station. This arrangement, in addition to being a great convenience to the public, gives your company a local representative in each of these towns. Many cut-offs have been completed, putting more of the track on private right-of-way, with good ballast and drainage, and permitting the shortening of the schedule time. Four pay-within city cars, six modern interurban cars and three repair cars have been added to the equipment the past year.

"In January, 1912, the Montgomery Traction Company was merged into your company, and the revision of the Norristown Division was completed on Dec. 1.

"In April, 1912, your company bought one-half of the capital stock of the Norristown Transit Company, which gives your line a permanent entrance into Norristown and a connection with the Philadelphia & Western Railway, thus giving your cars, by virtue of a traffic arrangement, the use of the Philadelphia & Western tracks between Norristown and Philadelphia, and an entrance into the subway-elevated terminal station at Sixty-ninth and Market Streets, Philadelphia. Through service into Philadelphia was inaugurated on Dec. 12, and the increased business obtained by this new service has been very gratifying. The line from Allentown to Sixty-ninth Street, Philadelphia, via the Philadelphia & Western Railway, is almost 5 miles shorter than the steam road to its terminal, the average time only five minutes more, and the round trip fare $1 less, the fare averaging 1¼ cents per mile.

"The new high-speed limited cars are of the latest and most improved interurban type, are 56 ft. in length and are of 500 hp. They are equipped with smoking, toilet and baggage compartments. The conveniences equal those of the modern Pullman.

"The freight service operating from Philadelphia, via Chestnut Hill to all Lehigh Valley Transit Company points has proved a valuable factor in our earning capacity. The gross receipts for the year amounted to more than $40,000, with a net profit of about $14,000. The business is steadily growing in volume, the receipts this year having increased 44 per cent over the year previous, and with the Lansdale-Norristown territory added we have a very promising outlook.

"The Adams Express Company is now operating over the lines of the Lehigh Valley Transit Company and the Philadelphia & Western Railway. Every indication points to a large business in this territory, which has heretofore been monopolized by the United States Express Company, and we can look for substantial earnings from this source.

"The Allentown Bridge Company, all the stock of which is owned by your company, is erecting a toll bridge wholly within the city of Allentown, directly connecting two wards, one a thickly settled section and the other a developing part of the city. It is anticipated that the tolls alone will pay the interest on the cost of the bridge. Your company has the exclusive and perpetual right to operate its cars over the bridge. This will be the largest reinforced concrete bridge of its kind in this country, being 2,600 ft. long, and 150 ft. high.

"Gross passenger receipts for the past fiscal year increased $100,869, or 8.8 per cent. Car mileage increased 136,299, or 3.6 per cent. Operating expenses for the fiscal year 1912 were 52 per cent of the gross receipts, the same as the pre-

vious year. Total operating expenses per car mile for 1912 were 16.36 cents. Net operating earnings increased $43,247, or 8 per cent. The surplus revenue from all sources before discount, dividend or depreciation deductions was $374,442, or an increase of 27 per cent. From this revenue surplus, bond discount of $12,677, a depreciation reserve of $117,360, a 2 per cent dividend of $99,566 on the preferred stock and improvement charges of $6,587 were deducted, leaving a final surplus of $138,250 for the year."

Application of United Railroads Denied

The Railroad Commission of California has denied the application of the United Railroads of San Francisco to issue $2,350,000 of five-year notes and of the Market Street Railway to issue $2,150,000 of 5 per cent bonds as collateral for these notes. The commission said in part:

"Upon the failure of the applicant to produce the books as requested, it was announced that no order would be made granting this application, and in view of the fact that these books have not been produced, although ample time has been given, it is the conclusion of this commission that this application should be denied and that it be understood that no favorable action will be taken by this commission on any application presented by the United Railroads or its subsidiaries until the information demanded by the commission has been furnished.

"The applicant is burdened with approximately $40,000,000 of outstanding bonds, and it is conceded that in 1927, when the issue of United Railroads 4 per cent bonds becomes due, there will be approximately $20,000,000 face value of these bonds which the company will be unable to pay at that time, and in view of the fact that many of the important franchises of applicant will expire within a few years after 1929, it cannot be said that the financial condition of applicant is sound, unless it be shown that all of its outstanding obligations not only can but will be paid at maturity, or at least at the time when many important franchises of applicant expire. No such showing has been made to the commission, and as the bondholders must rely upon the sinking fund provided for in the trust deed under which the United Railroads' 4 per cent bonds were issued, and whatever physical value of property may exist at the time of the maturity of these bonds, in the judgment of this commission, these bonds at this time are not certain of payment in full.

"In order to safeguard the payment of the obligations of applicant when they fall due, a large part of the surplus income of applicant should be diverted to these securities and it appears to this commission as proper that the payment of dividends on the large amount of capital stock outstanding should be deferred to the security of these bonds."

Reference to the application of the company to the commission was made in the Electric Railway Journal of Jan. 4, 1913, page 45.

American Railways, Philadelphia, Pa.—The American Railways has taken out a charter in Delaware with a capital of $25,000,000 for the avowed purpose of surrendering its New Jersey charter and bringing its business under the laws of Delaware if the laws governing corporations which are now before the Legislature of New Jersey for enactment are finally passed. The American Railways was organized under the laws of New Jersey in 1899 with an authorized capital stock of $25,000,000, of which about $8,000,000 is outstanding. Jeremiah J. Sullivan, president of the company, is reported to have made the following statement: "Under the new legislation it is made illegal for a holding corporation to loan money to a corporation outside the State or to buy additional properties. The American Railways operates numerous electric railways in various States, and it is necessary to advance money to them from time to time and to finance their needs. We are constantly buying new properties. I do not think we could do business under the proposed laws. I think there is little doubt that many other corporations will take similar action."

Boston (Mass.) Elevated Railway.—The Massachusetts Railroad Commission has approved an issue of $600,000 twenty-year 5 per cent bonds by the West End Street Railway to bear date of Nov. 1, 1912, proceeds to reimburse the Boston Elevated Railway for improvement to property made in accordance with the terms of the lease. The commission has also approved an issue of 4400 shares of additional common stock by the West End Street Railway to be sold at public auction, proceeds to reimburse the Boston Elevated Railway for improvements. In addition the commission has approved the application of $28,727, realized as part of proceeds of bonds issued under order of the board on April 4, 1912, toward the cost of permanent additions and improvements to property.

Chatham, Wallaceburg & Lake Erie Railway, Chatham, Ont.—MacKenzie & Mann are reported to have purchased $400,000 out of a total of $787,500 of outstanding first mortgage 5 per cent bonds of the Chatham, Wallaceburg & Lake Erie Railway.

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—E. W. Moore, president of the Cleveland, Painesville & Eastern Railroad, acting in the interest of that company, has acquired the property of the United Light & Power Company, Geneva, Ohio, furnishing current in cities and rural sections of Lake and Ashtabula Counties. The Cleveland, Painesville & Eastern Railroad will do the electric light and power business in all territory on its line between Cleveland and Ashtabula, except in Painesville, where there is a municipal plant.

Columbus Railway & Light Company, Columbus, Ohio.—Through an application filed with the Ohio Public Service Commission and then withdrawn it was learned that the reorganization committee of the Columbus Railway & Light Company has planned to incorporate an entirely new company, to be known as the Columbus Railway, Light & Power Company, to take over all the companies now operated under lease. The application filed was for permission to issue stock to be exchanged for the stock of the companies as now constituted. It was found necessary, however, for the present companies to secure permission from the Public Service Commission to sell their holdings, and it was decided to have the commission consider all the applications at the same time. This caused the temporary withdrawal of the original application.

Empire United Railways, Inc., Syracuse, N. Y.—The Public Service Commission of the Second District of New York has approved the application of the Rochester, Syracuse & Eastern Railroad, the Syracuse, Lake Shore & Northern Railroad and the Auburn & Northern Electric Railroad for permission to consolidate as the Empire United Railways, Inc., in accordance with the terms published in the Electric Railway Journal of Feb. 1, 1913, page 228. The Empire United Railways, Inc., was incorporated under the laws of New York with a capital stock of $11,600,000 by Clifford D. Beebe, Hendrick S. Holden, Edward Joy and others, on Feb. 18, 1913.

Halifax (N. S.) Electric Tramway.—At the adjourned meeting of the Halifax Electric Tramway held on Feb. 12, 1913, new directors were elected as follows: J. A. Neville, H. H. Smith, W. M. P. Webster, J. E. Wood and O. E. Smith, Halifax; Sir Frederick Borden, Ottawa; P. J. Mackintosh, E. A. Robert, J. W. McConnell, W. G. Ross and F. H. Wilson, Montreal. The only director re-elected is O. E. Smith. New officers have been elected as follows: E. A. Robert, president; J. W. McConnell, first vice-president; O. E. Smith, second vice-president. The board of directors formerly consisted of nine members, whereas it is now composed of eleven members. The negotiations for the sale of the property to a syndicate which included J. W. McConnell and E. A. Robert was noted in the Electric Railway Journal of Oct. 19, 1912.

Interborough Rapid Transit Company, New York, N. Y.—The stockholders of the Interborough Rapid Transit Company will vote on March 5, 1913, on the plan to authorize a mortgage to the Guaranty Trust Company, New York, N. Y., as trustee, to secure an issue of 5 per cent fifty-three-year gold bonds for an aggregate amount of $300,000,000, to provide for expenditure under the dual rapid transit arrangement with the city and for refunding.

La Crosse (Wis.) City Railway.—The property of the La Crosse City Railway has been taken over by the Wisconsin Railway, Light & Power Company, the incorporation of which was noted in the Electric Railway Journal

on Feb. 1, 1913, page 230. Frank B. Desmond, Milwaukee, has been elected president of the La Crosse City Railway to succeed B. E. Edwards and A. G. Casper, Milwaukee, has been elected secretary of the company to succeed P. J. Riegger. Frank P. Hixon and R. C. Whelpley have resigned as vice-president and treasurer respectively of the company, but no successors to them have been elected as yet. It is announced that Peter Valier will remain with the La Crosse City Railway as general manager. The Wisconsin Railway, Light & Power Company has filed for record in La Crosse County a mortgage for $10,000,000 in favor of the First Savings & Trust Company, Chicago, Ill., given to secure an issue of twenty-year 5 per cent bonds.

Los Angeles (Cal.) Railway Corporation.—Harris, Forbes & Company and E. H. Rollins & Sons, New York, N. Y., are offering for subscription to yield more than 5.20 per cent the unsold portion of their block of $3,000,000 of first and refunding 5 per cent sinking fund bonds of the Los Angeles Railway Corporation dated 1910 and due Dec. 1, 1940. These bonds are part of a $20,000,000 issue covering all the property now owned or hereafter acquired by the company.

New York State Railways, Rochester, N. Y.—The New York State Railways has announced that the holders of the temporary fifty-year first consolidated mortgage 4½ per cent gold bonds, series "A," may exchange their temporary bonds for the definitive engraved bonds at the office of the Bankers Trust Company, New York, N. Y.

Penn Central Light & Power Company, Altoona, Pa.—Brown Brothers & Company and Robert Glendenning & Company, Philadelphia, Pa., are offering at par and interest the small unsold part of $1,300,000 of first and consolidated mortgage 6 per cent gold bonds of the Penn Central Light & Power Company of 1913, due February, 1963, but redeemable at 105 and interest on and after Feb. 1, 1918. The interest is payable February and August at the office of the trustees, the Philadelphia Trust, Safe Deposit & Insurance Company, Philadelphia, Pa. The Penn Central Light & Power Company is a Pennsylvania corporation and a consolidation by merger of the Edison Electric Illuminating Company and Citizens' Electric Light, Heat & Power Company, both of Altoona; the Huntington Gas Company and the Wilson Electric Company, Huntington, Pa.; the Lewistown Light, Heat & Power Company and the Mifflin County Gas & Electric Company, Lewistown, and the Hollidaysburg Electric Light & Power Company, Hollidaysburg, Pa. All of the stocks and bonds of the Pennsylvania Hydroelectric Company and all of the stock and some of the bonds of the Lewistown & Reedsville Electric Railway are subject to the lien of the mortgages of the Penn Central Light & Power Company, and these companies are operated in connection with the Penn Central Light & Power Company.

Toledo Traction, Light & Power Company, Toledo, Ohio.—Harris Forbes & Company, New York, N. Y., are offering for subscription $5,822,000 of first lien five-year 6 per cent bonds of the Toledo Traction, Light & Power Company, the successor to the Toledo Railways & Light Company, dated Feb. 1, 1913, and due Feb. 1, 1918. The interest is payable on Feb. 1 and Aug. 1 at the office of the New York Trust Company, New York, trustee. The authorized capital stock of the company is $17,200,000, of which $9,200,000 is common stock and $8,000,000 is 6 per cent preferred stock cumulative after Jan. 1, 1914. Of these amounts $8,881,500 of common stock is to be issued and $7,461,225 of preferred stock is to be issued. The authorized bonded debt will consist of $7,500,000 of first lien 6 per cent five-year bonds and $1,200,000 of second lien 6 per cent five-year bonds. The following statement of earnings of the Toledo Railways & Light Company and allied interurban electric railways for the year ended Dec. 31, 1912, has been made public: Gross earnings, $3,979,275; operating expenses and taxes, $2,789,427; net earnings, $1,189,848; interest on gas and heating and interurban railway bonds not owned by traction company, $209,550; surplus, $980,297; annual interest on first lien 6 per cent bonds, $360,000; balance, $620,297.

Underground Electric Railways, London, Eng.—James Speyer, William Barclay Parsons, L. F. Loree and J. G. Metcalfe, New York, N. Y., have resigned as directors of the Underground Electric Railways, it having been decided best to turn the entire management of the company over to the London directors.

Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.—The Washington, Baltimore & Annapolis Electric Railway has taken over the stock of the Annapolis Gas & Electric Company, which has been held by the Annapolis Utilities Company, organized by interests closely associated with the electric railway. The Annapolis Gas & Electric Company serves a population of 9000. It has $100,000 capital stock, with $63,000 first mortgage 6 per cent bonds and $110,000 consolidated 5 per cent bonds.

Dividends Declared

American Railways, Philadelphia, Pa., quarterly, 75 cents, common.

Columbus (Ohio) Railway, quarterly, 1¼ per cent, common.

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

Tennessee Railway, Light & Power Company, Nashville, Tenn., quarterly, 1½ per cent, preferred.

United Light & Railways Company, Grand Rapids, Mich., quarterly, 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE

Period.			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m.,	Dec.,	'12	$60,334	*$28,818	$31,516	$17,341	$14,175
1 "	"	'11	54,383	*24,654	29,729	15,485	14,244
12 "	"	'12	385,870	*166,834	219,036	101,349	117,687
12 "	"	'11	331,465	*144,163	187,302	80,157	107,145

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m.,	Dec.,	'12	$95,454	*$57,085	$38,369	$23,963	$14,406
1 "	"	'11	83,827	*50,234	33,593	21,029	12,564
12 "	"	'12	1,064,674	*634,616	430,058	266,029	164,029
12 "	"	'11	943,472	*553,748	389,724	239,713	150,011

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.

1m.,	Dec.,	'12	$650,442	*$382,804	$267,638	$125,426	$142,212
1 "	"	'11	550,521	*305,157	245,364	121,530	123,834
12 "	"	'12	6,389,919	*3,718,297	2,671,622	1,502,572	1,169,050
12 "	"	'11	5,519,640	*3,162,927	2,356,713	1,274,405	1,082,308

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE

1m.,	Dec.,	'12	$175,134	*$102,012	$73,122	$56,510	$16,612
1 "	"	'11	169,936	*126,626	43,310	49,668	†6,358
6 "	"	'12	1,168,770	*619,299	549,471	332,901	216,570
6 "	"	'11	1,120,503	*665,313	455,190	298,779	156,411

EAST ST. LOUIS & SUBURBAN COMPANY

1m.,	Dec.,	'12	$228,206	*$110,839	$117,367	$48,019	$69,348
1 "	"	'11	202,702	*85,017	117,685	45,617	72,068
12 "	"	'12	2,452,568	*1,353,568	1,098,883	578,471	520,415
12 "	"	'11	2,279,147	*1,270,351	1,008,796	547,525	461,271

GRAND RAPIDS (MICH.) RAILWAY

1m.,	Dec.,	'12	$106,978	*$65,608	$41,370	$14,252	$27,118
1 "	"	'11	108,609	*60,167	48,442	14,556	33,886
12 "	"	'12	1,233,588	*700,230	533,358	175,225	358,133
12 "	"	'11	1,169,393	*660,278	509,115	179,388	329,727

JOPLIN & PITTSBURG RAILWAY, PITTSBURG, KAN.

1m.,	Jan.,	'13	$44,709	*$27,935	$16,774	$12,541	$4,233
1 "	"	'12	38,466	*24,439	14,027	12,923	1,104
12 "	"	'13	539,781	*319,424	220,357	152,371	67,986
12 "	"	'12	471,713	*277,817	193,896	153,122	40,774

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE

1m.,	Dec.,	'12	$47,359	*$32,286	$15,073	$14,400	$673
1 "	"	'11	45,075	*30,413	14,662	14,446	216
6 "	"	'12	348,252	*200,629	147,623	86,400	61,223
6 "	"	'11	339,589	*193,746	145,843	86,705	59,138

PHILADELPHIA RAPID TRANSIT COMPANY

1m.,	Jan.,	'13	$2,002,067	$1,228,131	$773,936	$769,000	$4,936
1 "	"	'12	1,808,472	1,162,811	645,660	740,322	†94,662
7 "	"	'13	13,928,191	8,314,906	5,613,286	5,329,921	283,365
7 "	"	'12	13,152,880	8,021,299	5,131,581	5,170,645	†39,065

PORTLAND (MAINE) RAILROAD

1m.,	Dec.,	'12	$76,693	*$60,247	$16,446	$10,253	$6,193
1 "	"	'11	72,146	*80,143	7,997	9,743	†17,740
6 "	"	'12	549,915	*352,290	197,625	61,935	135,690
6 "	"	'11	542,761	*381,361	161,400	57,518	103,882

*Includes taxes.
†Deficit.

Traffic and Transportation

The Ticket Seller and the Public

A. D. B. Van Zandt, publicity agent of the Detroit (Mich.) United Railway, was the guest of honor at the February banquet of the Detroit Passenger Club, an organization composed of the ticket sellers and passenger agents of the various transportation companies which have offices in Detroit. Mr. Van Zandt spoke on "The Ticket Seller and the Public" and in the course of his remarks said:

"You, the gentlemen who sell the tickets, are well posted in the passenger operations of your own lines and of the other lines. I say of the other lines because you must know them to know that the line you represent is vastly the superior. If you did not know this you would not be where you are. That is a part of the optimism necessary in the business. You, the gentlemen who sell the tickets, are mighty important cogs in the machinery operating the roads to which you belong. A successful year by the railways depends upon you in no small measure and when I say that I do not limit my meaning to success in purely monetary matters. I say you are important cogs in the machinery because you are the cogs that come closest in touch with the moving public. To most of those who ride —and this includes about all the people—you are the connecting cog between them and the men higher up.

"The presidents of your companies, the general superintendents, the chiefs of divisions are all people of mystery to the riding public. How many Detroiters know, for instance, the president of the Michigan Central Railroad or the man who guides the larger affairs of the Pennsylvania System? As your acquaintances grow in number you become the railways you represent and the railways you represent melt into your personality.

"Truly the personal element is extremely strong with the American public and it is growing stronger every year. The personal standing of yourself with the public is indeed well worth cultivating not only for your own good but for the good of the public utility you represent. As I have said, you are the representatives of your companies with whom the public come in contact and as such you have large duties to perform.

"To you a railway ticket is as simple as adding two and two, but despite the immense aggregate of passenger traffic in the United States most people do not know whether to read a ticket from right to left or upside down. They only know that whatever way they do read it is wrong. The average man simply accepts what you give him in faith that in the course of human events he will reach the haven of rest and be welcomed at the other end. The man or woman who buys a ticket from you, having confidence in you and hence in your road, is entitled to the fullest consideration you can give. A long railway journey often causes no little fear and trembling. This going into strange towns and strange depots is not the most peaceful pursuit and the possibility of going wrong is uppermost in the minds of many. The number of those who heave sighs of relief when the journey is done is by no means small and so it becomes your duty to be patient and careful in dealing with all, opening up to them the full fount of information at your command and seeing that none leave your presence in doubt or with any question still unasked.

"All your corporations have within their organizations departments of publicity—headed by men who, through printed word and picture, impress upon the public mind the beauties of a ride upon your own individual line. The roster of employment does not place you within this department of publicity, but you are nevertheless publicists always. You are advertising agents as well as ticket agents. All the work of the publicity department is of little avail without your co-operation. It would fall to the ground without your personality to make the impression deeper. A pamphlet, an illustration, a bit of description will do its part toward building up the business, but a word from you will make the business certain. Therefore I would say do not be content to pass the printed matter over the counter —talk it over."

Hearing on East Boston Tunnel Toll Reduction

The committee on metropolitan affairs of the Massachusetts Legislature gave a hearing on Feb. 7 upon several bills drafted to eliminate the present toll charge of 1 cent per passenger using the East Boston tunnel, one of the rapid transit lines of the Boston Elevated Railway. Chairman Sullivan of the Boston Finance Commission was the chief advocate of the abolition of the toll, which results in each passenger paying a 6-cent fare when using the tunnel. Mr. Sullivan presented a statement from City Auditor Mitchell of Boston, showing that in 1912 the net receipts from tolls were $134,287, which, added to the rental, which is three-eighths of the gross earnings, or $57,000, totals $191,287. The sinking fund and interest charges call for $150,000. With this excess, Mr. Sullivan claimed that the Railroad Commission is obliged by the terms of the tunnel act to reduce the toll if duly petitioned. Representative B. F. Sullivan and Corporation Counsel Corbett, Boston, opposed the reduction, taking the ground that the tolls are needed to liquidate the sinking fund and interest charges. If the tolls were abolished the city would have to make up the deficit of $93.000 per year. Mr. Corbett emphasized the answer of the Massachusetts Supreme Court in 1906 to a legislative inquiry as to the legality of an act proposed to abolish the tunnel tolls. The court emphatically stated that such enactment would be a repudiation of contract between the commonwealth and the city, and that it would be unconstitutional.

Through Service Between Coffeyville and Parsons.—The Union Traction Company of Kansas, Independence, Kan., has established through service between Coffeyville and Parsons. The distance between the two cities is 50 miles.

Skip-Stop Idea Suggested in Los Angeles.—At the suggestion of President Wheeler, the Public Utilities Board of Los Angeles, Cal., has decided to take up with the electric railways which operate in that city the question of having inbound cars on the interurban lines stop at alternate street corners and the outbound cars stop at corners at which the inbound cars do not stop.

Collision Near Dunkirk.—A westbound passenger car of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., collided with an eastbound freight and express car of the company on the evening of Feb. 11, 1913, 1 mile east of Silver Creek, which is near Dunkirk. None of the passengers was seriously injured, but the cars took fire following the accident and are reported to have been destroyed.

Transportation to Destination.—A car belonging to the Louisville (Ky.) Railway was taken from the carhouse of the company at an early hour recently by a man who claimed former residence and employment as a motorman in St. Louis, Mo. Before the night police chief after his arrest the man declared that a transfer which he held took the form of a contract binding the railway to carry him to his destination. A fine of $5 was imposed.

Accident in Canandaigua.—The lives of more than thirty passengers were endangered when a car of the Rochester & Eastern Railway was derailed and overturned in Canandaigua, N. Y., recently. The accident is ascribed unofficially to the breaking of the front axle on the forward truck of the car. The local fire department at Canandaigua had to be called out to extinguish a fire which started in the car following the accident. The damage to the car from the fire was insignificant.

Protection for Conductors in Spokane.—The City Council of Spokane, Wash., has instructed Commissioner Fassett to take up with the Spokane Traction Company the question of better protection for its conductors during the winter months. The commissioner will endeavor to have the company agree to vestibule the rear platform of its cars or permit conductors to stay inside during the cold weather. If a satisfactory arrangement cannot be effected with the company the Council has announced that it will appeal to the Railroad Commission.

Recommendation for Governing Parades.—The Louisville (Ky.) Railway is interested in a recommendation which the Board of Public Safety of that city has made to the heads of the municipal government. This recommen-

dation is that an official route for street parades and similar processions in Louisville be established and that intervals be determined when such pageants shall break to permit electric railway traffic to pass. The company has experienced considerable difficulty at times in keeping to its schedule because of interruptions from this source.

Suit to Extend Transfer Privilege in Chicago.—Very little real progress has been made in the suit to compel the issuance of transfers between the Chicago (Ill.) Railways and the County Traction Company. The validity of the 1910 traction ordinance granted the Chicago Railways has been questioned. Roy O. West, an attorney who was instrumental in drafting the ordinance, has been called as a witness to explain his position. Emil O. Schmidt, president of the County Traction Company, testified that the company could not operate at a profit if it was compelled to issue transfers to the lines of the Chicago Railways.

Supplementary Petition in Louisville Freight Case.—A supplementary petition has been filed by the Board of Trade and other shippers of Louisville, Ky., with the Interstate Commerce Commission, Washington, D. C., in the case of these complainants versus the Indianapolis, Columbus & Southern Traction Company, Seymour, Ind.; the Louisville & Northern Railway & Lighting Company, New Albany, Ind., and other electric railways connecting Louisville, Ky., with Indianapolis, Ind. In this case through freight routes over the electric railways are sought by the shippers and an original complaint and a response have been filed by both parties to the action.

Complaints Before Pennsylvania Commission.—Certain members of the Birdsboro Town Council have complained to the Railroad Commission that the service furnished to Birdsboro by the Reading Transit Company is inadequate owing to the operation of single-truck cars, not equipped with modern safety appliances. The commission has advised the complainants to file a specific grievance, after which a hearing will be scheduled. W. A. Preston, president of Columbia Town Council, has complained to the Railroad Commission that the Conestoga Traction Company is operating one car on its line with only one man in charge. Walter E. Greenwood, of Coatesville, has complained to the commission that the West Chester Street Railway is over-crowding cars between West Chester and Coatesville.

Electric Express Service Inaugurated at Worcester, Mass.—The Worcester (Mass.) Consolidated Street Railway has begun the operation of an electric express business, a new terminal station having been established on Green Street, near the wholesale shipping district. Service is at present rendered in connection with the Boston & Worcester Street Railway and over the lines of the Consolidated property westward through the Southbridge, Fiskdale, Brimfield and Palmer districts. The Boston freight terminal of the Bay State Street Railway, Boston Elevated Railway and Boston & Worcester Street Railway is being used as a part of the general electric express development in central and eastern Massachusetts, and a striking increase of business between Worcester houses and establishments outside the city and hitherto unprovided with the present Worcester connections, has been noted. Following the securing of the necessary local franchises, the service will be extended toward the north and south of Worcester. The establishment of the present service was delayed about two years by agitation against the granting by the Aldermen of Worcester of an unlimited franchise to transport electric express and freight matter, the company being unwilling to undertake the service under a limited permit. The Massachusetts Railroad Commission favored an unlimited franchise, subject to the usual regulative powers of the board, and as finally granted the permit is not limited as to its duration. The Green Street terminal station is a concrete and brick structure 105 ft. long by 35 ft. wide. It has receiving accommodations for seven teams, with three loading doors and two service tracks capable of handling six cars at a time. Provision has also been made for future storage tracks, and a teaming yard of liberal area has been established. Through and local services are being given daily between Worcester and Boston, with local service between Worcester and Springfield. Frank E. Wood is in charge of the Worcester office as general agent.

Personal Mention

Mr. H. C. Allen has been appointed traffic agent of the Northwestern Pennsylvania Railway, Meadville, Pa.

Mr. G. L. Randall has been promoted to the position of assistant purchasing agent of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.

Mr. P. J. Mitten has resigned as master mechanic of the International Railway, Buffalo, N. Y., to become connected with the Philadelphia (Pa.) Rapid Transit Company.

Mr. W. L. McDonald, of the contract department of the Knoxville Railway & Light Company, Knoxville, Tenn., has been promoted to the position of cashier of the company.

Mr. F. F. Wheeler has been elected president of the Board of Public Utilities of Los Angeles, Cal., to succeed Mr. Thomas Foulkes, who continues as a member of the board.

Mr. George Cooper, who has been acting as auditor of the Knoxville Railway & Light Company, Knoxville, Tenn., has been appointed to the position to succeed J. E. Tappan, deceased.

Mr. Edward G. Riggs has been appointed executive assistant to Mr. Charles S. Mellen, president of the New York, New Haven & Hartford Railroad, with offices in New York.

Mr. R. M. Hannaford, assistant chief engineer of the Montreal (Que.) Tramways, is in charge of the engineering and construction department, in consequence of the resignation of Mr. J. D. Evans.

Mr. H. P. Fant, who has been general manager of the St. John's Electric Company, St. Augustine, Fla., has been elected vice-president of the company and has been appointed general superintendent.

Mr. P. C. Kaercher, who has been purchasing agent of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been promoted to the power sales department as assistant to Mr. T. L. Sturgeon.

Mr. Walter A. Draper, secretary of the Cincinnati (Ohio) Traction Company, has been elected a vice-president of the Ohio Electric Railway, Cincinnati, in addition to the two present vice-presidents, Mr. Dana Stevens and Mr. J. B. Foraker, Jr.

Mr. F. C. Yockey, who has been secretary to Mr. Charles M. Hatch, general manager of the Northwestern Pennsylvania Railway, Meadville, Pa., will act as chief clerk in the traffic department of the company, the traffic agent of which is Mr. H. C. Allen.

Mr. C. O. Bailey, who has been assistant purchasing agent of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been made purchasing agent, to succeed Mr. P. C. Kaercher, who has been promoted to the power sales department.

Mr. Edmund Arthur Robert, president of the Montreal (Que.) Tramways, has been elected president of the Halifax (N. S.) Electric Tramway, the property of which was taken over recently by a syndicate composed of himself, Mr. J. W. McConnell, Mr. W. G. Ross and others.

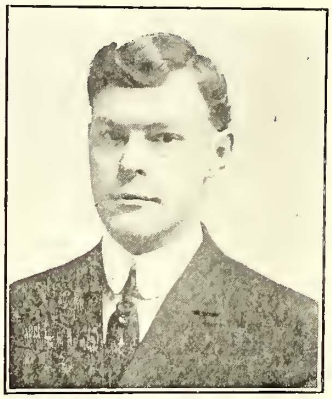
Mr. William McClellan, chief engineer of the Public Service Commission, Second District, New York, gave a talk at the Technology Union, Boston, on Feb. 12, before the Electrical Engineering Society of the Massachusetts Institute of Technology, his subject being "Public Service Corporations and the Public."

Mr. W. B. Tuttle, vice-president of the San Antonio (Tex.) Traction Company, controlled by the American Light & Traction Company, has been elected general manager of the San Antonio & Austin Interurban Railroad, organized recently to build an electric railway between San Antonio and Austin, Tex., a distance of 85 miles.

Mr. George W. Dunlap, whose appointment as mechanical engineer of the International Railway, Buffalo, N. Y., was announced in the ELECTRIC RAILWAY JOURNAL of Nov. 30, 1912, will take over the work with that company which was performed previously by Mr. P. J. Mitten, who has resigned as master mechanic of the company to become connected with the Philadelphia (Pa.) Rapid Transit Company.

Mr. W. R. Willcox, who has just retired as chairman of the Public Service Commission of the First District of New York, had a dinner tendered to him at the Hotel Astor, New York, on the evening of Feb. 17, 1913, by the present members of the commission and the past and present members of the staff of the commission. Among those who attended were: Chairman McCall of the commission, Commissioners Maltbie, Eustis and Williams, ex-Commissioners Bassett and McCarroll, Mr. Travis H. Whitney, secretary of the commission; Mr. Alfred Craven, chief engineer of the commission; Mr. James Blaine Walker, assistant secretary of the commission, and Dr. A. F. Weber, statistician of the commission.

H. G. Throop



F. L. Hinman

Mr. F. L. Hinman, who has been promoted to be shop foreman and master mechanic of the Syracuse and Oneida lines of the New York State Railways, has during the past ten years served in various capacities with the Syracuse (N. Y.) Rapid Transit Company and its successor. He began as a shop apprentice in Syracuse, but spent a year with the Auburn & Syracuse Electric Railway in the shop and power house in Auburn. He returned to Syracuse in 1905 and became clerk in the storeroom and two years later was put in charge of stores for the Syracuse Rapid Transit Railway and allied lines. In 1910 he became chief clerk to Mr. W. J. Harvie, the chief engineer, and two years later was appointed general foreman of the mechanical department.

Mr. Dan G. Fisher, who has been connected with the Strickland interests in Texas for some time, has been appointed assistant general manager of the interurban electric railways controlled by the J. F. Strickland Company, which include the Dallas-Sherman, Dallas-Waxahachie and Dallas-Waco lines. Mr. Fisher is well known in Dallas. He entered business in that city in the circulation department of the Dallas *Times-Herald.* Subsequently he entered the service of the Strickland interests and has been employed by them in various capacities. He is an active member of the Dallas Advertising League and was chairman of one of the committees of that association at the time of the recent national convention of advertising men held in Dallas.

Mr. H. G. Throop, who becomes engineer of lines and buildings of the Utica-Syracuse lines of the New York State Railways, was graduated from Cornell in civil engineering in 1905. After short terms of service on the New York State Barge Canal and in railway location for the Cleveland, Cincinnati, Chicago & St. Louis Railway, he joined the staff of Mr. W. J. Harvie on the West Shore electrification, in which he had charge of field work and of the preparation of special reports. In the fall of 1908 he was appointed engineer of construction and records for the Syracuse (N. Y.) Rapid Transit Company and allied lines and assisted in the construction of the Wolf Street shops, extending substations, etc. After the consolidation of the lines as part of the New York State Railways he continued the same line of work under the title of engineer of buildings.

Mr. J. R. Ayers, of the New York State Railways, has been appointed master mechanic of the Utica lines of that company with headquarters in Utica. Mr. Ayers has been connected with the Utica & Mohawk Valley Railway and the Syracuse Rapid Transit Railway much of the time during the last fifteen years. After a brief period of service with the Lamb Manufacturing Company, Chicopee Falls, Mass., and the Lackawanna Railroad he entered the shops at Utica. In 1903 he left the employ of the railroad to take charge of the paint shops of the Utica & Mohawk Valley Railway and five years later became master painter of the Utica & Mohawk Valley Railway and of the Syracuse and Oneida lines. In 1910 the work of the car-cleaning department was added to his duties. Mr. Ayers was made general foreman of the Utica shops and master painter for the three lines last year.

Mr. G. N. Brown, who has been appointed electrical engineer of the Utica-Syracuse lines of the New York State Railways, was lately assistant engineer of the same company. After graduation from Cornell in electrical engineering in 1908 he started railway work as inspector of car equipment with the Utica & Mohawk Valley Railway, having served during previous summers as car inspector at Utica and bond inspector at Syracuse. In the fall of 1908 he was transferred to Syracuse as car inspector on the Oneida Railway, but returned to Utica after a year as assistant to Mr. H. S. Williams, electrical engineer of the Utica & Mohawk Valley Railway. In November, 1910, he become connected with the Boston & Maine Railroad and took part in the Hoosac Tunnel electrification, afterward acting as switchboard operator in the North Adams power plant. In May, 1912, he became assistant engineer of the three lines which now form the Syracuse-Utica division of the New York State Railways.

Mr. J. P. Barnes, who on March 1, 1912, succeeded Mr. W. J. Harvie as chief engineer of the Syracuse (N. Y.) Rapid Transit Railway and allied lines, has resigned to become connected with Allen & Peck, Inc. He will represent that firm as general manager of the Syracuse & Suburban Railway, which operates an 18-mile line with twenty-one cars from Syracuse to Fayetteville and Manlius. Mr. Barnes was graduated from the Massachusetts Institute of Technology in electrical engineering in 1905. He spent two months as meter inspector with the Utica & Mohawk Valley Railway, nine months as designer with Pass & Seymour, Syracuse, and nearly six years in various capacities with the Oneida (N. Y.) Railway and the Syracuse Rapid Transit Company. During this last connection he assisted Mr. Harvie in the West Shore electrification and in laying out and superintending the construction of the Wolf Street shops in Syracuse. Between 1908 and 1912 he was assistant electrical engineer in connection with the line and power departments of the Syracuse Rapid Transit Railway and allied lines. When the New York State Railways took over

J. R. Ayers

G. N. Brown

the Syracuse Rapid Transit Railway in 1912 Mr. Barnes continued as chief engineer of the consolidated lines. Since Mr. Barnes' resignation on Feb. 15 his duties have been divided among other members of the staff, and the office of chief engineer will be abolished. On Feb. 13, 1913, a dinner was tendered to Mr. Barnes by his immediate associates in the company, and on Feb. 15, 1913, a dinner was tendered to him by the heads of the departments of the New York State Railways.

Mr. Safford K. Colby has been elected one of the vice-presidents of the firm of Allen & Peck, Inc. Mr. Colby is well known in the electric railway business. He is an engineer of experience and his association with leading manufacturers has brought him in contact with many of the larger enterprises of recent years. Mr. Colby is an alumnus of the Rensselaer Polytechnic Institute, from which he was graduated in 1894. After eleven months in the employ of the Lake Shore & Michigan Southern Railroad as rod and instrument man, he entered the electric railway business and from May to October, 1895, was engineer in charge of construction for the Troy & New England Railroad. Mr. Colby next entered the commercial field, taking a position as assistant to the manager of the New York office of the Pittsburgh Reduction Company, which afterward became the Aluminum Company of America. After two years in this position he was placed in charge of the New York office of the company. In 1905 Mr. Colby resigned to become treasurer of Pierson, Roeding & Company, San Francisco, and later became vice-president and part owner of the firm. Through his connection with Pierson, Roeding & Company and the principals they represented on the Pacific Coast, among whom were The J. G. Brill Company, the Aluminum Company of America, the Electric Storage Battery Company, the Locke Insulator Manufacturing Company, the Lombard Governor Company, the Fibre Conduit Company, the R. D. Nuttall Company and the tower department of the American Bridge Company, Mr. Colby has been identified with much of the important electrical construction in the western part of the United States. In October, 1912, Mr. Colby was elected a member of the executive committee of the American Electric Railway Manufacturers' Association. He is an associate member of the American Institute of Electrical Engineers and an associate of the American Society of Civil Engineers. Mr. Colby, with his eighteen years of experience in the commercial side of the electric railway business, brings to his new associates knowledge and ability which should prove of great value to them in their many enterprises.

S. K. Colby

OBITUARY

James F. Parker, who has been connected with the claim department of the Quincy division of the Bay State Street Railway, Boston, Mass., for eighteen years, is dead. Mr. Parker was born in Quincy forty-five years ago. He was educated in the Adams School, Quincy, and entered the employ of the Bay State Street Railway as a clerk.

Marcellus H. Young, a former president of the Union Trunk Line, one of the street railways assembled by Stone & Webster as the Seattle (Wash.) Electric Company, is dead. Mr. Young became a member of the board of trustees of the Seattle Electric Company at the time of its formation, but retired from the Stone & Webster properties upon the organization of the Puget Sound Traction, Light & Power Company.

Edward L. Clark, for many years auditor of the General Electric Company, died at his home in Schenectady, N. Y., on Feb. 15, after a lingering illness. The late Mr. Clark was born in Edinburgh, Scotland in 1849. In 1884 he came to America and was employed by Mr. Thomas A. Edison as auditor of the Edison Electric Light Company, New York, N. Y. In December, 1891, he became auditor of the Edison General Electric Company. He had full charge of the work of consolidation of accounts when the General Electric Company was organized in 1892. Two years later he was made assistant to the comptroller of the General Electric Company, the late J. P. Ord, and soon thereafter was made general auditor of the company.

Construction News

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

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

RECENT INCORPORATIONS

***Colorado Mines, Railways & Utilities Corporation, Dover, Del.**—Incorporated in Delaware with an authorized capital stock of $25,000,000, consisting of 5,000,000 shares of the par value of $5 each.

***Valdosta (Ga.) Traction Company.**—Incorporated in Georgia to succeed the Valdosta Street Railway. Capital stock, $125,000. Incorporators: W. S. West, J. G. Cranford and E. K. Wilcox.

***Hooppole, Yorktown & Tampico Railroad, Hooppole, Ill.**—Incorporated in Illinois to build an interurban railway from Hooppole to Tampico via Bureau County. Capital stock, $100,000. Incorporators: Charles W. Groves, Henry J. Ringel, George Mathis and James Tonkinson, of Hooppole; R. H. Mathis, of Prophetstown, and John H. Cooley and J. W. Mathis, of Tampico.

***Tipton-Frankfort Traction Company, Tipton, Ind.**—Incorporated to build an electric railway presumably between Tipton and Frankfort. Capital stock, $10,000. Incorporators: E. Purtelle, A. G. Busick and F. B. Russell.

***Farmington & Oakland Interurban Railway, Farmington, Maine.**—Application for a charter has been made by this company in Maine to build an electric or steam railway between Farmington and Oakland, via New Sharon, Mercer and Smithfield. Capital stock, $300,000.

***Houlton (Maine) Street Railway.**—Incorporated in Maine to build an electric or storage battery line from the Canadian Pacific Railroad in Houlton to Limerick and the shores of Nickerson Lake. The authorized capital stock is fixed at $4,000,000, divided into shares of $100, but the amount to be issued at this time has not been decided yet. The company has the right to do a freight, passenger and express business. Incorporators: Arthur R. Gould, Horace N. Crandall, Presque Isle; Parker P. Burleigh and Ira G. Hersey, Houlton.

***Kansas City, Raytown & Lees Summit Electric Railway, Kansas City, Mo.**—Application for a charter has been made in Missouri by this company to build an electric railway from the Metropolitan Street Railway's right-of-way, where it intersects with the Blue Ridge Road, ½ mile east of Sheffield, along the Blue Ridge Road to Hickmand Mills, thence across country to Lees Summit, a distance of 30 miles. A contract for grading has been let to Davidson Brothers Construction Company. Incorporators: F. J. Bannister, Compton J. Tucker, R. E. O'Malley, Luther Davidson and Robert Davidson.

***Ottawa & St. Lawrence Electric Railway, Ottawa, Ont.**—Application will be made to the Ontario Legislature at its next session for an act amalgamating the North Lanark Railway with the Ottawa & St. Lawrence Electric Railway, under the name of the Ottawa & St. Lawrence Electric Railway, and increasing the capital stock from $1,000,000 to $5,000,000.

***American Railways, Philadelphia, Pa.**—Incorporated in Delaware for the purpose of surrendering its New Jersey charter and bringing its business under the laws of Delaware as referred to in the department Financial and Corporate elsewhere in this issue. Capital stock, $25,000,000. Jeremiah J. Sullivan, president.

***Palmetto Railway, Columbia, S. C.**—Application for a charter has been made by this company in South Carolina to build an interurban line from Columbia to Greenville via Prosperity, Newberry, Clinton and Laurens, a distance of 100 miles. Capital stock, $500,000. Incorporators: W. L. Gray, A. J. Christopher and E. S. Hudgins, Laurens, S. C.

FRANCHISES.

Los Angeles, Cal.—J. M. Buckley has received a twenty-one-year franchise from the Council for a double-track line on Fifty-fourth Street from Denker Avenue to the west city limits of Los Angeles.

Bay City, Cal.—The Pacific Electric Railway has asked the Board of Supervisors for a franchise in Bay City. The company has asked the Council for a franchise for an extension of its Alamitos line from the present terminus along Ocean Avenue to Main Street, thence to junction with the main line in Los Angeles.

Martinez, Cal.—The Oakland, Antioch & Eastern Railway, Oakland, has asked the Board of Supervisors for a franchise along the county road from Walnut Creek to Danville for the extension of the San Ramon Valley branch of its line to the Oakland Park stock farm.

Belleville, Ill.—The East St. Louis & Suburban Railway has asked the Council for a twenty-five-year extension of its franchise in Belleville.

Champaign, Ill.—The Danville, Urbana & Champaign Railway has asked the City Council for a franchise over Walnut, Bailey and Market Streets and University Avenue in Champaign.

East St. Louis, Ill.—The East St. Louis Railway has asked the Council for a franchise over Fortieth Street from Waverly Avenue to Forest Place and on Forest Place from Fortieth Street east to the city limits.

Jacksonville, Ill.—It is reported that H. E. Chubbuck, vice-president of the Illinois Traction System, has offered the city $30,000 bonus for a franchise for the Jacksonville Street Railway. The city asks a percentage of the gross receipts for a renewal of the franchise.

Cedar Rapids, Ia.—The Cedar Rapids & Marion City Railway has asked the Council for a twenty-five-year franchise to extend and double-track some of its lines in Cedar Rapids. The company has asked the Council for a franchise to use the proposed new bridge at Third Avenue in Cedar Rapids.

Lexington, Ky.—The Kentucky Utilities Company, Lexington, has asked the Fiscal Court for a franchise along various county turnpikes coming into Lexington.

St. Martinville, La.—The Southwestern Traction & Power Company has received a franchise from the Council in St. Martinville. Right of way has been obtained and work on the line through St. Martinville will probably be begun at once.

Cloudcroft, N. M.—J. C. Jones, Cloudcroft, has received a franchise from the county commissioners to build an electric railway from Cloudcroft down and through James Canyon to the easterly line of Otero County, and from Cloudcroft through Cox Canyon to the easterly line of Otero County. [E. R. J., Dec. 21, '12.]

Lexington, N. C.—The North Carolina Public Service Company, Salisbury, has received a sixty-year franchise from the Council in Lexington.

***East Berlin, Pa.**—The Council has granted a franchise to East Berlin capitalists to build an electric railway in East Berlin. This is part of a plan to build a line between East Berlin and York. Surveys will be begun as soon as the weather permits. It is intended to operate this railway as an independent line. The names of those interested are not yet given out.

Austin, Tex.—The San Antonio & Austin Interurban Railway, San Antonio, has asked the County Commissionerst for a franchise to operate through Travis County. This 80-mile line will connect Austin and San Antonio. Vories B. Brown, San Antonio, president. [E. R. J., Feb. 8, '13.]

Galveston, Tex.—The Galveston Electric Company has received a franchise from the Council for a new line in Galveston. The grant will make it possible for the company to build its proposed new line to the east end of the city of Galveston.

Richmond, Va.—The Virginia Railway & Power Company has asked the Common Council for a franchise over Franklin Street, Richmond.

Milwaukee, Wis.—The Milwaukee Western Electric Railway has asked the Council for a franchise to enter Milwaukee over the tracks of the Milwaukee Electric Railway & Light Company. The company plans to build a line between Milwaukee and Fox Lake. Most of the right-of-way has been obtained.

TRACK AND ROADWAY

Tidewater Development Company, Birmingham, Ala.—This company has completed its line between Birmingham and East Lake.

Calgary (Alta.) Municipal Railway.—This company will build about 18½ miles of city track during the year.

Burrard, Westminster & Boundary Railway & Navigation Company, Vancouver, B. C.—Work will be begun in May by this company on the section of its line between Stave River Falls and Pitt River, 20 miles. [E. R. J., Oct. 26, '12.]

Glendale & Eagle Rock Railway, Los Angeles, Cal.—This company's line, which extends from Fourth and Brand Avenues, Glendale, to Verdugo Park, is to be taken over by a financial syndicate of Los Angeles men. The prospective owners plan to extend the line from Verdugo Park through Montrose to Los Angeles Avenue, in La Crescenta.

Pacific Electric Railway, Los Angeles, Cal.—Bids for grading this company's line to connect San Bernardino and Upland will be opened Feb. 20.

Redwood City (Cal.) Railway.—This company will begin work in March on the construction of its 4½-mile line in Redwood City. George A. Merrill, Redwood City, president. [E. R. J., April 6, '12.]

Crescent City Railway, Riverside, Cal.—This company has awarded the contract for the grading of the extension from Bloomington to Rialto to Oscar Ford, Riverside.

Capital Traction Company, Washington, D. C.—Plans are being considered by this company for a line on Seventeenth Street, from U Street to Pennsylvania Avenue, and on Eighteenth Street, west from G Street, southward to and into Potomac Park, Washington.

Palatka-Hastings Interurban Railway, Palatka, Fla.—This company states that its plans are not yet sufficiently definite to warrant publication as to when work will be begun on its 10-mile line between Palatka and Hastings. Its passenger service will be handled by direct gasoline or by gasoline electric power and the freight will be handled by steam. F. J. Von Angelken, East Palatka, secretary. [E. R. J., Feb. 1, '13.]

Georgia Railway & Power Company, Atlanta, Ga.—It is announced that this company will spend $1,104,000 during 1913 for improvements and extensions to its lines. The greater part of this money will be used to pay for the laying of double tracks.

Hillsboro Electric Light & Power Company, Hillsboro, Ill.—It is reported that this company plans to build a line from Hillsboro to Nokomis, via Schram City, during the summer. A franchise will soon be asked of the Council in Schram City.

Chicago, Peoria & Quincy Traction Company, Peoria, Ill.—This company held its first annual meeting in Peoria Feb. 10 and elected the following officers: J. L. Soebbing, president; Judge Albert Akers, first vice-president and general manager; W. J. Heintz, second vice-president; C. A. Van Ness, secretary; B. G. Vasen, treasurer. It was stated at this meeting that satisfactory financial arrangements were about to be made and actual construction would be started in the near future on its line between Quincy and Peoria. [E. R. J., Nov. 16, '12.]

Springfield & Jacksonville Railway, Springfield, Ill.—Land owners along the right-of-way of this railway, which ceased operations after securing the right-of-way and grading between Springfield and Jacksonville will attempt to revive the project. A meeting has been called for Feb. 25. It is announced that new financiers for the railway have been secured. John W. Boston is interested.

Laporte, Ind.—Plans are being made by citizens of Laporte for the organization and incorporation of an electric railway to extend from Laporte to Logansport via Bass Lake and Knox. Ora Boserman is said to be interested. [E. R. J., Dec. 14, '12.]

Joplin & Pittsburg Railway, Pittsburg, Kan.—This company is now building 1½ miles of new track in the city of Joplin.

Louisville (Ky.) Railway.—Surveys will be made by this company for an extension of its Orell line from Kosmosdale to West Point, a distance of 3 miles.

Madisonville, Ky.—B. T. Robinson, Morton's Gap, and W. W. Kington are considering plans to build an electric railway from Madisonville to Nortonville. [E. R. J., Dec. 14, '12.]

Baton Rouge (La.) Electric Railway.—This company will build 3 miles of new track during the year.

Rockland, South Thomaston & St. George Railway, Rockland, Maine.—This company plans to build 2 miles of track to South Thomaston.

Frederick (Md.) Railroad.—A 10-mile line from Jefferson through Petersville to Brunswick will be built by this company during the year.

Michigan United Traction Company, Lansing, Mich.—It is said that this company plans to reconstruct the roadbed of its Lansing-St. John's line, a distance of about 21 miles.

Granite City Railway, St. Cloud, Minn.—About 3½ miles of new track will be built by this company during 1913.

Moberly, Huntsville & Randolph Springs Railway, Moberly, Mo.—This company advises that it will award contracts in April to build its 12-mile line between Moberly, Huntsville and Randolph Springs. It will also furnish power for lighting purposes in Huntsville. Capital stock, $500,600. Officers: C. H. Dameron, president; W. T. Dameron, vice-president; W. M. Evans, secretary; G. P. Dameron, treasurer, and John J. Mundinger, chief engineer, all of Huntsville. [E. R. J., Feb. 15, '13.]

Piedmont & Northern Railway, Charlotte, N. C.—Work will soon be begun by this company on its extension to Concord, N. C.

Brazil, Devil's Lake & Minneapolis Electric Railway, Devil's Lake, N. D.—This company has not yet decided when it will begin the construction of its 3-mile gasoline and steam railway in Devil's Lake. The company will operate eleven cars and will locate its repair shops at Devil's Lake. Capital stock authorized, $100,000; issued, $10,000. Officers: A. B. Fox, president and general manager; J. B. Richey, vice-president; Vernon E. Fox, secretary, and C. W. Glasgow, treasurer. [E. R. J., Dec. 28, '12.]

Halifax (N. S.) Electric Tramway.—About 2½ miles of new track will be built in Halifax by this company during the year.

Porcupine-Rand Belt Electric Railway, Porcupine, Ont.—The organization of this company is now completed. It holds an Ontario charter of incorporation; it has a Quebec charter, and it is proposed to secure a Dominion incorporation. Preliminary surveys have been made for several routes under existing charters, viz: From Dane, via Larder Lake, to North Temiskaming and Liskeard; from Ruel, on the Canadian Northern Railroad, to Lake Porcupine and the National Transcontinental Railway via West Shining Tree Lake and the Mattagami River, and from Dane to Swastika and the Great North Bend, Montreal River, to South Porcupine. It is proposed to use single storage battery cars, with trailers for freight. There are several good water powers along the routes which it is proposed to develop for recharging batteries. The company is authorized to make agreement for running rights with railways with which its line may connect. The following officers have been elected: F. G. Earl, New York, president; S. A. Adila, Toronto, vice-president; H. S. Rowland, Toronto, secretary and treasurer, and C. R. Fullerton, Liskeard, Ont., chief engineer. [E. R. J., Dec. 7, '12.]

St. Thomas (Ont.) Street Railway.—About 1 mile of new track will be built by this company in St. Thomas.

Oregon Electric Railway, Portland, Ore.—Among the improvements planned by this company will be the extension of its line from Eugene to Roseburg, via Cottage Grove, and from Roseburg to Myrtle Point and Coos Bay and thence south along the coast to San Francisco.

Altoona & Logan Valley Electric Railway, Altoona, Pa.—This company has been asked to extend its tracks by building a loop from the present terminus at East End in Altoona to the Red Bridge by way of the cemetery.

Easton (Pa.) Transit Company.—This company announces that it contemplates an expenditure of $250,000 during the year to improve its lines in Easton, Phillipsburg, Palmer and Freemansburg.

Sherbrooke Railway & Power Company, Sherbrooke, Que.—This company will build 1 mile of new track in Sherbrooke during the year.

Carolina Traction Company, Rock Hill, S. C.—During the year this company plans to build 8 miles of track.

Knoxville Railway & Light Company, Knoxville, Tenn.—This company has placed in operation its 3-mile extension to Vestal. The company has under construction a 5-mile extension along the Kingston pike.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—Work will be begun on March 1 by this company on its electric line between Salt Lake City, Provo and Payson. The company will purchase power from the Utah Power & Light Company and will operate eight or ten cars. W. C. Oram, Salt Lake City, president. [E. R. J., Dec. 21, '12.]

***Tacoma, Wash.**—Plans are being considered to build an 11-mile municipal electric railway in Tacoma from Eleventh Street and A Street to Dash Point. Nicholas Lawson and S. C. Davis, Tacoma, are interested.

Monongahela Valley Traction Company, Fairmont, W. Va—Surveys have been made and it is reported that bids will be asked by this company in April for the construction of its line between Salem and Lumberport. The track will be laid with 80-lb. rails.

SHOPS AND BUILDINGS

San Francisco, Oakland & San José Railway, Oakland, Cal.—This company has awarded the contract to the Twohy Brothers, Spokane, Wash., for the enlargement of its terminal facilities at Oakland.

Atlanta & Carolina Railway, Atlanta, Ga.—During the year this company plans to build new carhouses and repair shops in Atlanta.

Springfield (Ill.) Consolidated Railway.—This company plans to build an addition to its carhouses at Springfield. The structure will be of steel and concrete construction. It is estimated to cost amout $5,000.

Kankakee & Urbana Traction Company, Urbana, Ill.—This company has leased the L. E. Ford building on North Market Street in Champaign, which it plans to use as a passenger station.

Tri-City Railway & Light Company, Davenport, Ia.—Property in Rock Island has recently been purchased by this company and it will soon build new carhouses and repair shops between Third Avenue and Fifth Avenue east of Twenty-fourth Street.

Des Moines (Ia.) City Railway.—During the next two months this company plans to build a new carhouse with a capacity for sixty cars in Des Moines.

Winnipeg (Man.) Electric Railway.—During the year this company will build a new carhouse with a capacity for 100 cars at Winnipeg.

Detroit (Mich.) United Railway.—Work was begun by this company on its new general repair shops in Detroit.

POWER HOUSES AND SUBSTATIONS

Edmonton (Alta.) Radial Railway.—During the next few months this company expects to purchase one 750-kw motor generator, switchboards and transformers. The company has installed a new 2000-kw turbo-generator at its power house in Edmonton.

Toledo Railways & Light Company, Toledo, Ohio.—During the next few weeks this company expects to purchase one 6000-kw turbo-generator with boilers and auxiliary apparatus.

Southeastern Ohio Railway, Light & Power Company, Zanesville, Ohio.—During the next few weeks this company plans to build a new substation at Crooksville, Ohio. The company expects to purchase a rotary transformer and lighting transformers for its Roseville and Crooksville substations.

Cumberland Railway, Carlisle, Pa.—During the next few weeks this company expects to purchase one 100-kw, 600-volt generator and one water turbine.

Rhode Island Company, Providence, R. I.—This company will add to its power plant equipment one 15,000-kw Curtis turbo-alternator. The unit will be built and installed by the General Electric Company.

Manufactures and Supplies

ROLLING STOCK

Boston & Worcester Street Railway, Boston, Mass., has ordered two 36-ft. closed cars from the Wason Manufacturing Company.

Philadelphia & Garrettford Street Railway, Upper Darby, Pa., has purchased two 51-ft. passenger and baggage car bodies from the Jewett Car Company.

Monongahela Valley Traction Company, Fairmont, W. Va., has purchased two 42-ft. and two 43-ft. passenger car bodies from the Jewett Car Company.

Alton, Granite & St. Louis Traction Company, Alton, Ill., has ordered from the American Car Company ten 26-ft. closed cars with Brill No. 22 special trucks.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., lost a passenger car and a freight and express car in a fire which resulted from a collision near Silver Creek.

Charleston-Dunbar Traction Company, Charleston, W. Va., has ordered one 52-ft. passenger, baggage and smoking car body from the Jewett Car Company.

Birmingham Rapid Transit Company, 1025 First National Building, Birmingham, Ala., is in the market through the Kelly Company, its engineers, for forty city cars.

Tidewater Southern Railway, Stockton, Cal., has ordered from the Jewett Car Company three 51-ft. passenger, baggage and smoking car bodies and one 45-ft. passenger car body.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill., has ordered ten 53-ft. 8½-in. passenger and smoking car bodies and one 46-ft. express car body from the Jewett Car Company.

Lehigh Valley Transit Company, Allentown, Pa., has ordered from the Jewett Car Company three 50-ft. express car bodies and six 56-ft. combination passenger, baggage and smoking car bodies.

Southern Traction Company, Dallas, Tex., noted in the Electric Railway Journal of Feb. 1, 1913, as having issued specifications for twenty-two 53-ft. interurban cars, has ordered this equipment from the St. Louis Car Company.

Birmingham, Ensley & Bessemer Interurban Railway, Birmingham, Ala., has purchased twenty-five dump cars from the William J. Oliver Manufacturing Company for use in line construction work which it has under way in and around Birmingham.

TRADE NOTES.

F. H. Allison, Pittsburgh, Pa., has been appointed general purchasing agent in charge of all office and factory supplies for the American Vanadium Company and the Flannery Bolt Company, Pittsburgh.

Standard Heat & Ventilation Company, Inc., New York, N. Y., has appointed Frank N. Grigg its district manager with offices in Washington, D. C. Mr. Grigg was eastern representative of the Adams & Westlake Company for the past ten years.

H. W. Johns-Manville Company, New York, N. Y., held its annual salesmen's conventions on various dates from Jan. 2 to Feb. 8 at Milwaukee, Boston, New York, Philadelphia, Pittsburgh, Cleveland, Chicago, St. Louis, New Orleans, San Francisco and Toronto. More than 600 salesmen and department managers of the company were in attendance.

Weir Frog Company, Cincinnati, Ohio, has elected B. W. Rowe, formerly president, as chairman of the board of directors, and O. De G. Vanderbilt, Jr., as president of the company. During the past four or five months Mr. Vanderbilt has been in Cincinnati, where he has had active charge of the extensive additions and changes to the company's plant which are about completed. These improvements will increase the output of the plant from 25 per cent to 35 per cent.

Curtis Truck & Forging Company, Decatur, Ill., has been organized as the successor to the Curtis Motor Truck Company. Those in charge of the new organization will continue to make Curtis trucks, but, in addition, will engage in a general forging and manufacturing business, soliciting any business for which their plant is adapted. Those who now have Curtis trucks in service may be assured that the new company places its services at their disposal. A general sales office has been opened at 450 People's Gas Building, Chicago, Ill., and works and general offices are located at Decatur, Ill.

Pressed Steel Car Company, Pittsburgh, Pa., reports that the gross business for the year ended Dec. 31, 1912, amounted to $19,019,403, from which profits of $95,343 remained after paying the preferred stock dividend. This balance was equivalent to 0.76 per cent on the $12,500,000 common stock against 0.14 per cent earned in the previous year. President Hoffstot said in the report that the company's plants were operated continuously throughout the year, but the margin of profit was exceedingly small owing to keen competition. The orders secured in 1911, which carried over into 1912, were executed on an advanced labor and material market. Nothing was applied to the depreciation account, and the balance was added to the previous surplus. The total surplus reported was $7,460,184. The report states that the plants have been well maintained and that the Western Steel Car & Foundry Company, hitherto operated under a lease, has been bought on the basis of a small cash payment and the assumption of an existing mortgage maturing in 1942.

Massachusetts Chemical Company, Boston, Mass., is offering to the electrical trade three new insulating varnishes. Walpole clear insulating varnish is an amber-colored varnish of unusual flexibility and penetrating qualities. It comes through intact when it is subjected to an initial puncture test of 1000 volts per mil of thickness. Walpole black insulating varnish is oil-proof, water-proof and acid-proof and of even higher initial resistance, 1500 volts per mil being guaranteed by the company. It is used especially for insulating armatures and field coils of street railway motors. These two baking varnishes are supplemented by a new Walpole black varnish which is designed for finishing coats. It is made on an alcohol base which permits air drying in thirty minutes and gives the tough, elastic water-proof, acid-proof and oil-proof coat that remains black and lustrous. Richard F. Norvell has recently associated himself with the Massachusetts Chemical Company as traveling salesman and special representative.

General Railway Equipment Company, New York, N. Y., was on petition adjudged bankrupt on Feb. 18. At the same time a petition was filed against the United States Electric Company, a subsidiary company. The petitions were filed for Matthew B. Sentner, both being on claims assigned to him by the Kellogg Switchboard & Supply Company, Chicago, Ill. The petition in each case alleges that the company is insolvent. The General Railway Equipment Company was incorporated in Maine in April, 1912, with an authorized capital stock of $15,000,000, to manufacture railway equipment, principally complete systems of automatic safety equipment. The company authorized an issue of $1,500,000 preferred and $4,500,000 common stock to take over the following companies, which have an outstanding capital stock of $2,155,000: United States Electric Company, National Telephone Selector Company, Sandwich Electric Company, Electric Switch & Signal Company, Charter Electric Company, Sandwich Pole Changer Company and International Telegraphic Call Company.

ADVERTISING LITERATURE

Ohio Brass Company, Mansfield, Ohio, is mailing a folder which is descriptive of the National railroad trolley guard.

Ackley Brake & Supply Company, Inc., New York, N. Y., has issued Folder A-1913, which contains several bulletins relative to its brake and supply business. Bulletins A and B describe and illustrate the Ackley adjustable and no-staff brakes for export. Bulletin No. F-1 lists and describes the various types of Monarch refillable fuses. Bulletin G is devoted to "Tool Steel" gears and pinions for which the Ackley Brake & Supply Company, Inc., acts as export agent. The "Automatic" trolley guard is described and illustrated in Bulletin G-1913.