

# Street Railway Journal

VOL. XXIV.

NEW YORK, SATURDAY, DECEMBER 17, 1904.

No. 25.

PUBLISHED EVERY SATURDAY BY THE  
McGraw Publishing Company

MAIN OFFICE:

NEW YORK, ENGINEERING BUILDING, 114 LIBERTY STREET.

BRANCH OFFICES:

Chicago: Monadnock Block.

Philadelphia: 929 Chestnut Street.

Cleveland: Cuyahoga Building.

London: Hastings House, Norfolk Street, Strand.

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

## TERMS OF SUBSCRIPTION

In the United States, Hawaii, Puerto Rico, Philippines, Cuba, Canada and Mexico.

Street Railway Journal (52 issues)..... \$3.00 per annum

Combination Rate, with Electric Railway Directory and Buyer's Manual (3 issues—February, August and November) \$4.00 per annum

Both of the above, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, \$5.00 per copy).....\$6.50 per annum

Single copies, Street Railway Journal, first issue of each month, 20 cents; other issues, 10 cents.

To All Countries Other Than Those Mentioned Above:

Street Railway Journal (52 issues), postage prepaid..... \$6.00  
25 shillings. 25 marks 31 francs.

Single copies, first issue of each month, 40 cents; other issues, 15 cents.

Subscriptions payable in advance, by check or money order. Remittances for foreign subscriptions may be made through our European office.

Copyright, 1904, McGraw Publishing Co.

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

## EDITORIAL NOTICE

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

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

Address all communications to

STREET RAILWAY JOURNAL,  
114 Liberty Street, New York.

## Car Ventilation.

This is the time of year when it is most necessary to look closely after the ventilation of cars if they are to be kept in a condition which will not cause a loss of traffic. As the cold weather sets in, the natural inclination is to close up cars as fully as possible, and on city cars, where there are many stops, the ventilation afforded by the front and back doors is sometimes more than ample. In outlying districts there is danger that this will not be the case. With the beginning of cold

weather there is a tendency for would-be passengers to stay at home anyway, and if they are confronted with the necessity of riding in an unventilated car if they ride at all, they are quite likely not to ride if they can avoid it. There are many passengers to whom a poorly ventilated car is more disagreeable than a car lacking in many other modern conveniences, yet there are companies which are spending thousands of dollars in purchasing improved rolling stock to induce an increase in travel when betterment in the cleanliness and ventilation of the existing cars would be equally as acceptable to the patrons of the road. New cars are undoubtedly attractive to the riding public, but there is frequently much room for improvements short of the purchase of new cars. We have in mind one suburban line operating in the outskirts of a large city, the receipts of which are undoubtedly falling far short of what they might be were attention paid to these points. As the cars run long distances between stops, there is little opportunity for ventilation by the opening and closing of the door. These cars are operated with the doors and ventilators all closed. They run through a somewhat mixed district, part of the way through manufacturing towns, and the balance skirting along the edge of high-class residential suburbs. The effect on passengers from the latter district on entering these unventilated cars and riding several miles in them just after a load of "hoboes" from the factory district has been disembarked can well be imagined, and the experience is one that is not likely to be sought after the second time. That a certain disagreeable odor is acquired by all cars after they have been in service for some time cannot be denied, the odor, to speak plainly, being dependent mainly on the character of the occupants they are carrying the greater part of their mileage. No small part of it, however, is also due to lack of ventilation in winter, and this lack of ventilation can in turn be attributed primarily to lack of heat. It is much less noticeable in modern cars heated with hot water, or with plenty of electric heaters, than it used to be in cars heated with stoves. The reason for this is simply that where there is plenty of heat radiating surface in a car, a good circulation of air is kept up, and if there is heat enough and to spare in the car, conductors and passengers will see to it that sufficient ventilation is provided to keep the cars reasonably well supplied with good air. One of the things to be done therefore to insure good ventilation is to provide plenty of heat. To be sure, this costs money, but does not begin to cost as much as many other provisions that every enterprising company is making to add to the comfort of travel and induce more travel.

## Save the Controllers or the Resistances?

The difficulty of interrupting the amount of current required to operate heavy elevated and interurban car equipments on a controller drum has forced the development of systems of control in which the circuit is broken by various contact devices, which are better adapted to interrupt large currents than are the contact drums of any drum type of controller. The limita-

tions of the drum type of controller in handling heavy currents are becoming more and more recognized. Nevertheless, many interurban cars have been and are being equipped with drum controllers because of the expense of the multiple-unit control systems which employ contactors capable of safely breaking heavy currents. Because of the danger of starting a destructive short-circuiting arc in a controller, it is the rule of some interurban companies that when current is to be thrown off soon after it has been turned on and the car has gained but little speed, the circuit breaker must be tripped by the motorman before throwing off the controller. This is to prevent burning up the controller by the arcs started when the current is thrown off. It goes without saying that at the crowded corners in city terminals it is not altogether easy for the motorman with two hands to use three pieces of apparatus, namely: the circuit breaker, the controller and the brake, yet when moving slowly through these streets is just the time when the motorman has to make the most use of his circuit breaker when such rules are in force. There is a method of greatly lessening the danger that a controller will be burned out when the current is thrown off before a car has gathered speed. This method is to place a high resistance on the first, and, possibly, the second points on the controller. This resistance will cut down the volume of the current that must finally be broken as the current is thrown off. It is evident that either of these methods of overcoming the danger of burning out controllers is somewhat of a make-shift to avoid the expense of purchasing multiple-unit control apparatus. If a high resistance is introduced so as to make the first point of the controller simply a breaking point, the car will not start until the second point is reached. But while making the first point of the controller simply a breaking point may save the controller much injury, it is likely to increase the number of repairs required on the resistances. With the resistances so proportioned that the car will not start on the first point, the motorman, if careless or indifferent, may sometimes allow the controller to rest on this point instead of throwing it clear to the off position. This, of course, allows a small amount of current to flow through the resistances and motors for a considerable time, and the resistance, especially that on the first point, will suffer. The current wasted, too, may be considerable. On large equipments, when supplied with the ordinary drum controller, it is almost compulsory to use the first point merely to break the current, unless resort is had to the other make-shift of breaking at the circuit breaker.

### Increasing Travel with Long Cars

It is not often possible to state specifically the effect of improvements in rolling stock on the general increase in travel. A case came to our notice the other day in the outskirts of a large Western city where the effect of such a change could apparently be definitely determined. On a certain line which was previously operated with single-truck cars, and where the majority of passengers were long-distance riders, a change was made to long double-truck cars. The maximum speed was between 25 and 30 miles per hour. Single-truck cars at this speed were somewhat given to galloping, and as they were equipped with stoves and longitudinal seats, were altogether a contrast to the new double-truck cars put on the line, which were heated with hot water and equipped with cross seats. The placing of the smooth riding, double-truck cars on the line resulted in an immediate increase of about 10 per cent in travel. This occurred, too, in a district where business was not over brisk at the time when the change was made.

### Some Features of Interurban Freight Business

A striking difference between the freight and express business carried on by interurban roads and steam road freight business, has been the attention to the wants of shippers by the interurban freight agent, which can be summed up in the one word, "accommodation." Wherever interurban freight business is a success, it is because an attention is given to details and to the prompt delivery of small shipments that cannot be given by steam railroads. Just as the steam railroad is magnificently organized for handling large quantities of freight long distances at a minimum expense, the electric road is adapted to moving small quantities of freight short distances with the greatest promptness. The same general principles that have made electric interurban passenger business successful hold true with regard to light freight. The convenience of cars operating at frequent intervals, whether they be passenger or freight, will attract traffic. We must confess, we are not among those who can see any immediate possibility that interurban roads of the kind now in operation will cut much figure in long hauls of heavy freight, because the entire organization of such roads is as unsuited to this kind of work as that of a trunk line steam road is ill adapted to the quick and economic handling of small lots of freight. We do believe, however, that the logical outcome of the present situation is that the local traffic, both freight and passenger, will be, by force of circumstances, given to the electric roads, whether these electric roads are owned by parallel steam roads or not, thus leaving the long haul through business to the steam roads. At the present time, there is undoubtedly much freight being picked up at small way stations on steam roads, or driven in wagons or "on the hoof" to larger towns on the steam roads than could be handled to advantage from points between steam road stations by the electric road, if only the steam and electric interests would work together. We know of one case at the present time where heavy carload freight, such as live stock, is being hauled two-thirds the length of an electric interurban line paralleling a steam line, and in a direction opposite to its ultimate destination, in order that it may be shipped over a friendly steam road with which a traffic arrangement can be made, rather than over the steam road which the electric line parallels and which refuses to make an equitable traffic arrangement with it. When the relations of steam and electric roads get settled down to a more sensible basis, such economic absurdities as this cannot exist, as the logical routing of freight picked up along the line of an electric road for long distance shipments should be by way of the nearest large town on the paralleling steam road. In this way freight can be picked up on any of the various many stopping places on the electric road, small, unprofitable stations on the steam road can be abandoned and the haulage by wagon reduced to a minimum.

A plan of accommodating shippers being practiced on several roads, as described in these columns on a number of occasions, is for the company to act as a kind of agent or middleman between buyer and seller. This is a matter which can be easily worked at a small expense with the operating force and telephone facilities maintained by the interurban roads. By this plan storekeepers in small towns along the line, or farmers, can make their wants known to the interurban freight agent, who sees that the order is telephoned to the proper wholesale or retail dealer in the large center who has the articles desired, and shipment is made on the next car. The only expense to the company in this method of freight accommodation is the time required in sending the necessary telephone messages.

This plan works both ways, and on an Ohio road, recently described in these columns, operating out of Dayton, a company's agent is often able to place various farm products with the city dealer who will pay the best price. All these little things, together with frequency of service, go to make up the success of interurban freight business. Some conservative managers may hesitate a little before going into the matter of accommodating the public in various small ways for fear that it will lead to a necessity for extra men in the freight department. Of course, all these things must be considered, and nothing should be attempted which is likely to develop into a nuisance from the company's standpoint. However, since accommodation to the public is what interurban roads are in business for, it is only logical that as much accommodation of various kinds should be given to customers of the road as can be justified by the net receipts.

### The Season of Snow

"About this time," as the Old Farmer's Almanac genially remarks, "expect snow." We are no prophets, but we feel bound, as a matter of precedent, to nod assent and to begin our annual commiseration of the sorrows of our managing friends. Last winter was a terror that staggered even the mendacious Oldest Inhabitant, but its rigors are no guarantee of better things this season. Nothing is more deceptive than the doctrine of averages when applied to the weather, for while upon the whole it is pretty well established that climate has not changed within historic times, it may square accounts in one year or in twenty. If we comfort ourselves with the thought that the early part of the current year showed very abnormally high precipitation, the unpleasant fact remains that for the last few months it has been extraordinarily dry. Hence the wise man will conclude that it is well to take no chances and will get his snow-fighting apparatus of various kinds ready for action at short notice.

Few people outside of the business realize how formidable is the task of keeping a track clear, let alone that of disposing of the snow in cities. From the last report of the Boston Elevated system, which not only has to remove the snow from its tracks, but take it away from the street as well, the expense due to this item last year exceeded \$600 per mile of single track. To cite one other example, also from Massachusetts, but representing suburban conditions, President Gordon Abbott, of the Massachusetts Electric Companies, states that the winter expenses on that system last year were \$250,000 more than usual. Other roads in Northern cities have similar tales of woe to recite. The country and interurban road do not show anything like the same expense as the city road, but they suffer even more in loss of traffic, and cars, being less frequent, have relatively a harder time of it to keep in operation.

In fighting snow, an ounce of prevention is worth a pound of cure, and the time when the most effective work can be done is during the first hour or two of a snow storm. In many cities the individual track scraper has proved the most important single piece of snow-fighting apparatus. It may take various forms, but it has the merit of being at hand and ready for work when trouble begins. On lines having plenty of cars in operation these cleaners alone will take care of a pretty severe storm, merely in virtue of their continued application, and check that tendency to disorganize the schedule, which almost inevitably ends in a real blockade. Scrapers run five minutes or less apart will generally keep the snow from getting ahead of the game. The fewer the cars the more capable should be the track cleaners

attached to them. And they should be put on early—not after the first few blockades.

The snow plow of the nose or shear type is the next line of defense, but, as we have more than once remarked, the snow plow is useful just about in proportion as it is ready for action. A plow in a distant car house with no crew immediately available may eventually break a blockade, but it seldom prevents one. Many a railroad has been tied up because its available plows were where they could not be gotten into action promptly, or were cut off from the lines where they were most needed by blocked cars. The plows ought to be so located that they can be put at work at all the danger points promptly, keeping ahead of blockades, instead of behind them. Otherwise a stalled car may tie up traffic for half a day. This is most likely to occur on rather long lines, where a little carelessness may produce a block before the plows can get around to the scene of action. In long roads the use of plows on each car, or of something more powerful than the ordinary scrapers, is worth trying. How far it would pay to go in elaboration of such devices it is difficult to say; rather further, we think, than is now customary. For the work which each plow has to do is roughly proportional to the number simultaneously in service, and with every car capable of doing a good bit of work, there is a far better chance of preserving the schedule and getting at the snow regularly at every point of the line.

The third degree is the rotary plow and its kin, fortunately needless in most instances, but tremendously effective when things have gone from bad to worse. There are plenty of interurban lines where these plows can be and are used with the very best results, and we think a good many more could use them to advantage. But even a rotary will not keep the line open unless it is properly backed up. In a driving storm, on a fairly long line, the snow will blow back almost as fast as a single rotary can throw it out, and the last state of that road is as bad as the first. Strength lies in numbers, and cars with plows sent along behind a rotary at frequent intervals will keep the latter's work from being undone.

Another point, which is quite as important in winter as snow-fighting apparatus, is power to operate it with, and right here is where some roads fall down. The winter is the season of heavy demand for power for many reasons. Cars must be lighted and heated, all of which takes considerable power. Even a little snow calls for extra power, and in fair weather and foul there is a tendency in winter to accentuate the peak of the load. Wherefore many a road gets caught short of power when the real rub begins. Even some of the most important and well organized roads have had to cut off their car heating at the rush hours, owing to the crippling of a single big unit in one of the power houses. Accidents will happen in the best regulated families, but when a great system can get caught in that way it behooves lesser ones to keep a close lookout, lest when the snow comes it may find them short of power. If so, a blockade is in order, for if there is any one time in which the full schedule needs to be kept sharply up it is when the snow flakes begin to sift steadily down. The man who wrote "Beautiful Snow" would run imminent danger of being lynched in almost any Northern street railway office. Look sharply to the power station in these troublous times, and if any repairs or renewals are needed, as you value your peace of mind, get them completed before the next storm begins. Else shall you repent and listen hot-eared to the objurgations of the waiting public, and bemoan receipts that might have been had the block been broken in time.

**STANDARDS OF CONSTRUCTION ON THE INDIANAPOLIS NORTHERN LINES OF THE INDIANA UNION TRACTION COMPANY**

During the past season the Indianapolis Northern Traction Company, which is controlled by the Indiana Union Traction

The Indiana Union Traction Company's system as it now stands is shown by the accompanying map, Fig. 1. The new, or Indianapolis Northern, lines extend from Indianapolis to Kokomo, from Kokomo to Logansport, from Kokomo to Peru, and from Tipton to Elwood. The new lines aggregate 110 miles in length. The older interurban lines of the Indiana Union Traction system aggregate 101 miles, and the city lines 50 miles, making a total of 261 miles. The legal relation of the Indianapolis Northern Traction Company to the Indiana

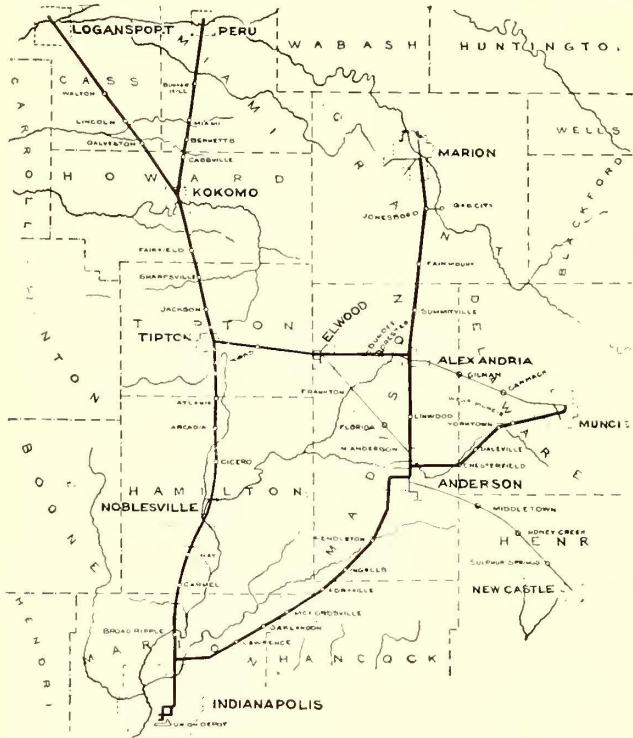


FIG. 1.—MAP OF THE INDIANA UNION TRACTION SYSTEM

Company, has completed about 110 miles of new interurban road. The standard forms of construction used on these latest



CROSSING OF THE LAKE ERIE & WESTERN NEAR NOBLESVILLE

Union Traction Company, which controls it, is given later. A number of the more notable features of the older line of this company were described in the STREET RAILWAY JOURNAL of Dec. 7, 1901, and frequent brief articles about its service have appeared in these columns since that time.

**TRACK AND OVERHEAD CONSTRUCTION**

The standard track and straight line overhead construction

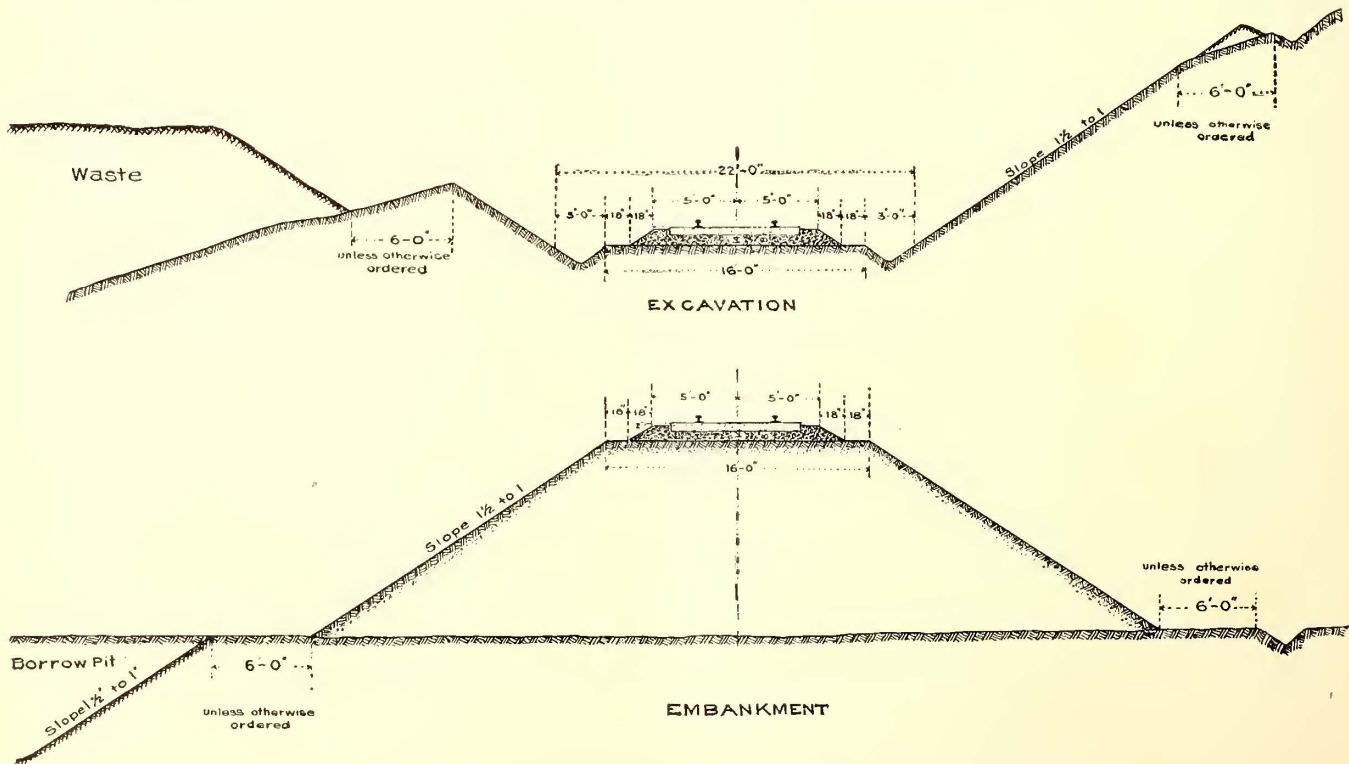


FIG. 3.—STANDARD EARTH SECTIONS

lines are of especial interest because they represent the results of the engineering experience on the second largest interurban system in the country, and one that has always been noted for the excellence of its construction work.

adopted is shown in Fig. 2. Fig. 3 shows the standard earth sections for cuts and fills, while Fig. 4 shows the construction adopted at sidings. From these figures it is seen that the bank upon which the ballast is placed is 16 ft. wide. The slopes on

both cuts and fills are  $1\frac{1}{2}$  to 1. The depth of ballast is 14 ins., and 80-lb standard T-rails have been used in the company's latest work. Ties are 6 ins. x 8 ins. x 8 ft. long, laid 2 ft. between centers. The trolley wire is carried on brackets 22 ft. above the track. Where high-tension transmission lines are necessary, they are placed on high cross-arms, arranged as shown in the drawings. When but one transmission line is used, it is placed on a single cross-arm 7 ft. 9 ins. above the lower cross-arm, which latter carries both the telephone and direct-current feeder wires. The lower cross-arm has the two pins nearest the pole devoted to direct-current feeders. The two pins on each end of the cross-arm are for telephone circuits, one telephone circuit being devoted to train despatching entirely, and the other to general business, although, in cases of emergency, the general business lines are used for despatching. At every twenty-fifth pole is a box at which hook contact can be made with the general business telephone lines. A pole step is provided upon which a telephone can be placed directly under this box. At sidings, as seen in Fig. 4, there is also a telephone connection box, on both the main track and siding, which is so placed that cars can make connection with the despatcher's line without having either the conductor or the motorman leave the car. This is done by simply reaching out of the vestibule window with the telephone connecting cord and hook. There is a clearance of 13 ins. between the side of the car and the telephone connection box. Details of the low-tension cross-arm and despatcher's telephone connection box at the siding are given in Fig. 5. Where two transmission cross-arms are used on a pole, the lower cross-arm is placed 5 ft. above the low-tension cross-arm. Poles are numbered with block letters 3 ins. x 5 ins. in size. In addition to this, there is a siding sign giving the number of the siding, as indicated in Figs. 4 and 5. Poles are placed 6 ft. in the ground. The trolley wire is No. 000, of figure 8 cross section. The trolley insulators and brackets on this new work were supplied by the Ohio Brass Company and the Mayer & Englund Company, respectively. The high-tension insulators are of glass, made by Knowles.

BRIDGES AND CULVERTS

A typical construction is shown in Fig. 6, which is of a 20-ft. arch of steel and concrete, a type erected by the National Bridge Company. This arch provides for a 16-ft. roadbed. The ballast is continued over the culvert, so that there is no abrupt transition from ballast to the

rigid foundation afforded by the concrete structure. This is a type of construction adopted extensively in recent years by steam railroads. It has the advantage that there is less difficulty in keeping the track to proper surface and alignment at the ends of culverts and bridges than if the ties rest directly on the unyielding bridge structure. In the latter case a slight settling of the ballast at the ends of the culvert causes uneven support of the track. While this is true to a certain extent

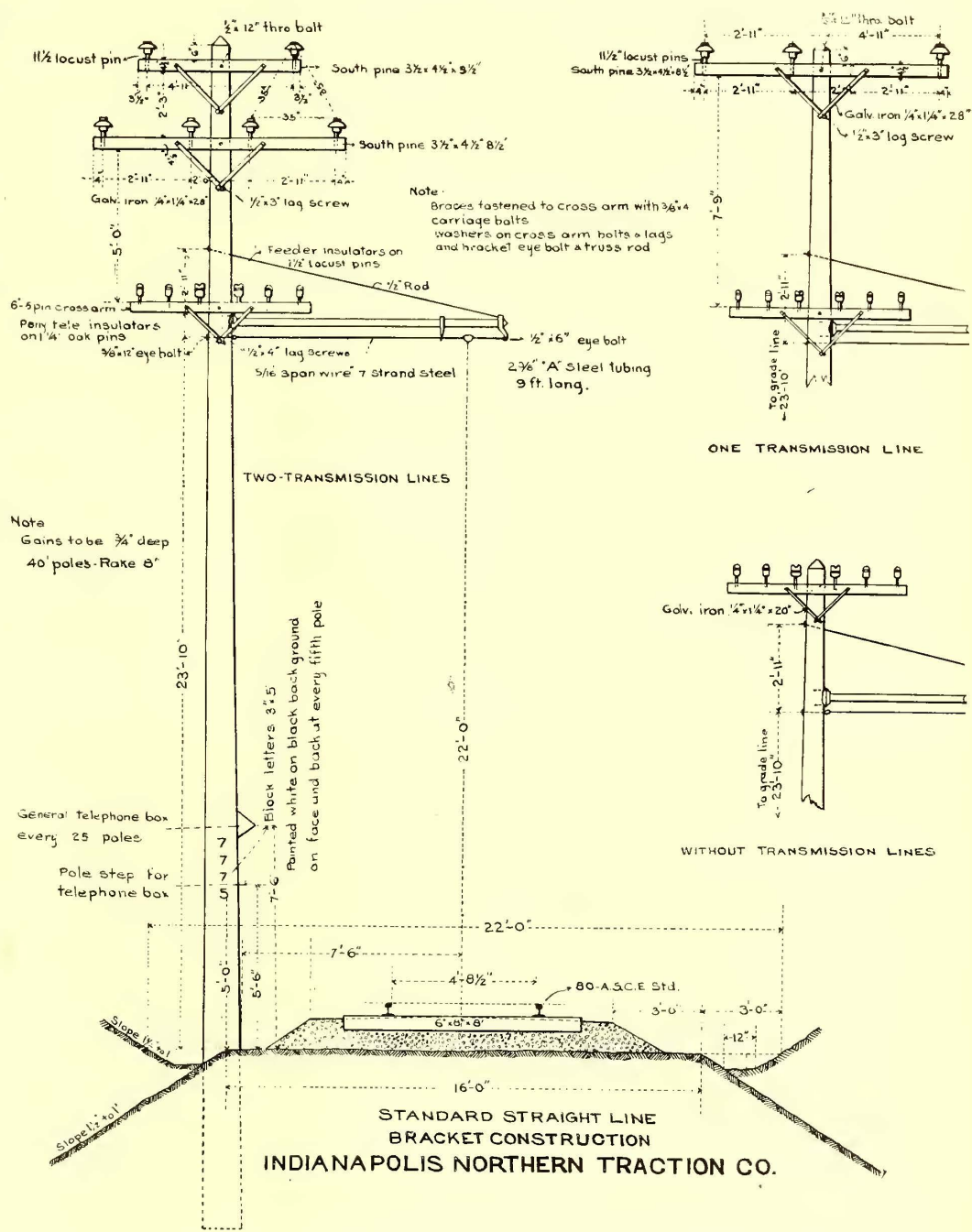


FIG. 2.—STANDARD STRAIGHT LINE CONSTRUCTION

where the ballast is continued over the culvert or bridge, it is not so marked, and there is not the difficulty in keeping the track support at the ends of the bridges in an exact level with the support offered by the rigid bridge structure. In the arch shown in Fig. 6, the concrete is reinforced by corrugated square steel rods of the Johnson type. These rods are placed about 1 ft. apart, as shown in the cross section, and are bent to give reinforcement at the proper point, as shown in the longitudinal section.

The standard abutment for plate-girder bridges is shown in Fig. 7. Fig. 8 shows a short span of track laid on I-beams which rest on such concrete abutments. Fig. 9 shows a somewhat longer type of span on plate girders with concrete abut-

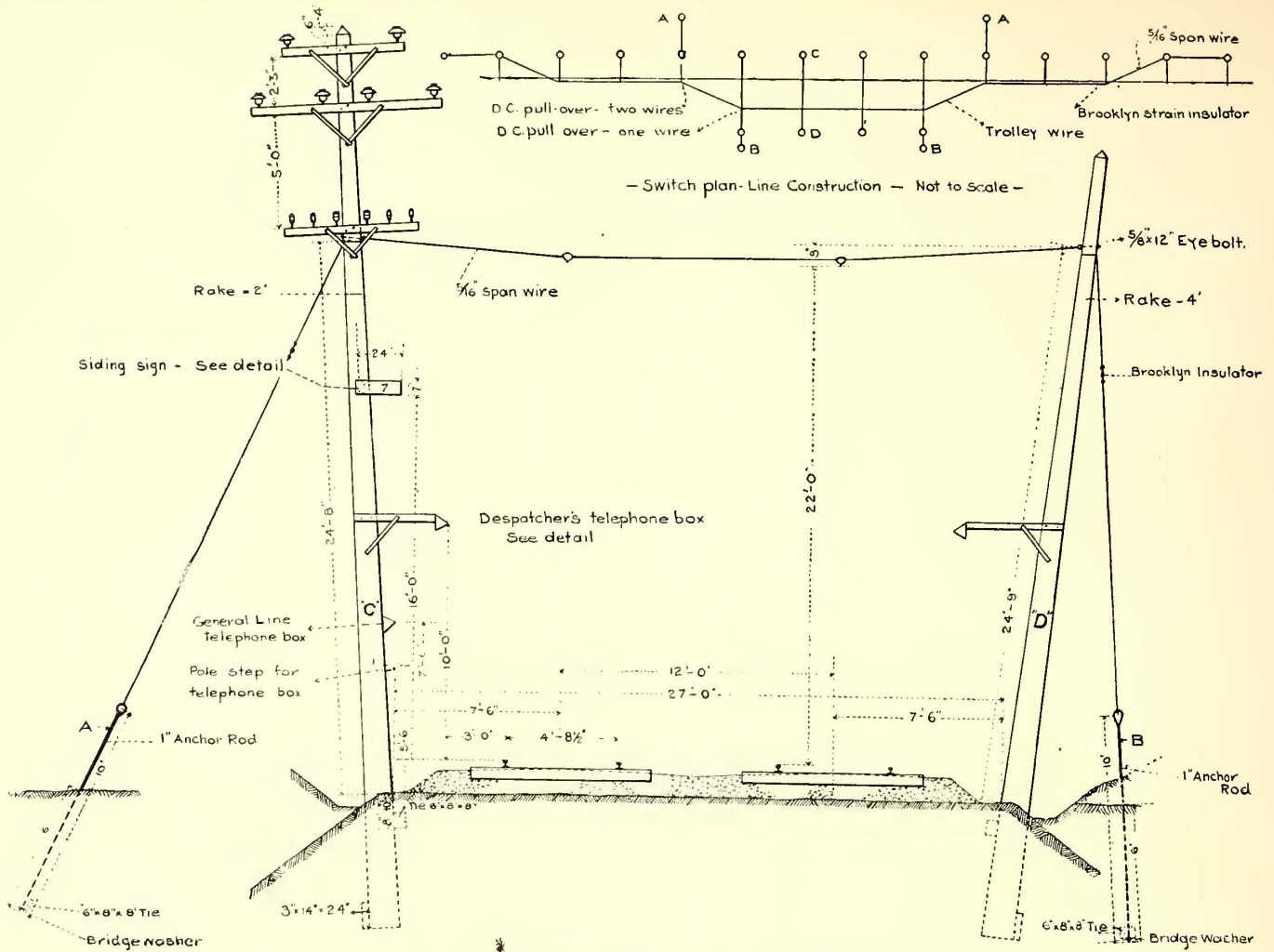


FIG. 4.—STANDARD CONSTRUCTION AT SIDINGS

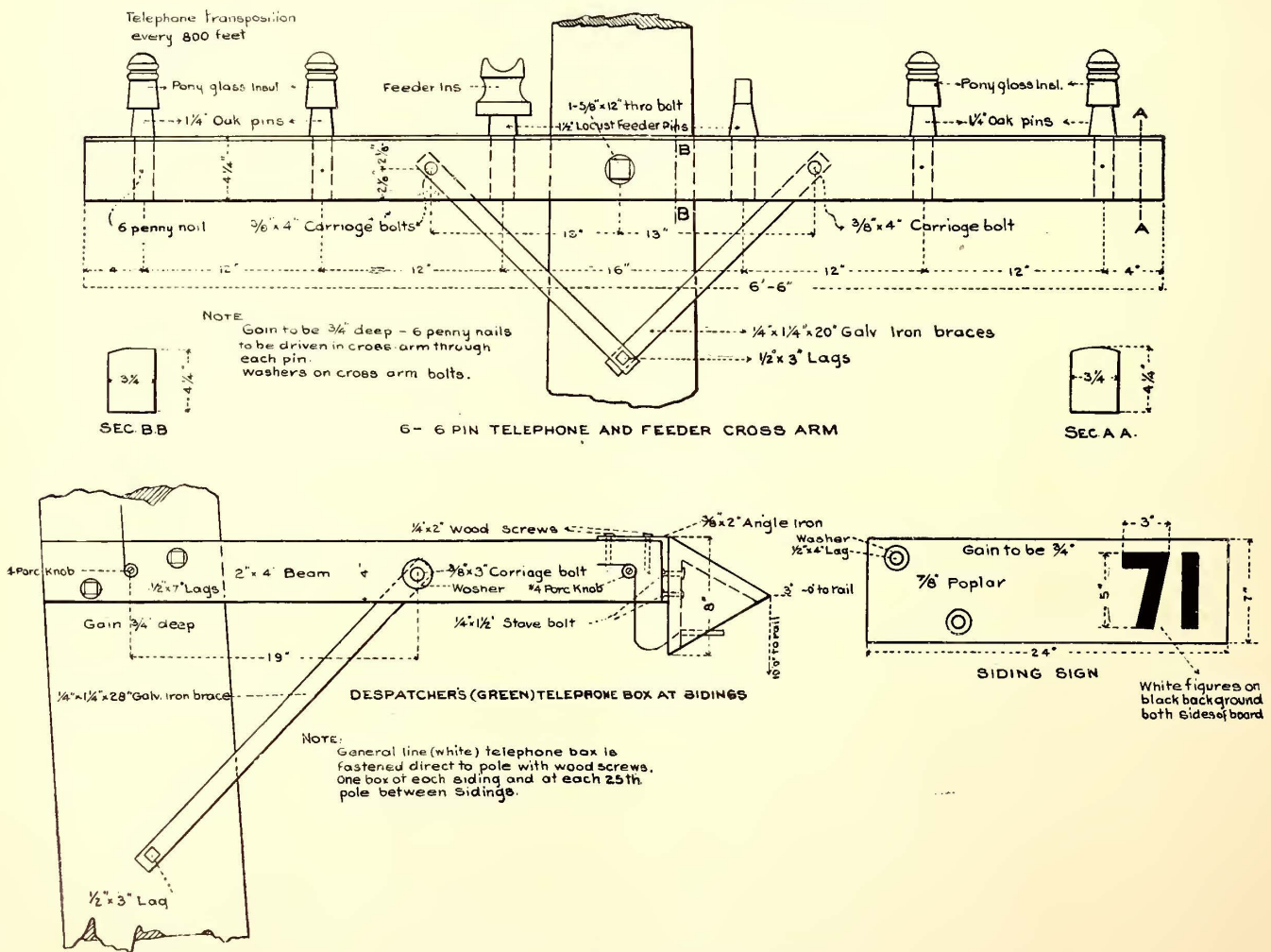
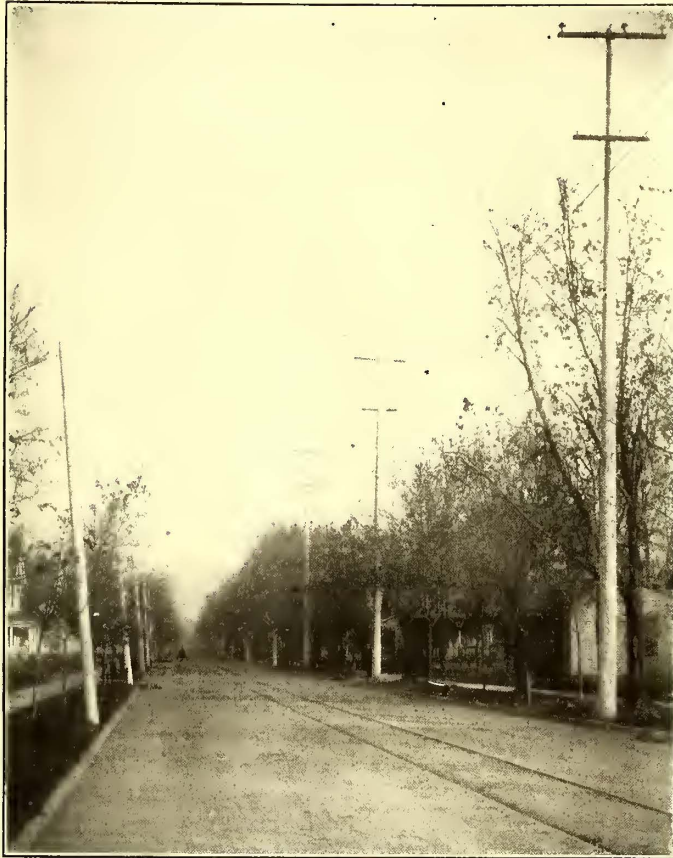


FIG. 5.—LINE CONSTRUCTION DETAILS

ments. This leads up to the construction used on long spans, and that of a 150-ft. span is shown in Fig. 10. Fig. 11 is the standard type of wooden trestle used.

In the Indianapolis Northern construction there are three over-way crossings with the Lake Erie & Western Railroad, and two under-way crossings with the Pennsylvania Railroad.



STREET IN NOBLESVILLE, SHOWING TYPICAL POLE LINE CONSTRUCTION

the trestle across the filtering beds of the Strawboard Works at Noblesville.



TYPICAL CONCRETE ARCH BRIDGE



TYPICAL CONCRETE ARCH BRIDGE

At the grade crossing with the Monon Railway, near Carmel (which, by the way, is the only grade crossing with steam lines outside of the city limits on the Indianapolis Northern

ELECTRICAL DISTRIBUTION SYSTEM

A map of the electrical distribution on this system is given in diagram, Fig. 12. All power is generated at a central power station at Anderson.

The older portions of the system, namely, those east of Elwood, are supplied over high-tension transmission lines operating at 15,000 volts. The new part, or Indianapolis Northern, is supplied over three-phase transmission lines operating at 30,000 volts. The map shows both high and low-tension feeders. From the power station at Anderson to Kokomo are duplicate three-phase transmission lines. On the balance of the Indianapolis Northern system there are single three-phase transmission lines. The distance between sub-stations is given on the dotted lines representing the trolley wire in each case. From this it will be seen that the distance between sub-stations on the line from Indianapolis to Logansport and Peru is 17 miles.



2810-FT. TRESTLE OVER THE FILTER BEDS OF THE BOX BOARD WORKS NEAR NOBLESVILLE

lines), is a full interlocking plant with home and distant signals on both steam and electric lines, furnished by the Union Switch & Signal Company. The principal bridge structures are over the Wabash River at Logansport and also at Peru, over the White River at Broadripple and at Noblesville, and

From this it will be seen that the distance between sub-stations on the line from Indianapolis to Logansport and Peru is 17 miles.

SUB-STATIONS

The floor plan of the standard sub-station arrangement is

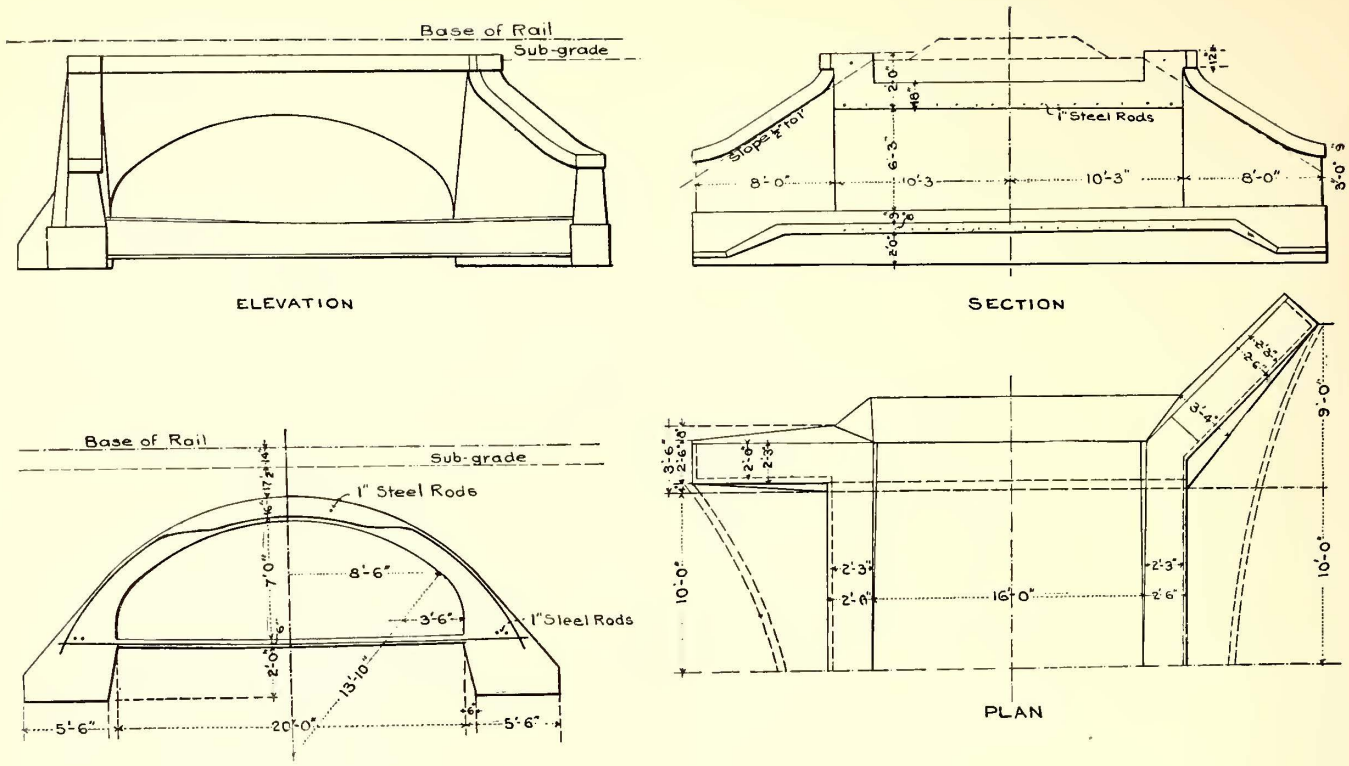
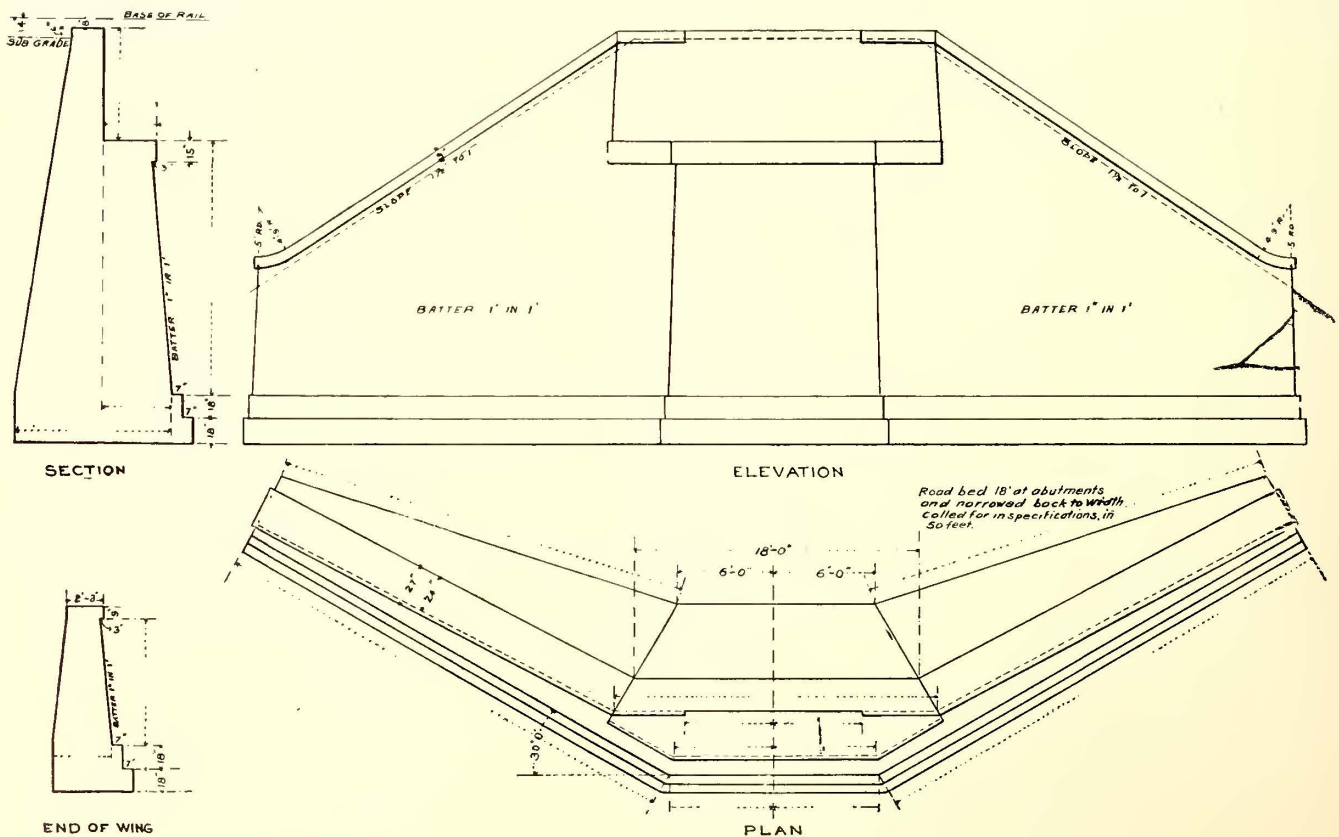


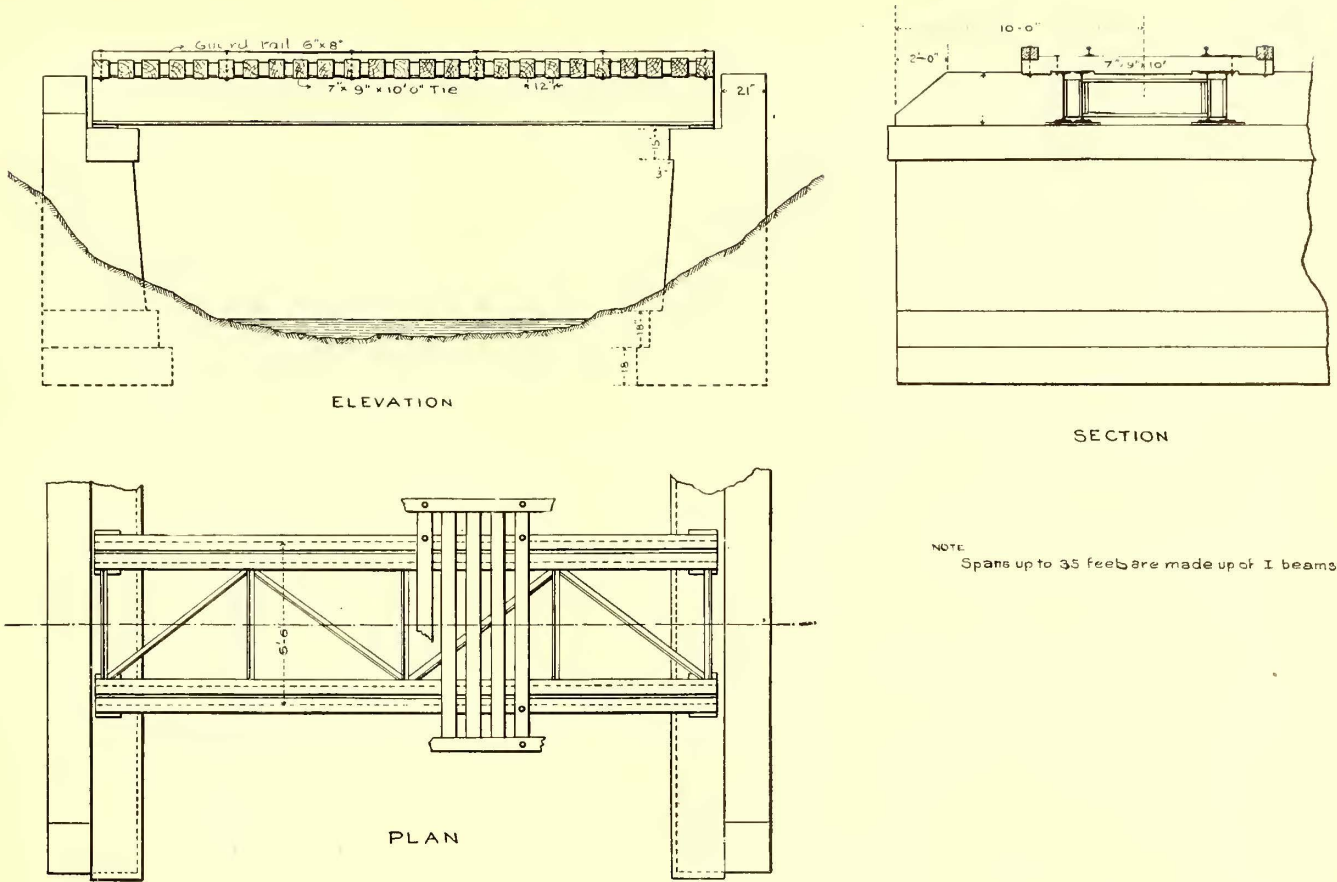
FIG. 6.—TYPE OF ARCH ERECTED BY NATIONAL BRIDGE COMPANY



NOTE  
Depth of foundation to be determined  
by Engineer. Dimensions not shown  
depend on span and conditions.

FIG. 7.—STANDARD ABUTMENT FOR PLATE GIRDER BRIDGES





NOTE  
Spans up to 35 feet are made up of I beams

FIG. 8.—TYPICAL I-BEAM SPAN

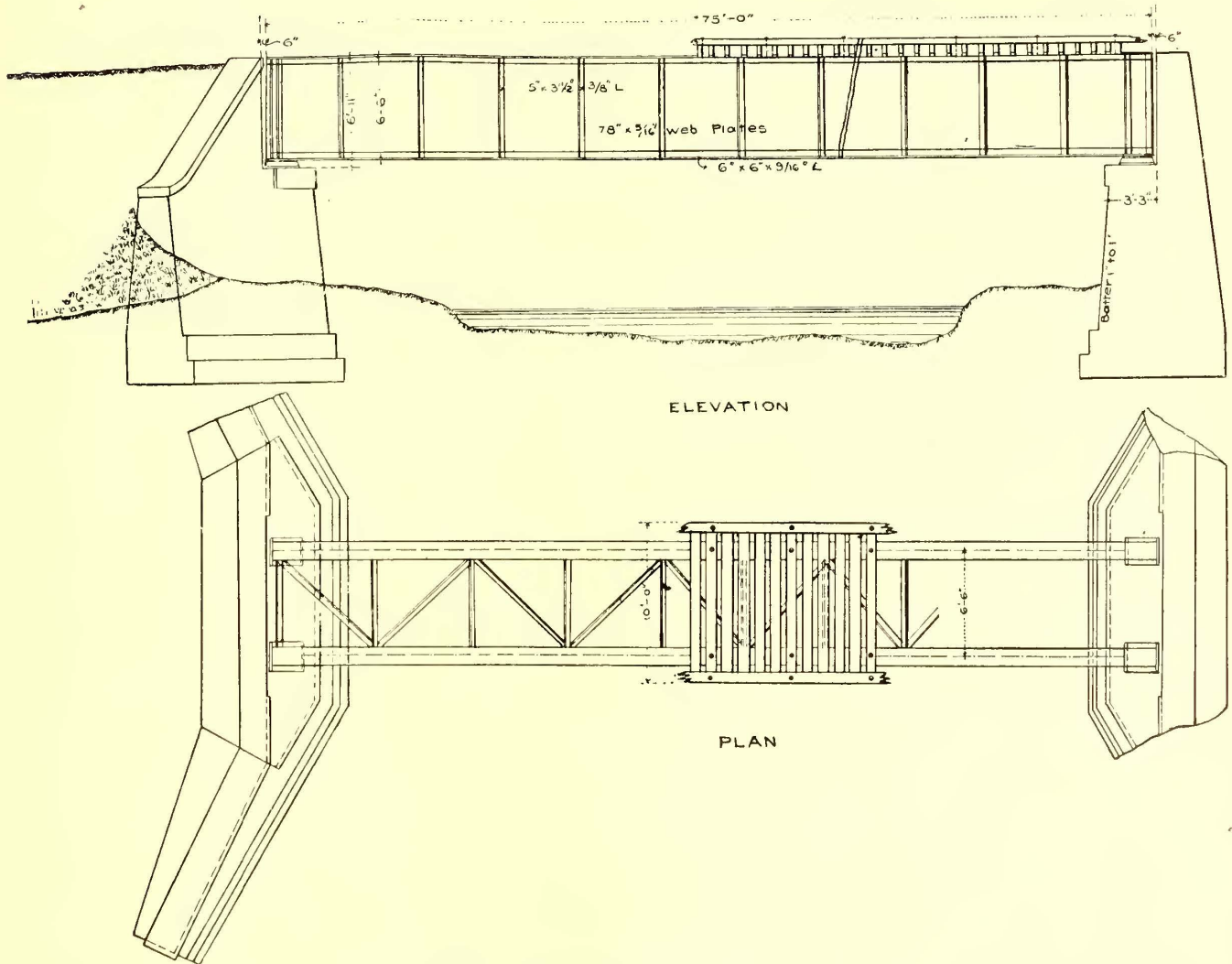


FIG. 9.—STANDARD 75-FT. GIRDER

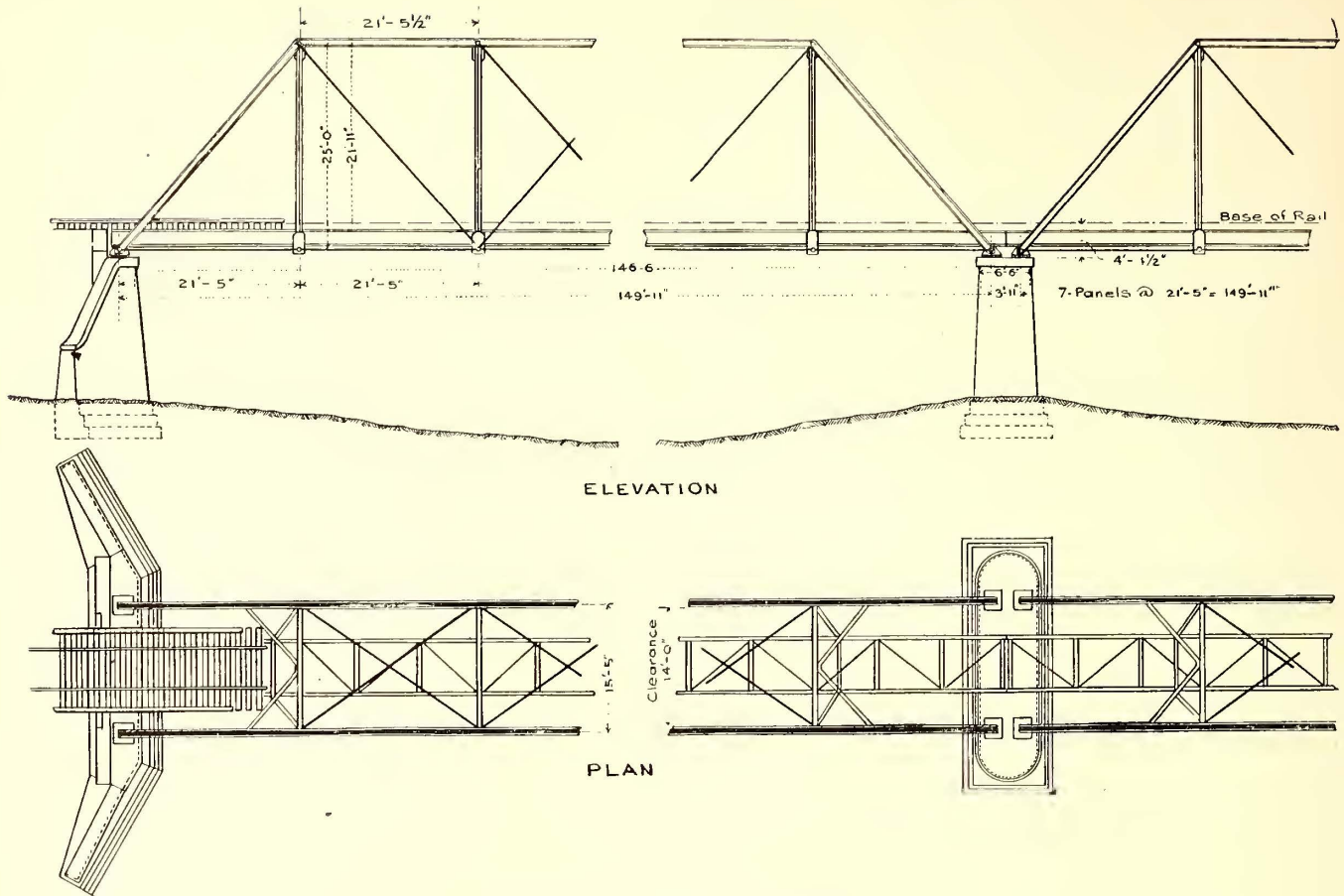


FIG. 10.—STANDARD 150-FT. SPAN

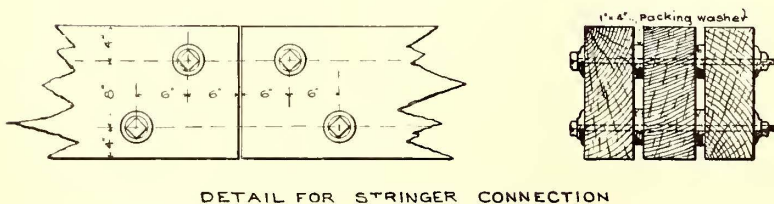
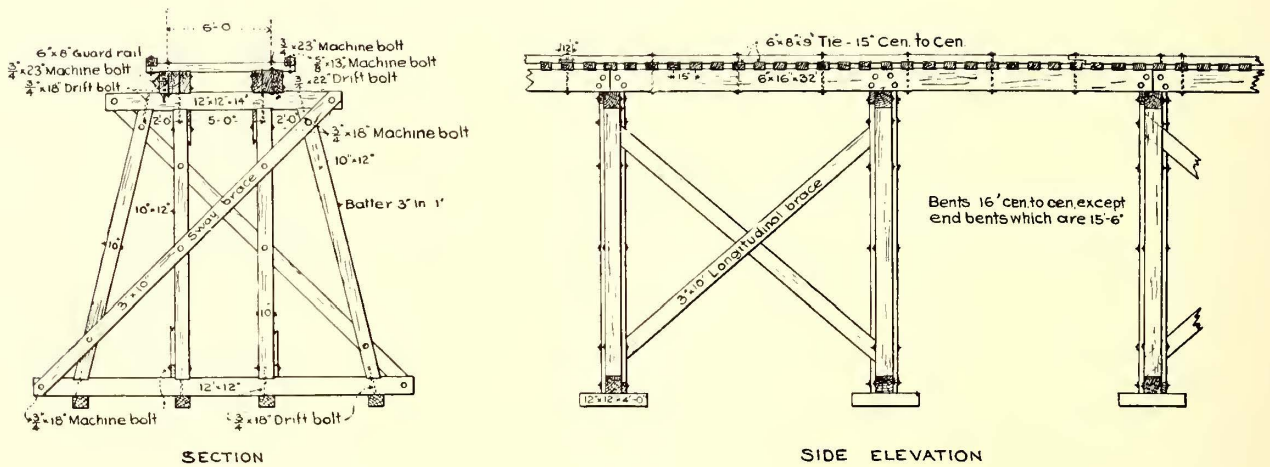


FIG. 11.—STANDARD TRESTLE CONSTRUCTION

shown in Fig. 14, this arrangement being decided upon as a result of this company's extensive experience with sub-stations for several years. These sub-stations contain two 250-kw rotary converters, a storage battery with a capacity of 320 amps. at the one-hour rate (although the Broad Ripple sub-station battery capacity is 640 amps. at one-hour rating), an induction motor-driven booster for use in connection with the storage battery, and four 175-kw step-down transformers, one of which is, of course, kept in reserve. One end of the building is given to the storage battery room, the other end to the ro-

one with both incoming and outgoing high-tension lines. High-tension circuit breakers of the Westinghouse stick type with enclosed fuses are used. The rotary converters and auxiliary appliances are also of Westinghouse manufacture. In Fig. 15 the words "lightning arresters" apply to the direct-current arresters on the outgoing railway feeders, and should not be confused with the three-pole, double-throw switch used in starting the induction motor of the booster. The high-tension lightning arresters are not indicated in this diagram. The rotary converters are provided with induction motors on the same shaft

for starting purposes, these induction motors being first started from special taps from the low-tension coils of the step-down transformers.

POWER STATION AT ANDERSON

The central power station at Anderson as originally constructed has been described a number of times in technical publications, but additions have been recently made to it and a special transformer house has been constructed outside of the main power station building. The floor of this station, as shown in Fig. 13, contains five 1000-kw three-phase Westinghouse generators driven by Rice & Sargent engines, supplied with steam from twelve B. & W. boilers. The voltage of the generators is such that it is supplied directly to the rotary converters in the power house which feed the 600-volt trolley lines in and near Anderson. The older portion of the station, as constructed by the Union Traction Company of Indiana, was built to accommodate four of these 1000-kw units. The end of the building as it stood formerly is indicated on the plan, Fig.

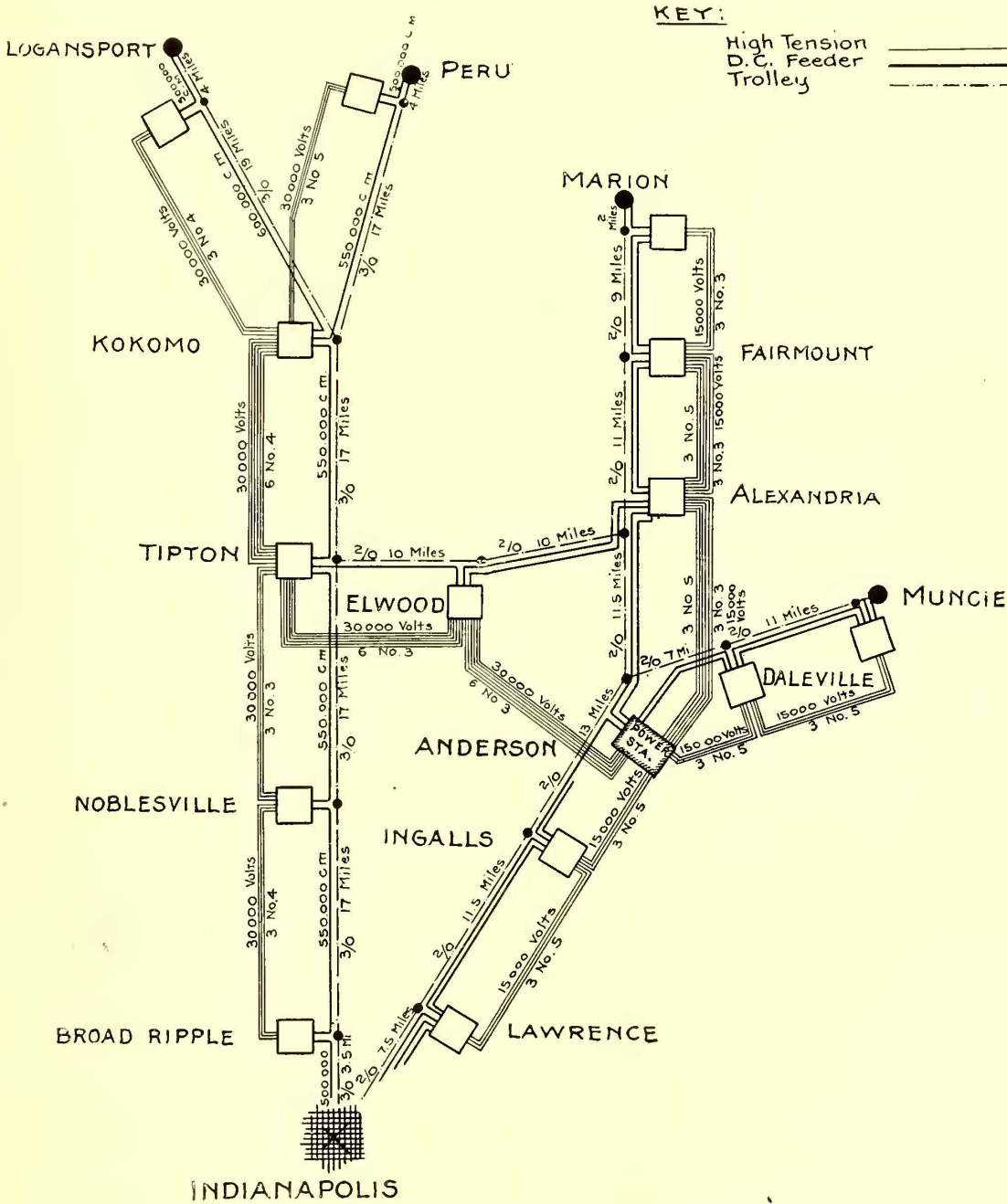
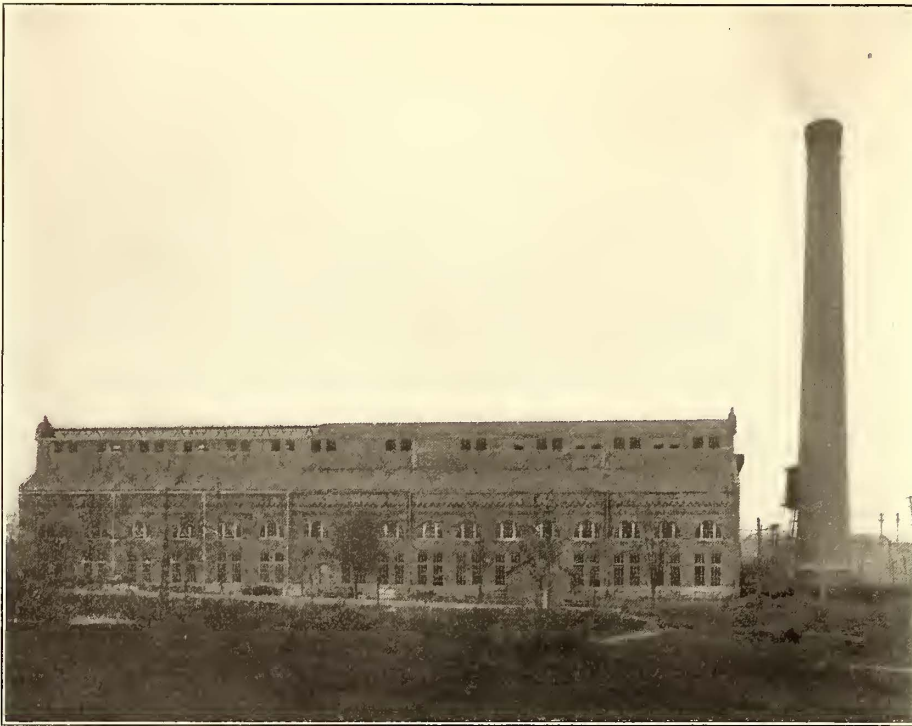


FIG. 12.—DIAGRAM OF A. C. AND D. C. DISTRIBUTING SYSTEM

tating machinery and switching apparatus. High-tension wires, switches and transformers are fenced off by wire netting to prevent any possibility of injury to visitors at the sub-station.

A railroad track enters the sub-station from the right, as shown in the plan. This is partly for convenience in construction and repairs, but also, so that in case of the necessity for added capacity at a sub-station, temporarily or in case of a break-down of some of the apparatus, one of the company's portable sub-stations located in a box car could be run in and connected up to be operated with the other apparatus in the sub-station. Fig. 15 shows the wiring diagram of a sub-station. The sub-station of which the diagram is given happens to be

13. The building has been extended, as shown, so that it now takes in five units, with room for six, and a second stack. The second stack, however, has not yet been erected, and the first stack is furnishing draft for the boilers now installed. The track enters the building at the northwest corner of the engine room. This connects with the tracks in the shop near by. A crane spans the engine room, and machinery can be picked up from the cars by the crane and delivered anywhere in the engine room. The transformers were originally installed in the basement of the main power house building near the switchboard. Because of fire risk and dampness, it was decided to place them in a separate building, and a two-story building was

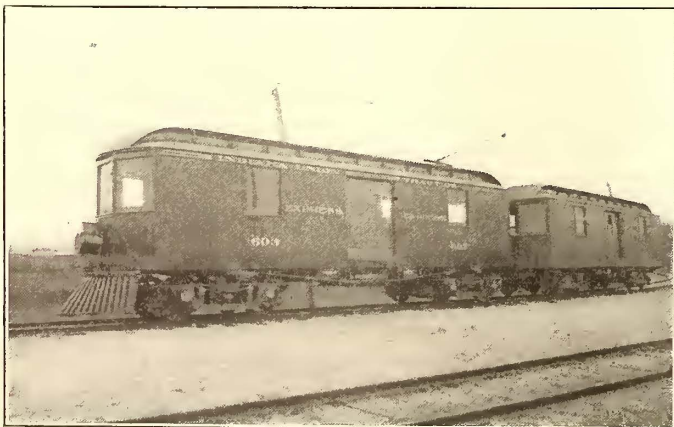


MAIN POWER STATION

erected, as shown. This transformer house has transformers on the lower floor, with a railroad track running through the center aisle. On the second floor are the high-tension switches, lightning arresters and static interrupters. In all, there are seven and one-third sets of transformers, five for the 15,000-volt lines, and two and one-third for the 30,000-volt lines. The insulators for the 30,000-volt lines were all tested by the company. For this purpose a 100,000-volt transformer capable of giving varying pressures was used. The completed appearance of some of these engineering features, of which drawings have been given, is shown by the accompanying photographs.

#### ROLLING STOCK

Two of the accompanying engravings show the standard passenger and freight cars used on the line; the former, as will be seen, differs materially from that used on most electric railways. The oval window at the side indicates the location of the toilet room, which also divides the car into smoking and regular passenger compartments. The former is furnished with ten wicker arm chairs, while the



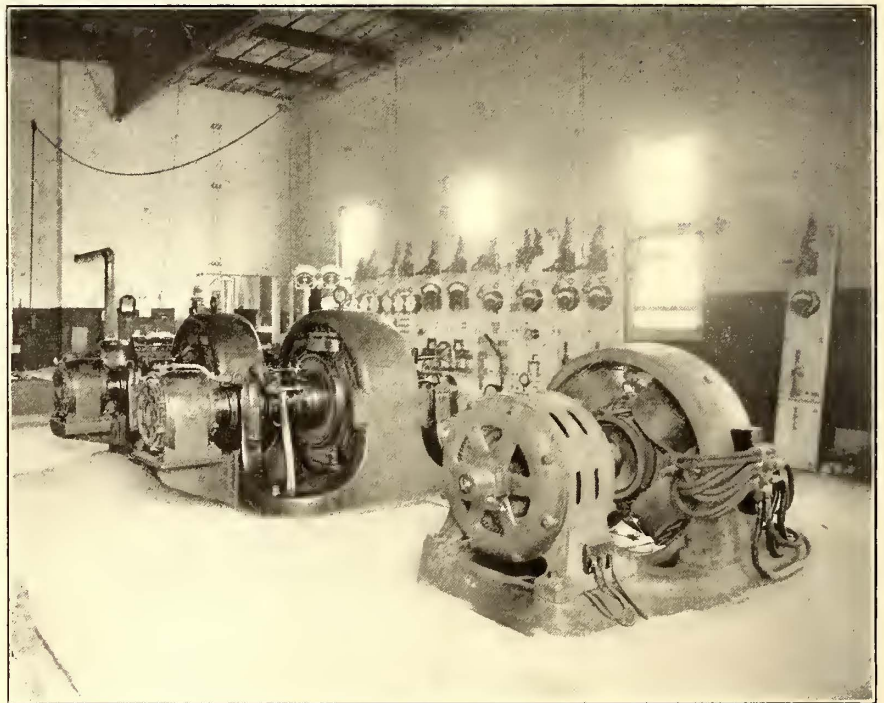
FREIGHT TRAIN OF TWO CARS

latter is fitted with Hale & Kilburn reversible seats, upholstered with deep blue plush. Full particulars and views of the interior of these cars were published in the *STREET RAILWAY JOURNAL* for Nov. 28, 1903, so that the general dimensions only are given below. They are: Length of body, 41 ft. 6½ ins.; length over bumpers, 53 ft. 5½ ins.; width over side sills, 8 ft. 6 ins.; height of rail to top of roof, 13 ft. 6 ins.; truck centers, 29 ft. 6½ ins.

The cars are mounted on Baldwin trucks with steel-tired wheels, and equipped with four Westinghouse No. 85 motors with L-4 controllers, Christensen air brakes, Nichols-Lintern sanders, Van Dorn draw-bars and Mosher arc headlights.

#### SCHEDULES AND FARES

As an indication of the character of the construction and service, brief mention of some of the train schedules is in order: Between Logansport and Indianapolis trains are operated on a schedule which gives an average of a car once an hour. Every other car is a limited car, stopping



INTERIOR OF A SUB-STATION

only at the principal towns along the line. This makes the 80 miles between Logansport and Indianapolis in three hours, of which about twenty-five minutes is consumed within the city limits of Indianapolis. The local cars, making all stops, make the run in three hours and twenty-five minutes. The passenger tariff is based on 1½ cents per mile for single-trip tickets. Round-trip tickets are sold at 180 per cent of the single-trip rate. Mileage books containing 1000 miles transportation are sold at the rate of 1¼ cents per mile. School tickets are sold in books at half fare.

#### ORGANIZATION

The Indianapolis Northern Traction Company was organized under the Indiana State laws in 1902. Soon after the incorporation of this company in 1902, the entire property was leased to the Union Traction Company of Indiana for fifty years, the latter company guaranteeing both the principal and

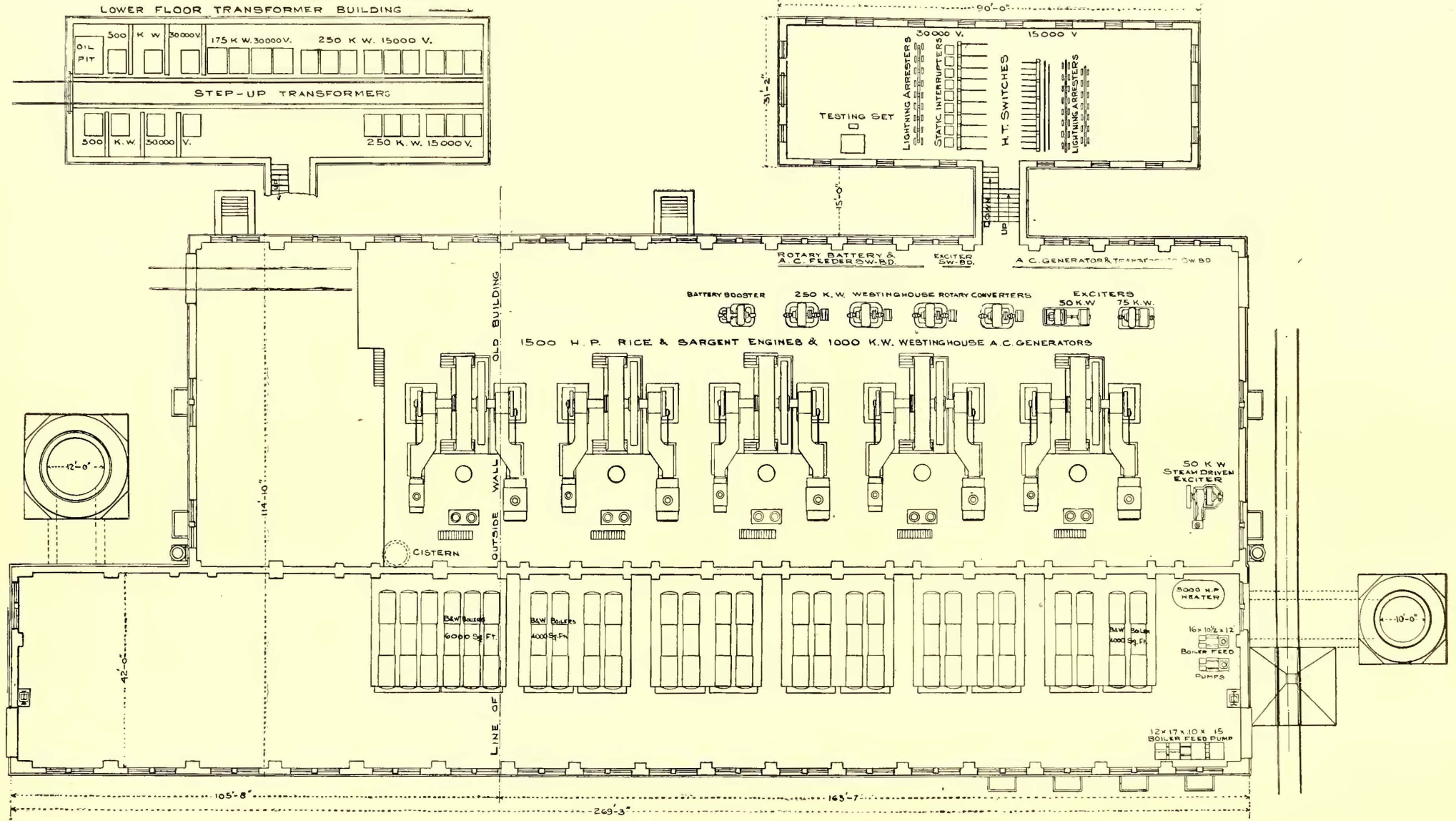


FIG. 13.—PLAN OF MAIN POWER STATION AT ANDERSON, SHOWING EXTENSION TO BUILDING AND NEW MACHINERY

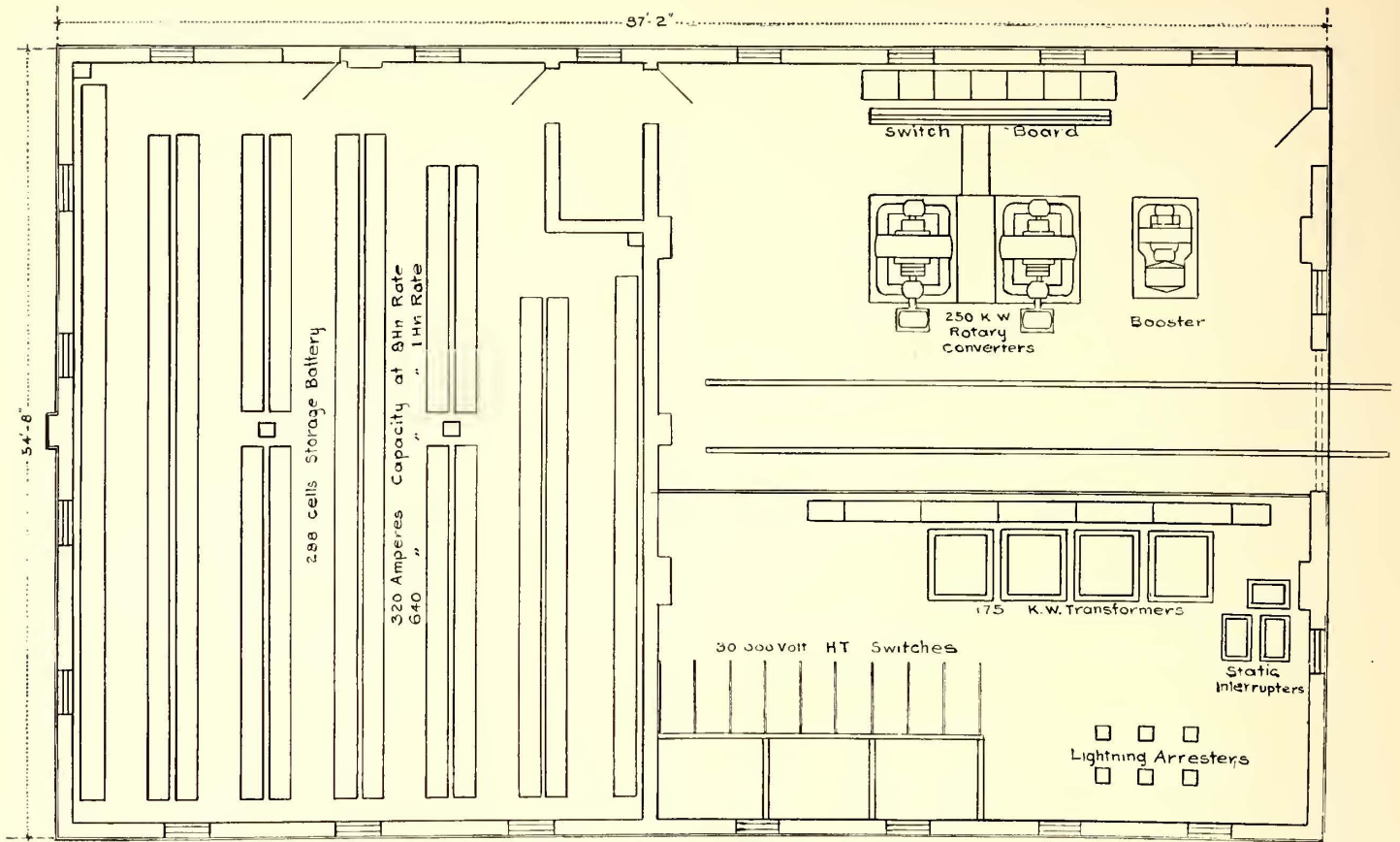


FIG. 14.—ARRANGEMENT OF SUB-STATION APPARATUS

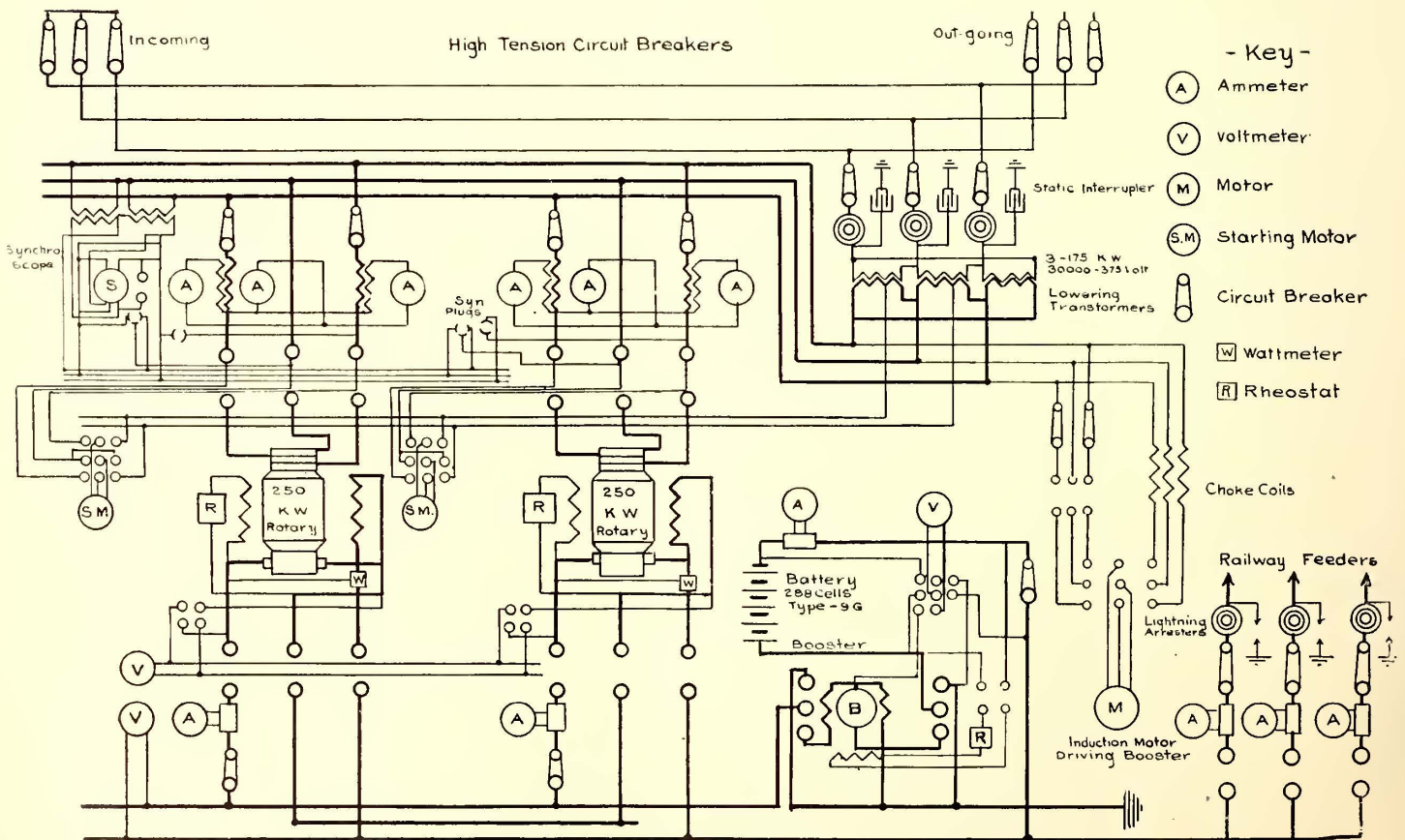
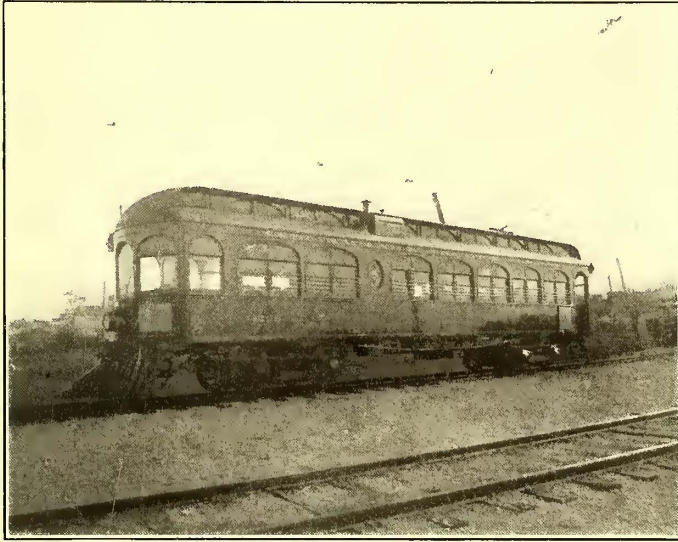


FIG. 15.—WIRING DIAGRAM OF SUB-STATION

interest on the bonds of the Indianapolis Northern Traction Company. On May 27, 1903, the Union Traction Company of Indiana and the Indianapolis Northern Traction Company were merged into a consolidated company called the Union Traction Company of Indiana, by a substitution of the common and preferred stock of the constituent companies for that of the consolidated company. On June 8, 1903, the Indiana Union Traction Company was incorporated under the Indiana laws, and on June 30, 1903, the Indiana Union Traction Company leased for a period of 999 years the entire property of the Union Traction Company of Indiana. The Indianapolis Northern lines are on private right of way except in the towns where



STANDARD PASSENGER CAR

there are fifty-year franchises. It has also a contract with the Fort Wayne & Wabash Valley Traction Company for entrance to Logansport, and with the Indianapolis & Traction Terminal Company for entrance to Indianapolis, and the use of the Indianapolis Interurban terminal station. The population of the cities and towns passed through by the Indianapolis Northern, by the United States census of 1900, is 234,657. The present estimated population, including the rural population, is 293,433, of which 15,000 is the estimated rural population.

The Indiana Union Traction system is at present under the general management of A. L. Drum, who has had charge of all the new construction work, and through whose courtesy the information for this article has been obtained.



### LARGE CONTRACT FOR ALTERNATORS IN SAN FRANCISCO

The Crocker-Wheeler Company has just secured a very important contract in California, which at once makes it an active factor in the alternating-current field. It will be recalled that this company secured the right to use in the North American continent all of the designs of the Brown-Boveri Company, of Switzerland, at the head of which is C. E. L. Brown, who is regarded by many as the greatest designing engineer in the world. The alternating-current department of the Crocker-Wheeler Company has been fully organized during the past year and prepared for active entry into the alternating-current field. The contract just closed is with the California Gas & Electric Corporation, of San Francisco, and includes three 4000-kw, three-phase, 13,200-volt, 25-cycle, 83 r. p. m., revolving-field alternators. These machines are to be driven by 6000-hp gas engines, the contract for which has been awarded to the International Steam Pump Company (Snow Steam Pump Works branch), and the units will be the largest gas engine-driven generators in the world. The alternators will supply current for operating the San Francisco street railways.

### THE MASSACHUSETTS RAILROAD COMMISSION

The somewhat anomalous condition of all street railway franchises in Massachusetts, described in the *STREET RAILWAY JOURNAL* for March 7, 1903, and the vast power conferred under the law upon the State Board of Railroad Commissioners, and the still greater influence exercised by that body, make a consideration of its work and duties of interest. The ability and integrity of the board is well recognized in all parts of the country, and the demand for its annual reports comes from every part of the United States and many remote sections of the civilized globe.

While the board is somewhat limited in its powers to order reforms in the conduct of the State's steam railroads and street railways (mark the difference in terms), yet there is not an instance on record where its recommendations have not been faithfully carried out. The nearest approach to dissent came when it advised the issuing of 500-mile mileage books by the steam railroads in place of 1000, yet there was no open opposition. While the railroads, without exception, believed that no necessity existed for the change, they adopted the views of the board, and to-day the 500-mile book may be purchased at any of the important railroad stations in the State.

In reviewing the range of the commission's duties, it may be of interest to know that it goes wide of the field of purely transportation matters; for instance, the city of Fall River desired to construct a new bridge over the Taunton River to meet the conditions of a rapidly growing community. Thereupon the Legislature in passing a bill authorizing the corporation of Fall River to engage in the work, stipulated that the Board of Railroad Commissioners shall sit jointly with the Harbor and Land Commissioners at all public hearings given to devise ways and means and to decide upon a location for the new structure, and to apportion the cost between the localities to be benefited by the enterprise.

Again, a bill was passed by the High and General Court of the Commonwealth authorizing the city of Boston to construct an additional subway, a clause of which empowered the Railroad Commissioners, in case of protest by the Boston Elevated Railway Company to the route selected by the Transit Commissioners, to name a route of their own or approve the one desired by the street railway corporation. As a matter of fact, the latter commission gave the subject its careful attention for more than six months, and, after making an exhaustive study of no less than five proposed routes, decided upon the one that it believed would afford the greatest accommodation to the general public, and which, in its opinion, offered the least number of engineering difficulties. However, it did not meet the indorsement of the street railway managers, and they took an appeal to the Railroad Commissioners, who, after three weeks given to a review of the several routes, decided against the Transit Commissioners and in favor of the railway company. The latter board is composed of five members and the former of three, yet the recommendation of the Transit Commissioners was set aside and that of the Railroad Commissioners made final.

Other obligations of a similar nature are imposed upon the board by the lawmakers, as there is a deep-seated conviction, among the bucolic members more particularly, that if the Railroad Commissioners have to do with any new project the interests of the public will be safeguarded and that grafting will be impossible. It is this absolute confidence in the integrity and thoroughness of the practices of the commission that increases its burdens and extends its field of operation beyond the limitation of transportation matters.

Usually the board devotes four days a week to public hearings, the sessions beginning at 10:30 and concluding at 1 o'clock. The remainder of the time is given up to correspondence, the weighing of evidence and to conferences. It should

be understood that thousands of questions are passed upon by the board without going through the tedious formalities incident to a public hearing. One of the characteristics of the average citizen of Massachusetts is his ability to carry on a discussion and to magnify supposed grievances against the railroads and the railways of the Commonwealth. At many of the hearings, more particularly those relating to protests against an increase of rates on street railways, the entire seating capacity of the hearing room is taken by the protestants, and the flow of oratory is seemingly without end. While the chairman of the board is a clever and astute lawyer, he waves the usual court limitations in the character of the evidence submitted, as any curtailment in the harangue would subject him to the charge of favoring the corporation at the expense of the general and "suffering" public. Occasionally he is forced to make a moderate application of the brakes when the loquaciousness of his audience is abnormally drawn out. Therefore, to avoid these avalanches of words, the board endeavors to reach a settlement by the more expeditious process of a private conference.

A considerable part of the commission's time is given to making personal inspections of localities where railroad or railway improvements are contemplated. The lawyers for the corporations and those representing the towns affected, always strive to have the members take a view of the premises, as each side believes its interests will benefit thereby. On these occasions the commissioners are accorded the utmost courtesy, not, of course, with any idea of biasing their judgment. When the commission visits a remote locality for the first time its reputation precedes it, and the townspeople turn out by the score to have a look at the three men who are so widely known for their honesty and straightforwardness.

The most difficult problem with which the board has to deal is that relating to fares on interurban railways. Following the ruling of the Supreme Court of the State that agreements relating to rates, made between boards of selectmen and the promoters of street railways in grants of location, are inoperative, a number of companies have advanced their charges, much to the indignation of the localities affected. In most cases of the kind, representatives of the towns in interest have appealed to the commissioners for relief. While the applicants know that the roads have a legal right to ignore these fare agreements, yet they hope that the existence of a moral obligation will influence the commissioners to recommend a continuance of the old rate.

The commissioners in considering propositions of this kind are confronted by two propositions, viz.: One of equity and another of expediency. On the one hand, a promise has been made that, in consideration of valuable rights in a town's highways, the prospective railway shall carry local passengers a certain distance for 5 cents and that school children shall be taken at a special rate considerably below the maximum. If promises of this nature had not been made it is safe to say that the development of street railways in many sections of the State would have been much slower than the statistics show. On the other, in the operation of the roads now seeking relief, it is shown that fixed charges are barely earned, that nothing is written off for depreciation, the stock has never paid a dividend and no sinking fund has been created with which to meet the cost of accidents. It is found that the physical condition of these roads is not up to the standard, that tie renewals have not been made, ballasting has been neglected and that the joints are out of repair; all of which, of course, militates against the safety of operation and enhances danger to those who patronize the line. In view of this presentation the commission waves the question of equity and places that of safety and convenience above all other considerations. In favoring an increase in rates it will sometimes say in its order that if the additional charge more than meets the legitimate expenditures of the road, the town may again come before the board on a petition to reopen

the case. Sometimes an experimental period is recommended, and in other cases the company is notified that the payment of dividends, from the funds realized by the new schedule of rates, is prohibited. In a special instance, the prayer of the railway was refused, as it was shown that hundreds of families had moved from a manufacturing center to the suburbs on the promise that a 5-cent fare would be the limit of the charge in case locations were granted. It will be seen from the above that sentiment and hard business propositions co-ordinate in the problems that come before the commissioners for settlement.

While on the one hand the commissioners have the power to increase the income of street railways, it has on the other the right to add enormously to their financial burdens. A case in point is that of ordering the Boston Elevated Railway Company to vestibule all of its closed cars. There was something like 3000 of them, and the entire cost was several hundred thousand dollars. The commission, however, in imposing obligations of this nature takes into consideration the financial ability of the company to carry them out. Even in the case of the Boston Elevated, the company was permitted to make the changes piece-meal.

Where railway corporations are not created under special acts, the commission exercises extraordinary care in passing upon applications for authorization to increase bonded indebtedness or capital stock issues. It insists on a careful appraisal of the property by an expert in such matters, and every item is scrutinized to the utmost. If an impairment of capital is shown, the amount asked for is reduced accordingly. In case the securities bring a premium in the market it is ordered that the bonus shall be applied to improvements of the property. While the commission has no legal power to order changes in freight rates on the steam railroads, yet rate questions are often before it, and its recommendations are always carried out without an audible murmur.

One of the duties imposed upon the commission by the Legislature is that of making an annual inspection of every foot of railway in the State, the careful examination of every bridge, a study of and the sanitary state of the waiting stations. The board has three inspectors in its employ, and they act as the eyes and ears of the members. In case of accident they collect all the facts and make report to the board. In case there has been a fatality it is optional with the board whether or not it gives a public hearing on the matter.

In case of all reports made by the special commissions appointed by the courts to consider the elimination of dual crossings, the board acts in a supervisory capacity before the report goes to the court; in fact, the Massachusetts Board of Railroad Commissioners has under its keeping everything relating to the transportation of passengers and merchandise throughout the State, and that its work is well done is shown in the confidence the lawmakers and the public have in it.

---

The Toledo & Western Railway Company has added several standard stock cars to its freight equipment, and is now shipping live stock and merchandise over its lines.

---

About twenty officials of the Everett-Moore syndicate, the Northern Ohio Traction & Light Company, the Canton-Akron Railway Company and the Stark Electric Railway Company recently made a trip over the roads mentioned in Henry Everett's private car, the "Josephine," with a view to securing closer relations between the various connecting roads in that district for the interchange of passenger and freight business. Arrangements are being made to sell through tickets over all the roads, so that it will be possible to buy a ticket in the central portion of Ohio and travel to points in Michigan.



## WATCH INSPECTION ON THE CINCINNATI, DAYTON & TOLEDO

The Cincinnati, Dayton & Toledo Traction Company inaugurated on Oct. 1 a system of watch and clock inspection for the employees of its various divisions. The results so far have been very satisfactory to the employees and company. As a similar system is not in use on all roads, the announcement issued by General Manager Sloat, placing the regulations in force, may be of interest:

### CINCINNATI, DAYTON & TOLEDO TRACTION COMPANY.

Hamilton, Ohio, Oct. 1, 1904.

1. This company will inaugurate a system of clock and watch inspection, and employees designated below are required on and after the above date to submit their watches for quarterly examination and semi-monthly comparison with standard time, to the various local inspectors who have been appointed for this purpose and who will be under the general supervision of J. W. Forsinger, Chicago, Ill., who has been appointed general inspector.

2. The names and locations of local inspectors are as follows:

Cincinnati, Ohio, G. H. Newstedt, 404 Walnut Street.

Hamilton, Ohio, Charles Diefenbach.

Middletown, Ohio, F. G. Wittlinger.

Dayton, Ohio, H. Best & Son.

3. Location of standard clocks:

1. Cincinnati terminal at Spring Grove.

2. Hamilton ticket office.

3. Trenton despatcher's office.

4. Franklin, Ohio, at L. & F. Junction.

5. Miamisburg, at M. & G. Junction.

6. Dayton ticket office.

4. Division superintendents, conductors, motormen, despatchers, express messengers, station masters, section foremen, bridge foremen, line foremen, inspectors, flagmen, brakemen, switchmen and switch tenders, must submit their watches for quarterly examination and semi-monthly comparison as required by the rules.

5. The minimum standard of excellence adopted by this company for watches is a grade equal to what is known among American movements as "nickel 17-jewel, patent regulator, adjusted to heat and cold and three position," the variation of which must not exceed thirty seconds per week. No key-winder will be accepted.

The grade names and numbers are herein plainly specified. No modifications will be permitted:

Elgin Manufacture.

18 size, B. W. Raymond, nickel, 17-jewel.

B. W. Raymond, 19-jewel.

Father Time.

Veritas, 21-jewel.

Veritas, 23-jewel.

16 size, Nos. 270 and 280.

Waltham Manufacture.

18 size, Appleton, Tracy & Company, "Premier."

Crescent Street, 19-jewel, 21-jewel.

Vanguard, 19-jewel, 21-jewel.

Vanguard, 23-jewel.

16 size, Riverside, 17-jewel.

Vanguard, 23-jewel.

Hamilton Manufacture.

18 size, Nos. 936, 937, 940, 941, 938, 939, 942 and 943.

16 size, Nos. 990, 992.

Illinois Watch Company Manufacturer.

18 size, Bunn, 17-jewel.

Bunn special, 21-jewel.

Bunn special, 24-jewel.

16 size, Nos. 187 and 189.

Sangamo, 21-jewel.

Sangamo, 23-jewel.

Hampden Manufacture.

18 size, John Hancock.

Special railway, 21-jewel.

New railway, 23-jewel.

Special railway, 23-jewel.

16 size, No. 104, 23-jewel.

No. 105, 23-jewel.

Rockford Manufacture.

18 size, Nos. 910, 810, 905, 805, 900 and 800.

16 silzs, Nos. 545, 540, 535, 530, 525, 520, 515, 510, 505 and 500

All new watches in service must be lever-set.

No watch specially made and named by or for any jeweler will be accepted on these lines. The intention of jewelers in offering watches specially made is generally understood to be for the purpose of removing the regular factory grade and name, thus enabling them to charge employees a higher price for same.

Any watch now in service up to specified grades will be accepted.

6. Each employee designated will apply immediately, and every three months hereafter, to his superior officer for a blank certificate

and order for examination, which he must take, together with his watch, to the local inspector, who will, if the watch is satisfactory, sign the certificate and forward same to the officer under whom the person is employed, free of charge to such employee. If the watch is below the required standard, it will be rejected and the officer in charge promptly advised. No watch so rejected can be used in the service, nor passed upon by another inspector, except under order of the general inspector. Employees where no inspector is located may send their watches, together with blank certificates, to the nearest local inspector.

7. In addition to the quarterly examination, employees must submit their watches to local inspectors semi-monthly for comparison with standard time, as must also other employees who have the opportunity for doing so, that record of the rating of their watches may be made on the standard form. Employees in train service who fail to submit their watches for semi-monthly comparison and quarterly inspection, in accordance with the terms of this circular, will be considered as having infringed the rules of the service, for which a satisfactory reason must be given.

8. When watches need cleaning or repair they may be left with the inspector, if owner so desires, or they may be taken to such watchmaker as the owner may select, but the watch carried in the meantime, and his own watch, after the same has been repaired, must be submitted to the company's inspector for examination and approval before such watch can be carried in service. Employees must not set their own watches, or allow anyone else than the company's inspector to set them.

9. When watches are left with the inspectors of the company to be cleaned or repaired, a standard watch will be loaned to the employee until his own is returned to him. Certificates must be signed by inspector for all watches loaned employees.

10. Standard watches, guaranteed to give required performance, can be obtained by the employee from the inspectors on monthly payments as may be agreed upon, not, however, exceeding six in number—the amount of such monthly payments to be deducted from the payroll if the employee so elects.

11. The officers having direct charge of employees who are subject to the above provisions will see that certificates of quarterly examination of watches are filed with them for watches of employees under their authority who are subject to the rules of watch inspection, and such officers in all departments will be held responsible for the collection and filing of watch certificates. They must also see that employees affected by this order turn in regularly certificates of semi-monthly comparison of their watches, and will enter in a record, to be kept for that purpose, the dates on which such certificates were received, and the exact number of comparisons.

12. Employees whose watches do not conform to the required standard will be given thirty days from issue of this circular to provide themselves with standard watches, as on and after that date all employees subject to the provisions of this circular must be provided with standard watches, and quarterly certificates to that effect must be in the hands of officers to whom they report.

13. The purpose of the introduction of this system of watch inspection being to insure improved efficiency in train service and provide additional safeguard against accident, affording greater security to life and property, the hearty co-operation of our employees in making the operation of system successful is earnestly requested. The desired results can only be obtained by observing carefully the rules as to inspection and comparison and refraining from any attempt to set or regulate their watches themselves.

F. J. J. SLOAT, General Manager.

## FLOOD IN NEW YORK SUBWAY

The subway service was brought to a standstill on Dec. 14 for the first time since it was opened on Oct. 27, because it took approximately four hours to get the water shut off from a burst 36-in. main at Broadway and Eighty-Sixth Street. From 10:20 to 10:30 in the forenoon not a car moved on the entire 35 miles of tracks from the City Hall to the Harlem River. From 7 in the morning until 1 o'clock in the afternoon the time schedules were in chaos, and during about four hours service was shut off between Seventy-Second and 103d Streets. At inter-station points between Eighty-Sixth Street and Broadway, where the break occurred, and Seventy-Second Street, four or five trains were held up for nearly an hour until the guards got orders to assist the passengers down to the tunnel tracks and guide them back to the station platforms. In this way all of these four or five trains were emptied, the passengers in some instances being obliged to splash and slop along through running water before they got to the high and dry station landings.

### OPERATING FEATURES OF THE SEATTLE ELECTRIC COMPANY

Practically all the electric railway, lighting and power business in Seattle, Wash., is controlled by the Seattle Electric Company, which, together with the railway properties in Tacoma and Bellingham, Wash., is owned by Stone & Webster, of Boston. The present owners entered the field about four years ago, acquiring several small properties then in the hands of receivers, and they have since brought into the consolidation all the city railway lines and all but one of the suburban lines

superintendent of transportation. Appearing in line, they are sized up in turn as to general appearance, and, if the first impression they make is favorable, they are given general application cards, Form A 76, reproduced in Fig. 1. These cards are 4 ins. x 6 ins. in size, and call for name, address, age, position desired, former position, name and address of last employer, references, etc. When filled out these cards form a ready general reference, and are filed alphabetically in a case until some disposition is made of the applicants, either by employing or dismissing them.

When it is necessary to add new men to the service, these cards are consulted and the most likely men are asked to fill out a personal record and application blank, Form A 74 (Fig. 2), which contains spaces for the usual information required, such as age, birthplace, name of parents or nearest relative, injuries, if any, received in previous employment and cause of giving it up. A question not common to such forms is asked thus: "Are you related to any officer or employee of this company, If so, state to whom and how related?" This blank is signed and witnessed, and then the applicant is given an oral examination, of whose questions and answers a stenographic record is made. The object of this questioning is to ascertain the applicant's condition of general health, eyesight, hearing, etc., and to bring out any further information that may be desired concerning his former employment or details of his past. It also provides

#### APPLICATION FOR EMPLOYMENT TO THE SEATTLE ELECTRIC COMPANY

Applicants Are Requested to Make Out Separate Cards for Any of the Following Divisions Under Which They Wish to Have Their Names Appear

- |                                                |                  |
|------------------------------------------------|------------------|
| Mechanical, Electrical and Civil Engineers     | Carpenters       |
| Draftsmen                                      | Car Painters     |
| Office and Accounting Engineers, Firemen, Etc. | Car Repairers    |
| Linemen and Wiremen                            | Armature Winders |
| Railroad and Station Construction              | Track Foremen    |
| Trainmen                                       | Lamp Repairers   |
| Machinists                                     | Meter Men        |
| Blacksmiths                                    | Day Laborers     |
|                                                | Dynamo Men       |
|                                                | Miscellaneous    |

Date \_\_\_\_\_ 190\_\_

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

Position Desired \_\_\_\_\_

Former Position Held \_\_\_\_\_

References \_\_\_\_\_

LAST POSITION (Name of Employer \_\_\_\_\_  
Employer's Address \_\_\_\_\_  
Position Held \_\_\_\_\_)

FIG. 1.—FRONT AND BACK OF APPLICATION FOR EMPLOYMENT BLANK

in Seattle. The task which presented itself in consolidating the properties was a difficult one, since it required the reconstruction of the different roads, the adoption of standards which could gradually be worked up to, the provision of new power supply and the general unification and betterment of the operating force, that the whole property might be handled systematically and with profit. How well the managers have succeeded is shown by the fact that the former bankrupt and run-

der or employee of this company, If so, state to whom and how related?" This blank is signed and witnessed, and then the applicant is given an oral examination, of whose questions and answers a stenographic record is made. The object of this questioning is to ascertain the applicant's condition of general health, eyesight, hearing, etc., and to bring out any further information that may be desired concerning his former employment or details of his past. It also provides

#### THE SEATTLE ELECTRIC COMPANY

##### PERSONAL RECORD AND APPLICATION

To \_\_\_\_\_ Superintendent of Railway

1. Age? \_\_\_\_\_ Married or Single? \_\_\_\_\_

2. Birthplace? \_\_\_\_\_ State? \_\_\_\_\_

3. Name of Parents, if Living? \_\_\_\_\_ State? \_\_\_\_\_

4. Name and Degree of Next of Kin, if Parents are Dead? \_\_\_\_\_ State? \_\_\_\_\_

5. When did you enter the Service of this Company? \_\_\_\_\_

6. Ever Injured; if so, on What Road and to What Effect? \_\_\_\_\_

7. What was Your Previous Occupation, or Have You a Trade? \_\_\_\_\_ State? \_\_\_\_\_

8. Name All Roads on Which You Have Been Employed? \_\_\_\_\_

9. On What Road Last Employed? \_\_\_\_\_ Cause of Leaving? \_\_\_\_\_

10. Number of Letters of Recommendation Enclosed? \_\_\_\_\_

11. How Have You Been Occupied Since Your Last Employment Terminated? \_\_\_\_\_

12. Are You Related to Any Officer or Employee of This Company (if so, State to Whom and How Related)? \_\_\_\_\_

This Application made by \_\_\_\_\_

Address \_\_\_\_\_ Date \_\_\_\_\_ 190\_\_

Witness \_\_\_\_\_

FIG. 2.—RECORD OF APPLICANT FOR POSITION

down lines are now well equipped and are being operated with a fair return of interest on the investment. The reorganization is not yet complete, but it is being effected as rapidly as possible. The details of car operation and of the handling of the trainmen have necessarily played an important part in the general improvement, and it is with them that the following notes will deal.

#### EMPLOYMENT OF TRAINMEN

The company has two application days each week on which the men present themselves at a window in the office of the



FIG. 3.—INSTRUCTION ROOM OF THE SEATTLE ELECTRIC COMPANY

the questioner with an opportunity to estimate the general make-up, manner of address and personal appearance of the candidate. One question invariably asked is whether the applicant belongs to any society or organization, the specific question as to whether he is a member of a union not being used. No men under 5 ft. 6 ins. in height are engaged, and the age limits are twenty-one and fifty years, preference being given to men who are over twenty-five.

After the stenographic record has been obtained and written replies from his references received, the successful applicant

is turned over to the assistant superintendent, who requires of him a physical examination conducted by the same physician who examines men applying for membership in the Seattle Electric Employees' Beneficial Association. As a matter of fact, the one examination serves both purposes. The character of the beneficial association will be described later.

#### INSTRUCTION

After passing the physical examination successfully, the applicant enters the school of instruction, where he serves on probation on his own time. An inexperienced man is required to receive ten days instruction, but is generally given from fifteen to eighteen, while a man with some experience is obliged to have five days, which is more often prolonged to ten. If, during this probationary period, a man is judged to be totally unfit for or incapable of discharging the duties of a trainman, he is immediately dropped.

There is an instructor of conductors and one of motormen. These men are inspectors in the regular employ of the company, but are called in whenever it is necessary to take charge of a group of students. The general oversight of their work is in the hands of the assistant superintendent. For use in instruction the company has recently fitted up two rooms in its office building at the Fifth and Pine Street car house. It is the intention to provide ultimately an instruction car, fitted with all the necessary apparatus, after the plans followed by railway companies in other parts of the country; but for the present the equipment assembled in the two rooms above mentioned serves the purpose very well.

In one of the rooms, Fig. 3, are placed the larger pieces of apparatus which are used for demonstration purposes. On a platform built up in the center of the room are mounted the three types of cable grips used, viz.: right hand and left hand grips of ordinary construction, and one with an automatic adjustment. For the instruction of the prospective motormen, a standard controller has been rigged up with resistance and ammeter, so as to demonstrate how the current is utilized. For the regular street railway motors there are substituted two motor-driven fans, shown at the right in the illustration, which can be operated in parallel or in series from the controller. Other car equipment includes a standard trolley pole and base, and hand-brake stand. Suspended near the ceiling is one of the company's single-track block switch signals, mention of which will be made later. On the wall are mounted profile maps of the lines, and in a case beneath them are a set of track or route maps, which have proved very useful in helping the men to familiarize themselves with the routes of the lines, their turn-outs, switches, crossings and other features. The manner of mounting these maps, of which there is one for each line, is rather unique. The blue print is rolled up from the ends on two round sticks about  $\frac{3}{4}$  in. in diameter. The sticks project about 4 ins. beyond the print at each side, and, when the map is not in use, they are held together at the upper end by a large rubber band tacked to one roll. The other two ends serve as handles in manipulating the map, and afford space on a flattened surface for the name of the line represented. This method of mounting the maps has been found to allow quick and easy access to them, and is also considered the best for preserving the maps, since blue prints last longer than when rolled or folded in usual ways. It is interesting to note that these blue print maps have been found to last until about the time a new map is made necessary by the changes and improvements in the track. Fig. 3 shows two map rolls, one as it is filed in the case, and the other in use. Other route maps similarly mounted are kept by the superintendent of transportation and other officials of the company in their desks for ready consultation.

In the second instruction room are located the desks of the student instructors, a blackboard, bells and registers, with the necessary cords, a car-lighting circuit, another single-track

block signal, headlight, a small library for student use, and a variety of small apparatus. On one of the walls is mounted a display board, Fig. 4, containing a sample, properly labeled, of each of the different pieces used in the overhead construction. In the picture some of the larger pieces are shown on the floor. On the shelf are displayed a lighting switch, circuit breaker and a Christensen air-brake valve with a compressor-motor controller. A simple dynamo-electric machine is used to illustrate the action of the motor, and two electromagnets serve to illustrate the magnetic force of electricity. These simple pieces of apparatus have proved very helpful in giving the students an elementary knowledge of the action of electricity. The blackboard is brought into service frequently in drawing out car circuits, etc. At the top of the board is printed in bold

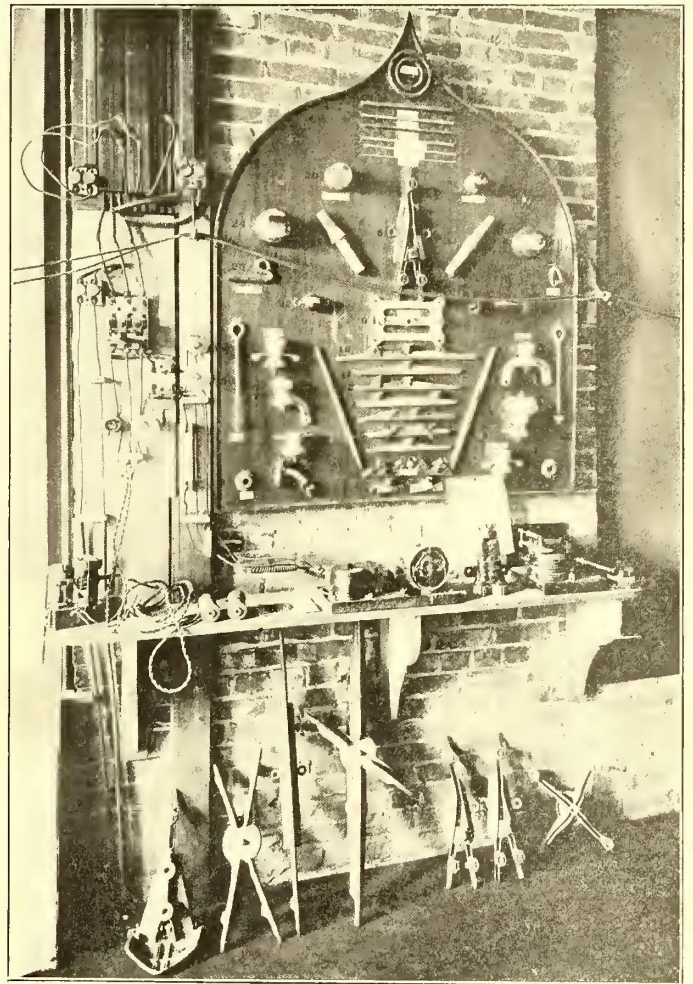


FIG. 4.—DISPLAY BOARD OF OVERHEAD MATERIAL IN THE INSTRUCTION ROOM OF THE SEATTLE ELECTRIC COMPANY

letters, "The Word 'Suppose' Is Barred," this admonition having originated with present Assistant Superintendent Bleecker, who, in his former position as instructor of motormen, had much to do with the organization of this department. Mr. Bleecker found that on questioning students they would "suppose" they knew or would do such and such a thing. The over-worked word was suppressed to convince the students of the necessity of being absolutely sure in their reasons and decisions, and of having definite knowledge of what was expected of them.

During their probationary period, the students are required to be present at the school each day, and after they have become familiar with the apparatus, they are given a careful talk, in which the instructors explain the company's attitude toward them, and impress on them how they will be expected to treat the public, the necessity of strict attention to work and other general duties of the position. They are then required to spend a half day, or, in the case of motormen, two or

three days, in the car house, where the motors, controllers, brakes and other features of the cars are explained in detail. The students are then turned over to competent trainmen for the necessary instruction on the lines of that division. Men are broken in on the lines only where they are actually needed, and if afterward they desire other runs they must file in the superintendent's office the proper certificate, signed by the division foreman. When first being broken in, each man is given a trainman's certificate, Form A 166 (Fig. 5), which is signed by the regular trainmen instructing him, and afterward by the instructing inspector. It must then be approved by the superintendent.

A. L. Kempster, superintendent of transportation, the author of many of the practices in force in his department, says that in employing new men for the train service, he prefers to secure those who have had no railway experience, although those with a slight experience generally prove capable. Those having seen considerable service with other railways are apt to prove less efficient than green men, as old habits formed un-

**THE SEATTLE ELECTRIC COMPANY**  
Transportation Department  
**TRAINMEN'S CERTIFICATE**

No. \_\_\_\_\_, Seattle, Wash., \_\_\_\_\_, 190\_\_  
Mr. \_\_\_\_\_ has served  
as STUDENT \_\_\_\_\_ days  
on lines indicated below, under direction of trainmen signing this  
certificate, and is fully qualified to act as \_\_\_\_\_  
on these lines:

LINES	DATE On / Off	SIGNATURES OF TRAINMEN

I hereby certify that the above named Student has received careful instruction as set forth above, and is qualified to act as \_\_\_\_\_  
Instructing Inspector  
Approved: \_\_\_\_\_, Supl. Train., \_\_\_\_\_, 190\_\_

FIG. 5.—RECORD OF PROBATION PERIOD

der previous conditions and rules of service are tenacious. The experience of the company is that candidates who have been accustomed to hard physical labor and are therefore strong and robust, prove to be the most efficient head-end men—i. e., motormen and gripmen.

After having served the required time in the school of instruction and having been broken in on the lines where they will work, they are given a thorough oral examination and placed on the extra list. No contract or agreement is required, nor are the men asked to make a deposit or furnish a security bond. Instead, their wages are held back one week, the amount thus always due each man being sufficient to cover any ordinary loss of property on his account.

RULES

The standard rules and regulations of the company relating to the car service are contained in a bound book, copies of which are supplied to all trainmen. Each book contains on the inside of the front cover a blank space in which is designed to be written the name and position of each employee to whom the book is loaned. On the same page is a number, so that a

record of each book may be kept in the office. When on duty, each employee whose duties are in any way prescribed in the book is required to have a copy always in his possession and to make himself perfectly acquainted with its contents. The following are paragraphs from the general prefatory letter of instruction:

Employees must bear in mind that they are engaged in a public service, in which they are constantly called upon to exercise great patience, forbearance and self-control. Politeness and courtesy continually practiced by employee will prevent controversy and complaint and greatly benefit the service.

The success and reputation of the company in the operation of its cars depends to a great extent upon the civility, honesty, good judgment, tact and appearance of its employees and their ability to get along with all sorts of people.

While the road is intended and expected to be a source of profit to the company, it was built for the "public convenience and necessity." There should therefore be an earnest effort on the part of every employee to make the service so excellent and attractive that the public will always find it convenient and necessary.

While it is the duty of employees to properly represent the company in dealing with the public, it is also the duty of good management to detect and remove from service all men who are incompetent or dishonest, that the competent and honest may be encouraged and protected.

APPLICATION FOR MEMBERSHIP

**Seattle Electric Employees Beneficial Association**  
APPLICATION FOR SICK BENEFIT

To THE OFFICERS AND MEMBERS OF THE SEATTLE ELECTRIC EMPLOYEES' BENEFICIAL ASSOCIATION:

I hereby make application to become a member of your Association. If elected I agree to conform to all of the by-laws, rules and regulations of the Association as they now are or may be hereafter amended to read.

My Name is \_\_\_\_\_  
Address is \_\_\_\_\_  
Age is \_\_\_\_\_

In case of sickness or death please notify  
Name \_\_\_\_\_  
Address \_\_\_\_\_  
Name \_\_\_\_\_  
Address \_\_\_\_\_

In case of death I hereby authorize you to pay my death claim to  
Name \_\_\_\_\_  
Address \_\_\_\_\_  
Relation to Applicant \_\_\_\_\_

Who did you enter the employ of The Seattle Electric Co. \_\_\_\_\_  
In what department? \_\_\_\_\_  
What is your position? \_\_\_\_\_  
Have you ever made application for membership in any other beneficial organization? \_\_\_\_\_ If so, give name of order and date of application: \_\_\_\_\_  
Were you accepted? \_\_\_\_\_  
Were you required to pass a physical examination before becoming a member? \_\_\_\_\_  
Were you ever in the employ of The Seattle Electric Company before? \_\_\_\_\_  
If so, in what department? \_\_\_\_\_  
Are you married or single? \_\_\_\_\_

FIG. 7.—APPLYING FOR MEMBERSHIP IN THE SEATTLE ELECTRIC EMPLOYEES' BENEFICIAL ASSOCIATION

The book contains the usual detailed rules for motormen, gripmen and conductors, and at the end are special rules governing the operation of the three cable lines, the two counterweight lines, and of all freight, work, line and other cars not engaged in passenger service. A valuable section of the book contains extracts from the city ordinances, such as pertain to fenders, guards, railroad crossing stops, speeds, etc.

In addition to the rule book, the customary bulletins of instructions are posted from time to time in the trainmen's rooms. Except in special cases, signatures of the trainmen are not required for these bulletins. When orders are issued to that effect, the men who are specified sign blanks, Form A 159, stating that they have read and thoroughly understand the bulletin in question.

The company has recently issued a special book of rules, affecting chiefly the issuance of transfers. The transfer system in force is practically a universal one, but as there had been trouble from loop riding, new rules were needed to prevent the abuse, and were incorporated in the book, together with other special transfer instructions previously issued in bulletin form.

**THE SEATTLE ELECTRIC COMPANY**  
TRANSPORTATION DEPARTMENT

Seattle, Wash., \_\_\_\_\_, 190\_\_

To A. L. Kempster, Superintendent:  
I have carefully read and thoroughly understand Bulletin No. \_\_\_\_\_ posted  
on Bulletin Board on \_\_\_\_\_, 190\_\_

Yours respectfully,  
\_\_\_\_\_

FIG. 6.—ACKNOWLEDGMENT OF AN IMPORTANT GENERAL ORDER

**Seattle Electric Employees Beneficial Association**  
APPLICATION FOR SICK BENEFIT

Seattle, Wash. \_\_\_\_\_, 190\_\_

In applying for sick benefit answer the questions below and deliver the blank when filled out to any Conductor of the Seattle Electric Company who will see that it reaches the Secretary, or else mail it direct to the Secretary at General Office Building Fifth Avenue and Pine Street, Seattle, Washington

- What is your Membership No.?
- What is your present address?
- When were you taken sick?
- What is the nature of your sickness?
- Have you had a Doctor?
- Have you a preference for any particular Doctor?

State whom \_\_\_\_\_

FIG. 8.—FORM USED IN APPLYING FOR SICK BENEFIT

These books, like the regular rule books, are numbered and recorded in the office.

**DISCIPLINE**

The company has no merit or demerit system for the enforcing of discipline among its men, although some such plan has been seriously considered. The method used in dealing with insubordination and other misdemeanors consists largely in suspensions, although it is the policy of the superintendent to discourage this form of punishment as much as possible. Preference is given to prompt and thorough cautioning, and reprimands when needed. When the nature of the offense warrants it, suspensions of three to five days are given, according to orders issued from the office of the superintendent, generally on the recommendation of the inspectors. A discharged man is never re-employed by the company. If an employee's education seems to be deficient in the lines of his required duties, he is sent back to the school of instruction for further coaching. The humiliation of such an event is generally sufficient punishment for the offense.

**WAGES AND UNIFORM**

The wage schedule of trainmen at present in effect on the lines of the Seattle Electric Company is as follows: During first six months of service, 22 cents per hour; after six months and less than one year, 23 cents; from first to fourth year, 24 cents; fourth to six year, 25 cents; sixth to tenth year, 26 cents; tenth to twelfth year, 27 cents; twelfth to fifteenth year, 28 cents; fifteenth to eighteenth year, 29 cents; eighteenth year and thereafter, 30 cents an hour. This schedule was put into effect over a year ago and has given satisfaction. It provides for all the old employees of the constituent companies, their time of service dating back to when they were first employed on the Seattle lines.

The uniform of the trainmen, which they are required to purchase, is made of standard navy blue cloth. Complete specifications as to its design, including overcoats and caps, are printed in the book of rules. During the summer season the men are permitted to wear brown straw, bell-crown caps.

**BENEFIT ASSOCIATION**

Reference was made above to the Seattle Electric Employees' Beneficial Association. This is a very successful organization, which has been fostered by the company. Any of the employees of the Seattle Electric Company may be elected to membership. They choose all of their own officers except the treasurer, who is required to be the assistant treasurer of the company. The president of the association at present is the assistant superintendent of the company. Application for membership in the association is made on a blank (Fig. 7) which calls for names and addresses of relatives or beneficiary in case of death, date and nature of employment with the company, information as to membership in any other beneficial organization, etc. The applicant is required to pass a physical examination under the association's surgeon, which examination may also serve for the record required by the company, as already mentioned. Upon acceptance, he is given a numbered certificate of membership, entitling him to the benefits offered by the association.

The sick benefit is ten dollars (\$10) a week, beginning with the eighth day of sickness or disablement, provided the proper application, Form No. 3 (Fig. 8), has been properly filled out and sent to the secretary. The association furnishes free medical and surgical attendance to all members accepting the services of the association's physician, and a low rate is also given for attendance upon persons in the family of a member. On the death of a member, the beneficiary is paid \$250. The regular dues of the association are 75 cents a month, special assessments being levied when a death occurs. In addition to the sick and death benefits, the association has adopted co-operative methods for supplying members with certain goods at a discount, arrangements being made with local merchants for

that purpose. Last year most of the members bought their coal at a reduced price through the efforts of the association.

Membership in this organization is not compulsory, but practically all the employees are enrolled, and many members retain their membership after leaving the employ of the company. Besides the help in time of need, the association furnishes also social benefits, and it is probably largely responsible for the fact that no union exists among the men, and apparently none is desired.

**OFFICE RECORDS**

In the office of the superintendent is maintained a vertical filing system for the preservation of and ready reference to the records of employees. In folders or envelopes of the standard size are placed all papers concerning each man, including ap-

Employed	Resigned or Discharged	Badge	Rule Book	Phone Key	Punch	
					Issued	Insert

FIG. 9.—CARD RECORD OF EMPLOYEE

plication blanks, physician's certificate, letters of recommendation, reports, assignment of runs, etc. For quick reference a card catalogue is also kept, each card (Fig. 9) containing space at the top for the man's name and address, with columns below for date of employment, of resignation or discharge, for badge number, rule book number, telephone key number and date of issuing and mark of punch. Such other information as number of key to locker in trainmen's quarters and of transfer rule book is also kept on the cards. An active list is maintained for

Form A. White Form No. \_\_\_\_\_ THE SEATTLE ELECTRIC COMPANY TRANSPORTATION DEPARTMENT JUN 1904

APPLICATION FOR RUN

To: \_\_\_\_\_ SUPT. TRANS.

Dear Sir:

I hereby make application for the following runs which are advertised as vacant:

First Choice	CON.	MOD.	GAIP	LINE	CLASS OF RUN	TIME ON	TIME OFF	HOURS	MIN.
Second Choice									

SENIORITY

Date of entering service \_\_\_\_\_ TRAINMAN

No. on Seniority List \_\_\_\_\_ Badge No. \_\_\_\_\_

FIG. 10.—APPLYING FOR A RUN ADVERTISED AS VACANT

all men in the employ of the company, and an inactive list contains the names of those who have left the service. The latter list is useful in looking up records in case a man seeks to be re-employed or to be recommended, or in case some other railway company desires information concerning some one.

**ASSIGNMENT OF RUNS**

All trainmen are listed for train service according to seniority in service, conductors being rated in one list and motormen and gripmen in another. The method of placing the men when vacancies occur is somewhat novel. On the 20th of each month a bulletin is posted advertising the vacant runs, and bids are received from the men for such vacancies up to the 25th of the month. Each trainman is allowed to bid on two runs only. Successful bidders for day runs are required to hold them for six months before being allowed to bid on any others. Bidders fill out an "application for run" (Fig. 10), on which they indicate first and second choices, specifying the position, line, class of run, time on, time off, hours, minutes, as well as the date of their entering the service, number on seniority list and badge number. The bids are carefully considered, and each run is assigned to the ranking bidder on the 1st of the next month.

There is little duplication of bids, since the men usually confer among themselves before submitting bids, and the fact that ranking men have first choice is well understood. As mentioned above, men holding day runs are required to keep the same for six months before bidding on vacancies of the same class. Trainmen holding relief or swing runs are entitled to bid for day runs whenever posted as vacant, but must remain on their relief or swing runs for three months before bidding on others of the same class. The company has found this system of assignment very satisfactory. In going into a new division, a man must take without pay whatever time is necessary to qualify as to competency to operate the new runs. A gripman, in securing a position as motorman, must spend ten days breaking in on his own time.

#### EXTRAS

The extra men are handled in the usual way, being assigned to work from day to day in their regular turn as occasions demand. Seniority lists are kept posted at each car house, and the daily list, showing the work assigned for the following day, is posted at 4:30 p. m. every day by the inspector in charge. In the regular plan of the division work, vacancies of two to five days are assigned to one person, those of five to ten days to two persons, ten to fifteen days to three persons, twenty to thirty days to four persons, and so on. One good feature in the handling of the extra men is a general monthly list, corrected daily, showing for each day of the month the exact amount of work, with run number, which each extra man has done. This list is posted so that all can see it, and if a man has a complaint to make on account of not getting as many opportunities to work as his fellows, he is referred to the list, which settles the doubt. Extra men failing to report for work when assigned are charged with a "Miss," are placed at the foot of the extra list for three days, and are required to report at 5 a. m. each day.

#### CAR SCHEDULES AND WORKING LISTS

For each line a car schedule is posted, containing for each car run the hour of leaving the car house, the leaving time at each end of the line, the hour of arriving at the car house and the total length of time scheduled for the run. Accompanying the schedule is the assignment of crews, or working list, for the regular or day runs. This list gives first the car number, and then, in parallel columns, the badge numbers and names of the conductors and motormen assigned to those runs, with time on and time off; and in the last column, the total time of the run. Whenever a crew have a swing or relief run on another line, notation is made under their names, with time on and time off, so that a man can tell by referring to but one list to what service he is assigned for the entire day. As a rule, the car runs having odd numbers, such as 1, 3, 5, etc., are the all-day or eighteen to twenty-hour runs, and are handled by regular crews and relief crews. The even numbered runs are generally the trippers, varying from five to nine hours in length, and handled by the swing crews. Some of the tripper runs are long enough to furnish a full day's work for a crew, but as a rule the swing crews fill in on relief and swing runs on other lines. In addition to the schedules and crew lists, a record of time points is posted with instructions as to the making up of lost time, lay-overs, etc. In the trainmen's quarters of each car house is a double desk, with bulletin board in the center, upon which are posted the schedules, working lists, time points, etc., each line having a separate section. On the desk portion for each line is the trainmen's register. Fig. 11 shows the

trainmen's board and a portion of the men's quarters at the Fifth and Pine Street car house.

#### DESPATCHING SYSTEM

Like most of the city railways in the West, the Seattle lines are operated by a telephone despatching system. Although a few of the short lines still operate on schedules, most of the system is despatched from the central office. The despatching force consists of three men, working on eight-hour shifts. The night man, after the last cars are in, acts in the capacity of watchman, looking out for fire calls and blows the work whistle for the shop in the morning. The dispatchers record all car runs on the usual large sheets, making special note of interruption to traffic, cars turned in on account of defects, lost trips, etc. From these sheets are compiled each day the desired records of car and motor mileage for the auditor's use. Special reports of cars sent in for repairs (see Fig. 12), and of delays to traffic are made out daily by the dispatcher on the blanks, shown in Fig. 13, for the superintendent's office. In addition, there is made up daily a typewritten report of the in-

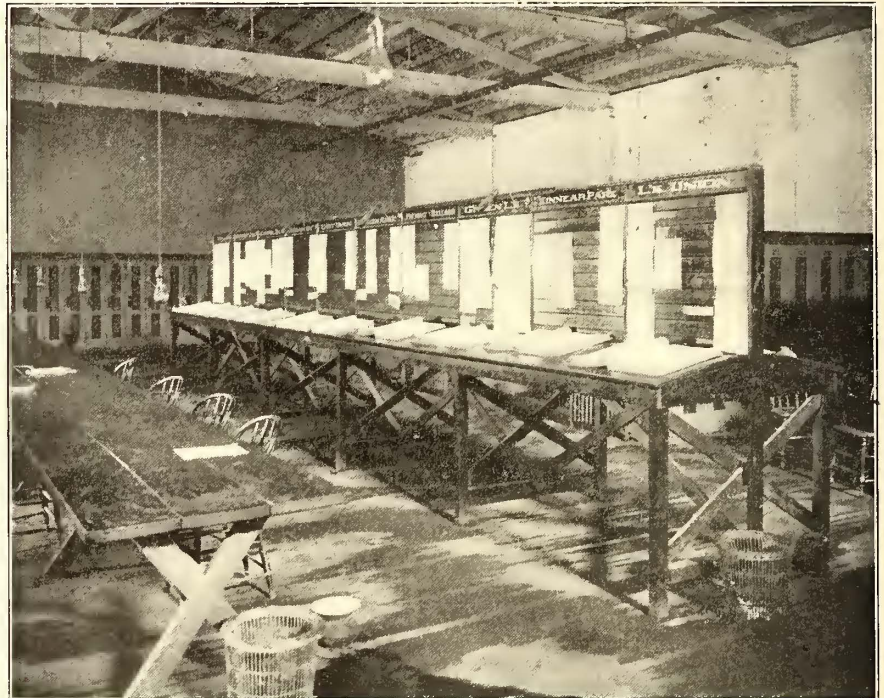


FIG. 11.—TRAINMEN'S BULLETIN AND REGISTER BOARD AT THE FIFTH AND PINE STREET CAR HOUSE OF THE SEATTLE ELECTRIC COMPANY

terruptions to traffic, which embraces a more detailed account of the delays and their causes, the state of the weather, and so forth. Copies of this report are sent to the manager, master mechanic and superintendent of track, as well as to the superintendent of transportation. A defect card, Form A 152 (Fig. 14), is used by the trainmen to record all damage to their cars, broken windows, trolleys, overhead lines, track and interruptions to service. On the reverse side of the card is a blank for record of the investigation made by the line foreman, master mechanic or official to whom the damage is reported, with a record as to who is to blame for the occurrence. The action taken is noted and signed by the superintendent, and the whole report is then approved by the manager. A similar card, called a complaint card, Form A 151 (Fig. 15), is used in the superintendent's office to record any public complaints that may be received by telephone from passengers or others with grievances. The card not only serves to remind the assistant superintendent, or whoever it is that takes down the report, of the necessary questions to be asked, but has also proved very useful by means of these same questions, in warding off needless complaints, since many people, when apprised of the fact that their grievance is being recorded for permanent reference and that they may be required to sign the record afterward, modify

their criticisms and frequently hang up the telephone without giving their names or further details.

INSPECTORS

The company has seven inspectors of train service, who report to and receive instructions from the superintendent. They are responsible for all running time and time points, and are required to see that the cars are operated on schedule time and are properly spaced. When hindrances from blockades or fires occur, the movements of cars are under their orders as directed by the despatcher. They also exercise a general supervision over the trainmen, look after the conditions of cars, overhead work and track, and in every possible way look out for the improvement of the service. As already mentioned, the two in-

complicated parts to get out of order, and, although a few seconds time is required to operate them, they are believed to be, on the whole, fully as satisfactory and reliable as, if not more so, than an automatic system. It suffices to say that the car service over the single-track lines has been much improved since the adoption of the block signals, and the liability of acci-

Form 1. Stone & Webster. 121-02-2900

**DISPATCHER'S OFFICE**  
**THE SEATTLE ELECTRIC COMPANY**

Mr. \_\_\_\_\_ 190...

SUPERINTENDENT RAILWAYS

The following cars were sent in for repairs on above date.

Dispatcher

CAR NO.	LINE	HARN.	TIME		CAUSE	REPAIRS BY CAR	TIME LOST	MOTORMAN OR GRIPMAN
			From	To				

FIG. 12.—DISPATCHER'S REPORT ON CARS SENT IN FOR REPAIRS

spectors best fitted for the work are assigned as instructors for the students just entering the employ of the company.

BLOCK SIGNALS FOR SINGLE-TRACK LINES

In the suburban districts there are several single-track lines, and, as the schedules operated are frequent and the general topography of the city often precludes the men from seeing from one turn-out to the next, it has been found necessary to

Form 2. Stone & Webster. 121-02-2900

**DISPATCHER'S OFFICE**  
**THE SEATTLE ELECTRIC COMPANY**

Mr. \_\_\_\_\_ 190...

SUPERINTENDENT RAILWAYS

The following is a Report of Delays to Traffic on above date.

CAR NO.	LINE	No. Minutes Delayed	TIME		PLACE	CAUSE	CONDUCTOR
			From	To			

FIG. 13.—DISPATCHER'S REPORT ON TRAFFIC DELAYS

install a system of block signals at all turn-outs. The signal consists merely of an incandescent lamp supported with a hood on a pole at the side of the track, and is thrown into or out of circuit by a bell-crank switch suspended in a wooden box from the span wire over the center of the roadbed. The switch is operated by the motorman from his platform by means of ropes which hang within easy reach. The following quotation from the company's rule book explains the use of the signals:

Both conductors and motormen are responsible for proper use of block signals. The motorman will operate the signal. Before entering a block motorman will bring his car to a dead stop with front platform of car opposite signal ropes, operate the signal and proceed only upon receiving the two go-ahead bells from his conductor. On leaving a block, the motorman will slow his car down to at least 3 miles per hour, will pull out the lights of the block he is leaving, and will proceed only upon receiving two go-ahead bells from his conductor. The conductor must watch the operation of the lights, both when they are pulled on and off, and must give two go-ahead bells to his motorman after the lights have been operated.

The operation of these block signals has been found very satisfactory. They are, of course, quite inexpensive, have no

Form 3. Stone & Webster. Form A 101 516-1018

**DEFECT CARD**

DO NOT FOLD

Date \_\_\_\_\_ 190...

Line \_\_\_\_\_  
Car No. \_\_\_\_\_  
Place \_\_\_\_\_  
Direction \_\_\_\_\_  
Time \_\_\_\_\_

REPORT BELOW ALL DAMAGE TO CARS, BROKEN WINDOWS, FROGGETS, OVERHEAD LINES, TRACK AND INTERRUPTION TO SERVICE

**INVESTIGATION**

Date \_\_\_\_\_ 190...

I have investigated this report and find that the following facts relating thereto exist:

And in conclusion I believe \_\_\_\_\_ to blame for the occurrence.

Signature \_\_\_\_\_  
Action \_\_\_\_\_  
Approved \_\_\_\_\_  
Sup't \_\_\_\_\_  
Gen'l Manager \_\_\_\_\_

USE THIS SIDE ONLY

FIG. 14.—REPORT ON DEFECTS IN EQUIPMENT

FIG. 14.—(OTHER SIDE)—INVESTIGATION OF DEFECT REPORT

Form 4. Stone & Webster. Form A 101 517-1019

**COMPLAINT CARD**

Date \_\_\_\_\_ 190...

Line \_\_\_\_\_  
Car No. \_\_\_\_\_  
Place \_\_\_\_\_  
Direction \_\_\_\_\_  
Time \_\_\_\_\_  
Badge \_\_\_\_\_

Signature \_\_\_\_\_  
Sup't \_\_\_\_\_  
Conductor \_\_\_\_\_  
Motorman \_\_\_\_\_

FIG. 15.—CARD FOR RECORDING COMPLAINTS FROM THE PUBLIC

dent has been greatly reduced. One of the signals is shown in the picture of the instruction room, Fig. 3.

CONCLUSION

The Seattle Electric Company is under the energetic and conservative management of Howard F. Grant, with A. L. Kempster as superintendent of transportation, and Mr. Bleecker as his assistant. Thanks are due to these gentlemen for courtesies extended and assistance rendered in the preparation of the above data.

THE FIFTIETH MEETING OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

The winter meeting of the American Society of Mechanical Engineers, the fiftieth convention of the organization, was held last week in New York, with a large attendance. The opening meeting was held Tuesday evening, Dec. 6, which was followed by morning and evening sessions thereafter until the closing session on Friday morning, Dec. 9. On account of the crowded condition of the society's headquarters at 12 West Thirty-First Street, the Wednesday and Thursday meetings were held in the hall of the Mendelssohn Union at 113 West Fortieth Street, where ample facilities were furnished for the full attendance.

The opening session, Tuesday evening, was taken up partly by the registration of members under the new form, being followed later in the evening by the annual address of President Ambrose Swasey. The subject of the annual address was: "Some Refinements of Mechanical Science." In it was recounted in an interesting manner the extreme refinements which have been attained by mechanical science, reference being had in particular to the wonderful precision of some of the modern developments in dividing-engines and optical instruments. An important feature of the opening session was the unveiling of a portrait of Past President John E. Sweet. C. W. Hunt, in making the address at the unveiling, spoke feelingly of the important part which Prof. Sweet had played in the founding and development of the society, and drew attention to the fact that his great career had earned for him this place of honor in the gallery of the society.

An important paper was read Tuesday morning, entitled: "A Twist-Drill Dynamometer," by Wm. W. Bird and H. P. Fairfield. It contained an account of experiments that had been made upon the power required to drive twist drills in metal drilling operations, a special dynamometer apparatus having been rigged up in an interesting manner for the purpose. An important fact was brought out in that it was found that 45-deg. angle drills could be operated with much less power than the standard 59-deg. drills—this tending to advocate the use of drills with the 45-deg. angle rather than 59-deg. drills for all metals except the harder grades of steel, where the flatter drills are found to be much better. A criticism of the paper was offered in that the results had not been made more practical by further experiments as to the relative advantages of various kinds of and angles in drills in different classes of metal.

Wednesday evening an interesting paper upon "An Indicating Steam Meter," by Charles E. Sargent, was read, describing a new style of mechanism for measuring the amount of energy flowing through a pipe in the form of steam, the device being arranged for indicating in pounds of steam or horsepower. The paper of most importance to power plant men was also presented at this session by George I. Rockwood, upon "Condensers for Steam Turbines." This paper, which was reprinted in the Dec. 10 issue of this journal (page 1047), presented valuable experience in the use of barometric condensers with steam turbines, describing the first installation of this kind that has been made. The paper thus outlined a new development in power plant practice, and it elicited strong criticism. F. Hodgkinson expressed the opinion in a written communication that the results recorded were remarkable for the use of a barometric or injector condenser, without an air pump. He pointed out difficulties which he considered would limit the use of this type of condenser with the steam turbine, such as the danger of leaks and the absence of the air pump to assist in maintaining vacuum. J. Morgan, in quoting from the experience with the operation of steam turbines at Johnstown, Pa., expressed his doubt as to the advisability of the use of the barometric condenser for this purpose, particularly where the turbine is to operate under variable loads. A very general discussion was participated in, but Mr. Rockwood, in closing the discussion, called attention to the unwarranted nature of the criticisms owing to the lack of precedent in this use of the injector condenser, and defended his position admirably by reference to the very successful results obtained in his installation, the first of its kind.

Other interesting papers were read, among which were: "Losses in Non-Condensing Engines," by J. B. Stanwood; "Pressures and Temperatures in Free Expansion," by A. Borsody and R. C. Caimcross (a study of the expansion of steam in turbine nozzles); "Discharge of Water with Steam from Water-Tube Boilers," by A. Bement; "Forcing Capacity of Fire-Tube Boilers," by F. W. Dean. Thursday afternoon was occupied by an excursion to the new power house of the New York Subway. The closing session was held Friday morning. The total registration was 820, 280 of which were guests. The officers elected for next year are as follows: President, John R. Freeman; vice-presidents, S. M. Vauclain, H. H. Westinghouse and Fred W. Taylor; managers, George M. Brill, Fred J. Miller and R. H. Rice; treasurer, Wm. H. Wiley. The spring meeting will be held at Scranton, Pa.

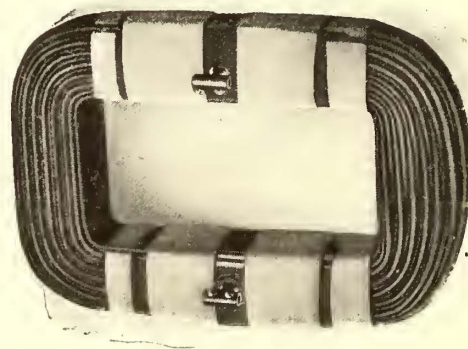
---

A traffic arrangement has been made between the Clover Leaf Railway (steam) and the Indianapolis & Northwestern Traction Company by which the latter will sell tickets to all points between St. Louis and Toledo. This gives Toledo direct connection and good service to Indianapolis, something it has not had heretofore.

## THE INSULATION OF RAILWAY MOTOR FIELD COILS

In the *STREET RAILWAY JOURNAL* of July 2, 1904, an article was published relative to the insulation and winding of Delta-boston magnet wire, which is made by the D. & W. Fuse Company, of Providence, R. I. Recently, elaborate experiments have been conducted by the company looking toward the production of a field coil insulation which would withstand unusual temperatures and would not be readily affected by water so that the life of the coil might be materially increased.

The company's process involves, first, the employment only of material which will not be affected by any ordinary motor temperature; second, the treatment of this so as to render it absolutely impervious to water. In the construction of such covering, that portion of the coil upon which the terminals are fixed is carefully insulated by wrapping with a single thickness of a special asbestos paper. Over this and under the terminal a thin sheet of micanite is placed, upon which the terminal, after being soldered to the wire, is then securely bound by stout asbestos twine, as shown in the accompanying illustration. The asbestos paper is then formed about the coil by dampening it with a thin solution of flour paste, or any good wall paper paste, care being taken that this solution is not so strong as to glaze over the paper, thus preventing it from becoming saturated with the compound later applied. To facilitate the forming of the asbestos paper over the coil, it was found desirable to cut the paper into various shapes as more readily conforming to the irregular form of the



MOTOR FIELD COIL WOUND WITH ASBESTOS TWINE

coil, so arranging these that joints should be frequently broken. A carefully arranged system of covering for any coil can be readily laid down so that the workmen will know exactly what piece of paper is used for each position. There are two covers, respectively designated as first layer and second layer, each layer being made up of several pieces of various shapes. The paper employed for this purpose is about .01 in. thick, and it is desirable to lay it flat on a board or in a shallow pan in applying the paste so that it may be thoroughly impregnated, as it must be wet quite through when applied to shape up readily without creases.

After applying the first layer, the coil should be slowly and thoroughly dried out. By leaving the coil over night it will be found apparently quite dry, but careful investigation will show that it still contains considerable moisture which must be driven off. It is therefore desirable to place the coil in an oven and raise the temperature to about 300 degs. F., allowing the coil to stay in there until the whole mass is brought to that temperature—say for a period of two to three hours. Taking the coil out while hot, it should be then completely immersed in one of the paraffine insulating compounds, allowing the coil to stay there until it is thoroughly cooled down. It is desirable to keep this solution fairly thin, and as the hot coil tends to drive off a considerable amount of the naphtha, which is employed as the solvent, it will be found necessary to replace this from time to time. After the coil is quite cooled down and no



bubbles appear at the surface, it may be removed from the bath and allowed to dry.

It is now ready for the second jacket, which is applied in the same manner as the first one. This outer cover should now be allowed to air-dry, when it will be ready for the application of the outer wrapping of asbestos tape, of a thickness of about .03 in. The most satisfactory width to use is about  $\frac{3}{4}$  in., and the coil should be carefully and tightly wrapped with a complete layer of this, care being taken at the corners to wind these so as not to make them too bulky. The coil is now ready for its final dipping and preparatory to this, it is placed in an oven and the temperature raised rapidly to 300 degs. F., for about one hour, and then taken out and immersed in a bath of good baking japan, where it is allowed to remain until quite saturated. Upon removing it from the japan it is desirable to let it drain for an hour or two to remove the excess. It should then be placed in a baking oven and baked for a period of three or four hours, until quite hard, at a temperature of 300 degs. to 350 degs. F. Upon removing it from this, while still hot, it is desirable to place it in the japan bath again to complete the saturation, after which another draining and another baking at the same temperature will complete the coil.

The company's experience has shown that this treatment makes it necessary to remove this coil not more than twice a year, at the most, from the motor and give it one dipping and baking in the japan.

To determine the value of this insulation, two comparative tests were conducted under service conditions, of coils wound with Deltabeston wire and insulated as described, and those wound with the ordinary asbestos paper and cotton insulation, and insulated on the outside by the methods now employed generally throughout the country. It appeared that apparently the Deltabeston insulation was slightly lower than the cotton, which is attributed in this particular case to the fact that the moisture was not carefully driven out of the paper before the coil was immersed in the insulating solutions. On the other hand, it was noted that the Deltabeston insulation recovered more rapidly than the cotton every time the circuit was opened, which occurred about the middle and the end of the test. Another point was that the maximum temperature reached by the Deltabeston coil was considerably higher than that of the cotton coil. This was due to two causes, first, that the resistance of the Deltabeston coil was somewhat higher than that of the other, and second, to the lower heat conductivity of the material employed in covering the coil.

At the end of practically ninety-seven hours continuous run, when the temperature of the copper wire had gone slightly above 900 degs. F. in the Deltabeston coil and about 780 degs. F. in the cotton covered coil, water was run into both cases. At that time the cotton covered coil had been reduced to a mass of charcoal, it being possible to puncture the insulation with the finger at any point. To all appearances the Deltabeston coil was quite uninjured. At the first application of water, contrary to expectations, the cotton coil showed fairly high insulation resistance, which could not be accounted for until it was observed that owing to the tremendously high temperature, the japan which had been melted had run to the bottom of the coil and had become baked into a dense, brittle mass at that point, which would completely exclude the water if unbroken. As the level of the water rose, however, until it reached a point above this japan, or as it penetrated through the cracks, the insulation immediately commenced to decrease until it had gone down to practically nothing. In the meantime the insulation of the Deltabeston coil had been improving rapidly, until it had exceeded the capacity of the instruments, some 400 megohms, notwithstanding the fact that it was all the time immersed in water, the temperature of which had gradually risen to about the boiling point. The immersion of the coil was continued for a period of twenty-four hours, and at the end of that time

it was impossible to get any readings whatsoever showing a decrease in the insulation resistance. A careful examination of the above coils showed that the cotton covered coil had been completely destroyed, while the Deltabeston coil was practically intact and required no more attention than a dipping in the japan to soften up the outer coating which had become somewhat hard, owing to the high temperature and long baking to which it had been subjected.

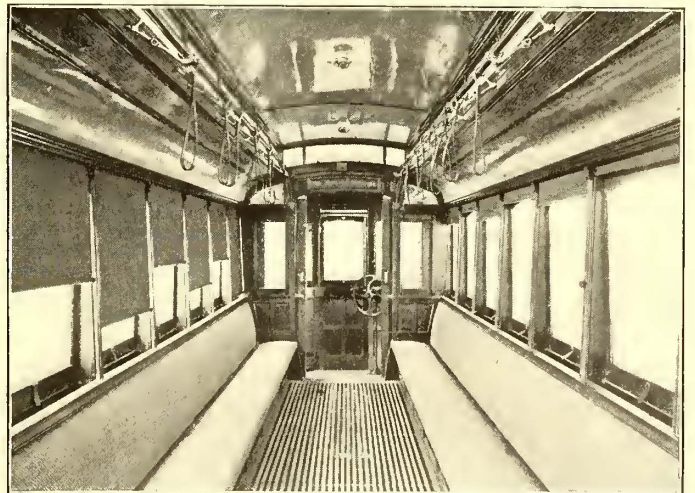
### NEW CARS FOR SPRINGFIELD, ILLINOIS

The Springfield Consolidated Company, Springfield, Ill., has recently received closed cars from the American Car Company, of St. Louis. The railway company operates a city system with 25 miles of trackage and about sixty cars. The new cars have spring rattan seats longitudinally placed. They are mounted upon Brill No. 21-E trucks, which carry the car bodies



ONE OF THE SPRINGFIELD CONSOLIDATED COMPANY'S CARS FURNISHED WITH HIGH FOLDING GATES

2 ins. lower than any other single truck. The interiors are finished in cherry, with decorated birch ceilings, giving a bright and attractive appearance. Besides having folding vestibule doors, the platform entrances are provided with high folding gates. The platform timbers are reinforced with angle iron, and angle-iron bumpers additionally strengthen and pro-

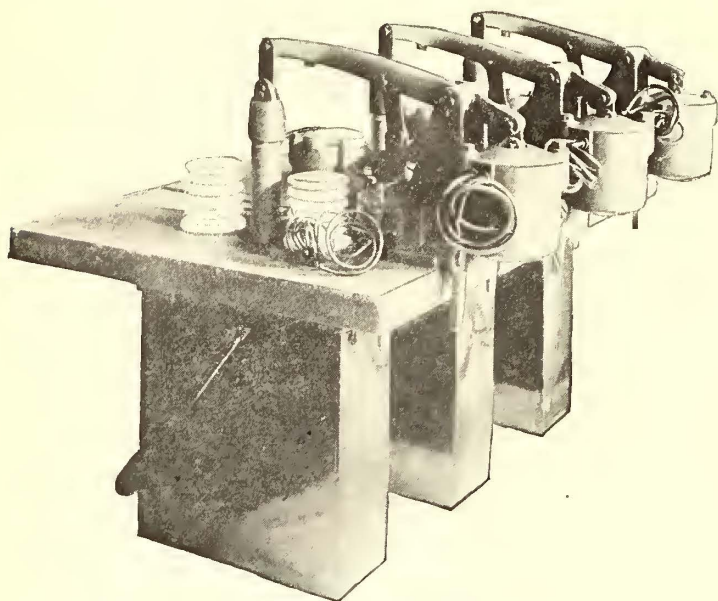


LONGITUDINAL SEATING ARRANGEMENT OF SPRINGFIELD CAR

tect them. The length of the cars is 32 ft. over the crown pieces, and 22 ft. over end panels. The width over the sills, including the panels, is 6 ft. 3 ins., and over the posts at the belt, 7 ft.  $5\frac{1}{2}$  ins.; sweep of posts,  $7\frac{3}{4}$  ins.; centers of posts, 32.9-32 ins. The side sills are  $3\frac{3}{4}$  ins. x 7 ins., and the end sills are  $3\frac{3}{4}$  ins. x 6 ins., with 7-in. x  $\frac{1}{2}$ -in. sill plates on the outside. The thickness of the corner posts is  $3\frac{3}{4}$  ins., and of the side posts,  $1\frac{3}{4}$  ins. The cars are equipped with folding gates, angle-iron bumpers, "Dedenda" gongs and other Brill specialties. The truck-wheel base is 8 ft., and the wheel diameter is 33 ins.

### NEW OIL CIRCUIT BREAKERS

The new automatic oil circuit breaker, known as electrically-operated type E, recently introduced by the Westinghouse Electric & Manufacturing Company, is shown in the accompanying illustration. It is adapted to distant control and is designed



THREE-POLE OIL CIRCUIT BREAKER

for voltages from 3300 to 25,000. Systems of very high voltage and capacity have received much attention from engineers, but a definite demand has arisen for a piece of apparatus of somewhat smaller capacity, which shall be compact, reliable and suited for electrical operation. The Westinghouse system of solenoid operation is especially adapted to such a form of apparatus, and has been used in the new line of circuit breakers.

The circuit breaker is made in single-pole units, each being mounted apart from the switchboard in a brick or concrete compartment. Two, three and four-pole combinations are made by placing the units side by side. The base of each unit is of treated soapstone and holds two heavy porcelain insulators which carry the stationary contacts and the connection to the external circuit. The movable contacts are at the ends of a U-shaped metal casting fastened at the center to a rod of treated wood, which is moved up and down by the operating mechanism in closing or opening the circuit. The final arc on breaking the circuit is taken by an arcing tip which may easily be replaced. The contacts deserve especial notice; the movable ones are in the shape of truncated cones and fit into corresponding surfaces in the stationary contacts, which are made up of several copper springs. This not only gives a large area of contact, but also insures a positive contact over its entire surface, and entirely prevents "freezing" under overloads. The tanks are liberally insulated and the inner surface so shaped as to reduce the amount of oil required, and therefore the fire risk to a minimum. The open position is in all cases maintained by gravity.

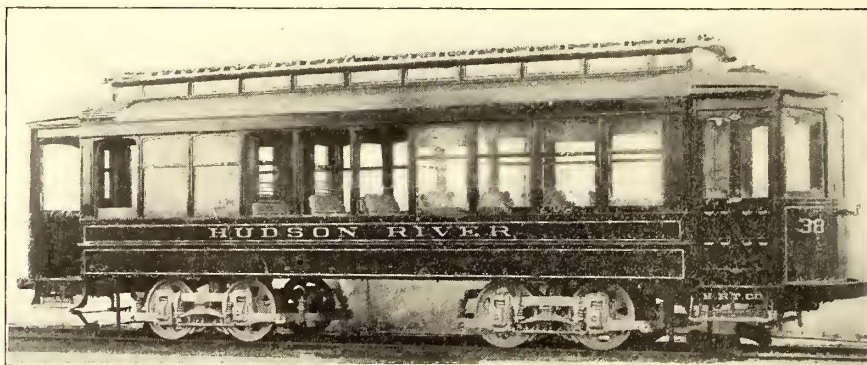
A simple system of levers and toggles is mounted on the top of the base and an electromagnet is arranged with its movable core attached to the lever system, so that when the magnet is energized the circuit breaker will be closed. The standard voltage used on the solenoid is 125 volts. A second electromagnet acts as a tripping coil, and may be controlled by a relay of any desired type. A small single-pole, double-throw

switch is mounted on the base and is operated by the motion of the levers in opening or closing this circuit; it controls the tell-tale indicator and lamp, which are mounted in view of the operator.

The entire mechanism is extremely compact and solid in construction, while the insulation has been carefully provided for. As in other Westinghouse oil circuit breakers, the break takes place near the surface of the oil instead of at the bottom, where there is almost always a certain amount of sediment. These circuit breakers have no live parts exposed. The oil tanks are firmly held in position by special holders, which, by the simple movement of a lever, may be removed and all contacts examined without disturbing any other part of the circuit breaker. The ultimate breaking capacity of the type E circuit breakers is, for single-phase, 6000 kw; two-phase, 12,000 kw; three-phase, 70,400. They will open circuits of these capacities under any condition of overload or short-circuit.

### CARS FOR THE HUDSON RIVER TRACTION COMPANY

The J. G. Brill Company, of Philadelphia, recently shipped three semi-convertible cars to the Hudson River Traction Company, of Hackensack, N. J., which were ordered through Ford, Bacon & Davis. The railway company operates a city system and an interurban line connecting Hackensack and Newark with intervening towns. The cars have the builders' semi-convertible window system, which, as the illustration shows, permits the windows to be held at any height or raised entirely into the roof pockets. This gives the car an open appearance in summer, and makes it bright and attractive in winter. As the window sills are too low to be used comfortably by an adult passenger, neat arm rests are provided. The car is divided into two compartments,



DOUBLE VESTIBULE SEMI-CONVERTIBLE CAR FOR THE HUDSON RIVER TRACTION COMPANY

one being for smokers. The dividing partition is of quartered oak, with glass in the upper part. Quartered oak is used entirely in the interior finish, including the ceilings. The seating capacity is forty passengers, using seats of the "step-over" type. Attached to the upper part of the steel dashers at the ends are bicycle hooks, enabling each car to carry six bicycles. These cars are similar to a lot of four which the railway company received from the builders about a year ago.

The general dimensions are as follows: Length over end panels, 28 ft., and over the crown pieces and vestibules, 37 ft. 5 ins.; width over the sills, 7 ft. 10½ ins., and over the posts at the belt, 8 ft. 2 ins.; sweep of the posts, 1¾ ins. The side sills are 4 ins. x 7¾ ins., and the end sills are 5¼ ins. x 6¾ ins.; sill plates, ¾ in. x 12 ins.; thickness of the corner posts, 3¾ ins., and of the side posts, 3¼ ins. The cars are equipped with folding gates, "Dedenda" gongs, track scrapers and other specialties of Brill manufacture.

## FINANCIAL INTELLIGENCE

WALL STREET, Dec. 14, 1904.

**The Money Market**

Contrary to general expectation, the money market continued to show increasing ease in all its branches. At the close of last week the market developed considerable firmness, call and time loans advancing sharply to 5 and 4 per cent, respectively, as a result of the crash in prices on the Stock Exchange. The strength, however, was only temporary, and despite the shipment of gold to Europe, and the prospects of further consignments of the precious metal this week, together with the preparation for Jan. 1, dividend and interest disbursements, the heavy draft soon to be made upon the banks on account of bond issues, including the new \$50,000,000 Atchison issue, and the heavy shipment of funds to the South in connection with the cotton crop movement, rates for all maturities ran off to the lowest point attained for some time. From 5 per cent, the call loan rate broke to 2 per cent, but subsequently there was an advance to 3 per cent, while time money dropped to  $3\frac{1}{2}$  per cent. The supply of funds at the low level was extremely large, both the local and out-of-town institutions displaying a general disposition to place their funds. The demand for funds was decidedly more active, and lenders reported a comparatively large business in call and time loans at prevailing rates. The overshadowing feature of the market has been the pronounced strength in sterling exchange rates for all classes of bills advancing sharply to within a small fraction of the highest point of the season. On Tuesday prime demand bills sold as high as 4.8695, which suggests the renewal of gold exports to Europe. At this writing \$1,000,000 gold in bars has been engaged for shipment by the end of the week steamer, and the opinion in exchange circles is quite general that additional exports of coin will be made, providing, of course, that the present strength of the market is maintained. Money at the leading European centers has shown a disposition to harden. At Berlin the rate of discount has advanced  $\frac{1}{4}$  to  $4\frac{1}{2}$ , while Paris reports an advance of  $\frac{1}{8}$  to  $2\frac{3}{8}$  per cent. The London rate was somewhat easier at  $2\frac{1}{4}$  per cent, while at Amsterdam the quotation remained unchanged, at 3 per cent.

At the close indications point to a continued easy market. According to the large banking interest, the market is free from disturbing factors, and apart from a slight hardening of interest changes, as a result of the end-of-the-year settlements, rates are not likely to rule materially above those prevailing at the present time.

**The Stock Market**

The volume of business upon the Stock Exchange assumed enormous proportions this week, but the dealings were accompanied by extremely sharp fluctuations in prices. The attack upon certain copper stocks by a prominent Boston speculator and his followers was renewed at the opening, and produced a situation that the leading bull operators were not prepared for. The heavy selling of the coppers and others of the industrial group, was communicated to the entire market, which finally developed into a general liquidating movement. The news of the week was extremely favorable. Money ruled comparatively easy, and railway traffic returns showed substantial increases over the corresponding periods of the year. This news, however, was entirely disregarded, and prices declined sensationally. At the low level, support was rendered strong interests, which was followed by a substantial recovery in prices. On Tuesday afternoon another attempt was made by the professionals to lower prices, but in this they were unsuccessful. The market closed unsettled, but the consensus of opinion was that stocks have passed from weak hands into strong ones, and that consequently the market was in a healthier position than at any other time during the week. The bond market was also extremely active, but the fluctuations in prices were comparatively small as compared with those in the stock department.

The traction stocks were active, but prices suffered severely in sympathy with the general market. Brooklyn Rapid Transit showed early strength on reports of large earnings, but in the subsequent dealings there was a short decline of about 9 points to 57, from which it recovered to  $58\frac{1}{2}$ . Manhattan Railway broke from  $167\frac{1}{2}$  to  $162\frac{3}{4}$  and rallied to  $163\frac{1}{2}$ . Metropolitan Securities dropped  $6\frac{1}{2}$  points to 75, and recovered to 76, while Metropolitan Street Railway broke from  $123\frac{1}{4}$  to  $117\frac{1}{4}$ , and closed at  $118\frac{1}{4}$ , a net loss for the week of 5 points.

**Philadelphia**

Less activity was displayed in the local traction issues this week, and prices, with few exceptions, sustained fractional losses in sympathy with the weakness in the New York market. Philadelphia Company common was the leader in point of activity, about 7000 shares changing hands. Initial transactions were made at  $42\frac{1}{8}$ , from which the price ran off to  $40\frac{1}{4}$ , but subsequently there was a full recovery, which was followed by another reaction at the close to  $41\frac{1}{4}$ , a net decline for the week of  $\frac{3}{4}$ . The preferred, however, was extremely quiet, but strong, several hundred shares being marketed within a range of  $47\frac{3}{4}$  and 47, the final transaction being made at  $47\frac{1}{2}$ . Philadelphia Rapid Transit lost  $\frac{5}{8}$ , about 1000 shares changing hands at from 18 to 17 and back to  $17\frac{1}{2}$ . Union Traction sold to the extent of about 1200 shares at from 59 down to  $57\frac{1}{2}$ , ex-dividend, but in the later dealings it recovered sharply to  $58\frac{1}{2}$ , showing a net loss of  $2\frac{5}{8}$ . Consolidated Traction of New Jersey was practically neglected, less than 300 shares selling at between 78 and  $77\frac{1}{2}$ . Philadelphia Traction and United Gas & Improvement were conspicuously strong, about 1500 shares of the first-named changing hands at 98 to  $98\frac{1}{2}$ , an advance of  $\frac{1}{2}$ , while United Gas & Improvement, after selling off to  $104\frac{3}{4}$ , advanced sharply to  $106\frac{1}{4}$ , about 10,000 shares changing hands. American Railways ruled unchanged, about 200 shares in odd lots changing owners at  $48\frac{3}{8}$  and  $48\frac{3}{4}$ .

**Chicago**

There were no important developments in the local traction situation this week, and there was a general disposition on the part of those concerned to await the final outcome of the franchise question. It is known that conferences have been held in New York between the Western and Eastern interests in the Chicago Traction Company, and while it is generally believed that substantial progress is being made toward working the whole problem, it cannot be learned that anything of importance has been concluded within the past few days.

The local transportation committee of the Council will it is said, begin immediately the preparation of an ordinance extending franchises of the Union Traction lines, so as to get a referendum vote on it at the April election. Judge Grosscup declined to negotiate with the Council, on the ground that, as he expected the consolidation of the City Railway and Union Traction would be made in the near future, he would have no authority over the combined company. It was also reported that a circular will soon be issued to the stockholders of the Chicago City Railway, offering to guarantee 10 per cent dividends on their new stock of the Consolidated Company. The market for traction stocks was extremely dull and heavy. Metropolitan Elevated was the most active issue on the list, about 700 shares selling at from  $77\frac{1}{2}$  to 77, a loss of  $\frac{1}{2}$  point, despite the renewed talk of dividends on the stock. Directors of the company decline to discuss the matter. The earnings of the road are said to show a fair return on the preferred stock, but there is considerable doubt as to whether or not enough surplus will have been accumulated by the end of the year to warrant the resumption of dividend payments. City Railway sold at 185 for 100 shares, a decline of a point, while Chicago Union Traction rose from  $11\frac{1}{2}$  to  $12\frac{1}{2}$  on the exchange of 200 shares. Chicago & Oak Park Elevated sold at  $7\frac{1}{4}$  to  $7\frac{1}{2}$  for about 400 shares, and West Chicago sold at  $50\frac{3}{4}$  for 50 shares.

**Other Traction Securities**

Trading in Boston traction issues was only moderately animated, and apart from Massachusetts Electric common and preferred, which declined 1 and  $\frac{3}{4}$ , respectively, price changes were insignificant. Upward of 700 shares of the common sold at  $14\frac{1}{4}$  to 14, while about 500 shares of the preferred sold at from  $62\frac{3}{4}$  to 62. The company's report for the year ending September 30, 1904, showed total income of \$571,197, a decrease of \$354,912. After deducting fixed charges of \$121,500 and dividends of \$616,722 there remained a deficit of \$182,247, against a surplus of \$7,507 in the previous year. Boston Elevated held firm, transactions being made at from 153 to 154. West End common declined  $\frac{1}{2}$  to  $92\frac{1}{2}$ , while the preferred ruled unchanged at 113.

The feature of the Baltimore market was the activity in United Railway 4s, and the income bonds, trading in these issues being stimulated by the ratification of the sale of the \$1,700,000 4 per cent bonds of the Baltimore, Sparrows' Point & Chesapeake Railway Company to New York bankers. One of the conditions of the sale

is that cars are to be run to the center of the city over the tracks of the United, and that this company is to receive a certain proportion of the fares collected while running in the city. It was also reported that New York interests were negotiating for the purchase of the company. Information as to how far the negotiations have gone, or any of the details of the deal, could not be obtained. About \$100,000 of the 4s sold at 93 $\frac{3}{4}$  and 93, while upward of \$125,000 of the income bonds changed hands at from 55 down to 51 and up to 55 $\frac{1}{4}$ , the final transaction being at 54 $\frac{3}{4}$ , a decline of  $\frac{1}{2}$  for the 4s, and a loss of 1 $\frac{1}{4}$  for the incomes. The stock was fairly active, about 15,000 shares being traded in at prices ranging from 12 $\frac{3}{8}$  to 14 $\frac{3}{4}$ . City & Suburban 5s sold at 112 $\frac{3}{4}$ , and Norfolk Railway & Light 5s changed hands at 91. On the New York curb, Interborough Rapid Transit was fairly active, but the price sustained a severe loss, in sympathy with the demoralization in the general stock market. At the opening the price held remarkably firm around 168 $\frac{7}{8}$ , but subsequently there was a sharp reaction to 160, which was the closing price. About 18,000 shares were traded in.

Columbus Railway & Light has been active recently, and the price has advanced from 43 to 48 $\frac{1}{2}$  bid and 49 asked. Columbus Railway common stock has been active, and the demand has come from the best sources. The price has advanced to 98 $\frac{3}{4}$ , which is the high record for this security. Lake Shore Electric also has been very active. The bid for the common is 2, while that for the preferred is 10. East St. Louis & Suburban Traction Companies sold at the record figure of 99 $\frac{1}{4}$ . Cincinnati Street Railway was offered at 144 without bids. Detroit United is offered at 79 $\frac{1}{4}$ , but with 78 $\frac{1}{2}$  the best bid and no sales. One small sale of Cincinnati, Newport & Covington Light & Traction preferred is reported at 92. Common of this company is quoted at 32, with 31 bid.

#### Security Quotations

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

	Closing Bid	
	Dec. 6	Dec. 13
American Railways .....	48 $\frac{1}{2}$	48
Aurora, Elgin & Chicago (preferred).....	45	—
Boston Elevated .....	153	a153
Brooklyn Rapid Transit .....	66 $\frac{1}{2}$	57 $\frac{7}{8}$
Chicago City .....	183	185
Chicago Union Traction (common) .....	12 $\frac{1}{2}$	11 $\frac{1}{2}$
Chicago Union Traction (preferred) .....	41 $\frac{1}{2}$	40
Cleveland Electric .....	75	75
Consolidated Traction of New Jersey.....	77 $\frac{1}{2}$	77
Consolidated Traction of New Jersey 5s.....	*108 $\frac{1}{4}$	108 $\frac{1}{4}$
Detroit United .....	79 $\frac{1}{4}$	77 $\frac{1}{2}$
Interborough Rapid Transit .....	168	161
Lake Street Elevated .....	—	22
Manhattan Railway .....	157 $\frac{1}{4}$	*162 $\frac{3}{4}$
Massachusetts Electric Cos. (common) .....	14 $\frac{3}{4}$	14
Massachusetts Electric Cos. (preferred).....	62 $\frac{1}{2}$	61 $\frac{1}{2}$
Metropolitan Elevated, Chicago (common) .....	24	25 $\frac{1}{2}$
Metropolitan Elevated, Chicago (preferred).....	67 $\frac{1}{2}$	66
Metropolitan Street .....	123	118 $\frac{3}{4}$
Metropolitan Securities .....	81 $\frac{1}{4}$	75 $\frac{3}{4}$
New Orleans Railways (common) .....	5	4
New Orleans Railways (preferred) .....	25	20
New Orleans Railways, 4 $\frac{1}{2}$ s.....	80	74
North American .....	102 $\frac{3}{4}$	99 $\frac{1}{4}$
Northern Ohio Traction & Light .....	17 $\frac{1}{2}$	16 $\frac{1}{2}$
Philadelphia Company (common) .....	41 $\frac{1}{4}$	41 $\frac{1}{4}$
Philadelphia Rapid Transit .....	18	17 $\frac{1}{4}$
Philadelphia Traction .....	98	97 $\frac{3}{4}$
South Side Elevated (Chicago) .....	97	96
Third Avenue .....	131	130
Twin City, Minneapolis (common) .....	106 $\frac{1}{4}$	103 $\frac{1}{2}$
Union Traction (Philadelphia) .....	58 $\frac{1}{2}$	58
United Railways, St. Louis (preferred) .....	68 $\frac{1}{2}$	—
West End (common) .....	92 $\frac{1}{2}$	92
West End (preferred) .....	113	113

\* Ex-div.

#### Iron and Steel

The "Iron Age" says that on Saturday last the steel rail manufacturers open books for 1905 delivery at \$28 per ton for standard sections, but thus far comparatively few orders have been placed with the Eastern mills, but Western mills have entered about 150,000 tons. The Tennessee Company, one of the independent producers, has booked new business which will employ the mill until the middle of next year. An order for 75,000 tons now in the market will go mostly to this mill, and will insure full employment for the whole of 1905. Steel rail manufacturers, after a careful study, have concluded that tonnage for 1905 will be very large.

## MR. McDONALD BECOMES CONNECTED WITH NEW YORK CITY RAILWAY INTERESTS

John B. McDonald, whose resignation from the Interborough Rapid Transit Company and the Rapid Transit Construction, of New York, as a director, was noted in the STREET RAILWAY JOURNAL of Dec. 10, was on Wednesday, Dec. 14, elected a director of the Metropolitan Securities Company to succeed Richard W. Meade, who has become president of the New York Transportation Company. At the same time four members of the Metropolitan directorate, Edward J. Berwind, John D. Crimmins, Frank S. Gannon and Augustus D. Juilliard were re-elected. In becoming connected with the interests that control the surface transportation system in New York, Mr. McDonald says his efforts will be devoted toward securing for the Metropolitan Company its proposal to the city to build an independent subway on the east side, from the Battery to the Bronx, which would provide lateral connections with the company's surface cars without additional fare.

## UNITED RAILWAYS EARNINGS IN ST. LOUIS

The gross earnings of the United Railways Company of St. Louis for November were \$730,102, an increase of \$282,755 over the corresponding month last year. This brings the gross earnings for the last eleven months up to \$9,269,898. While the November earnings are the lowest since May, it is generally believed that the earnings in December will exceed \$730,000, or be at least \$20,000 greater than the earnings were last April. Officials of the United Railways Company have not yet computed earnings on the last day of the Fair, December 1, but state that they were at least \$30,000, in which event the company has only \$700,000 to earn to fulfill the prediction made some time ago that the gross earnings for the year would amount to \$10,000,000. The earnings by months from January 1, 1904, show as follows: January, \$565,098; February, \$563,257; March, \$645,481; April, \$710,368; May, \$837,872; June, \$925,387; July, \$984,644; August, \$1,014,776; September, \$1,051,452; October, \$1,095,842; November, \$875,534; Total, \$9,269,667. The gross earnings in 1903 were \$7,259,460, which shows that 1904 earnings increased over 1903 \$2,010,207.

## REPORT OF THE ATLANTIC SHORE RAILWAY LINE

The following is a report of the income and expense account of the Atlantic Shore Line Railway of Kennebunkport, Me., from April 1 to Oct. 1, 1904:

Income:	
Passenger .....	\$37,397.66
Freight .....	14,847.04
Mail .....	516.29
Express .....	652.11
Other car earnings .....	920.35
Advertising .....	131.25
Rents .....	248.35
Power .....	6,065.56
<b>Total earnings, six months.....</b>	<b>\$60,769.61</b>
Operating Expenses:	
Maintenance way and structure.....	\$3,204.65
Maintenance equipment .....	3,859.67
Power-house expense .....	3,566.49
Transportation expense .....	8,989.76
Operation of freight service.....	4,517.84
General expense, including management, Casino, legal and insurance.....	5,785.95
<b>Total operating expense .....</b>	<b>\$29,924.36</b>
<b>Net earnings, six months.....</b>	<b>\$30,845.25</b>

The extension of 8 $\frac{1}{2}$  miles to Biddeford was opened for business July 24, 1904, so the above is the showing for four months of the old properties, and two months only of the completed line.

This company now has in operation 35 miles of road running from Springvale through Sanford, West Kennebunk and Kennebunk to Cape Porpoise, and from Kennebunkport to Biddeford, and it is expected that an extension of 12 miles from Kennebunkport to Ogunquit will be completed in time for next summer's business. The line from Kennebunkport to Biddeford was opened for travel July 24, 1904, and is built principally on private right of way. On the 1st of October the company paid a semi-annual dividend of 3 per cent on \$250,000 preferred stock. The company does a very large freight business, and supplies the Sanford Mills with power from the large water power electric plant owned by it.

## MORE BROOKLYN RAPID TRANSIT IMPROVEMENTS

The Brooklyn Rapid Transit Company will give fresh impetus, commencing immediately, to the series of improvements it has under way, by an elaborate readjustment of the Thirty-Sixth Street and Fifth Avenue elevated station. The expenditures contemplated here, in addition to those under way for the new storage capacity and new shops at this point, involve an outlay of more than \$250,000. For the purpose of increasing the facilities at Thirty-sixth Street and Fifth Avenue junction, two operating tracks will be added, which will entirely eliminate the present annoyance of trains waiting outside the station. It will also greatly facilitate the operation of express service, both to Coney Island and in the regular daily operation. The platform capacity will be doubled and other important improvements and conveniences will be instituted at this important transfer point. The building of the large shop for the maintenance of the elevated equipment and the increase of track in the storage capacity, under new conditions, will make this junction one of the most important on the entire elevated system.

The two new platforms, 300 ft. in length each, will be built outside the present platforms, and the two new outside tracks will be used for the express trains from Sixty-Fifth Street and Bath Beach, which will pass the Thirty-Sixth Street station without stopping. The local trains running only between Thirty-Sixth Street and the bridge will stand on the inside tracks. The whole signal and switching system at this point will be rearranged. Thirty-sixth Street will also be cared for by the Culver and West End service. The old steam shops are to be torn down and the site made into a yard for the storage of cars, and a fireproof running repair shop will be built. The company has recently acquired the big hill comprising several acres to the west of the station, and will use this in the enlargement of its yard facilities at this point. The terminal station at Sixty-Fifth Street is also to be doubled in capacity. Two more tracks will be put in for the accommodation of the express service.

Another station for the trolley service will be built beyond the present station, and the surface cars coming up from the south and returning will, by means of a loop, pass around the new station in both directions instead of having to come up to the platform and back down again, as at present, holding up all of the cars back of them. The elevated service will be made continuous also by the building of extra tracks at Sixty-Fifth Street. All of the stations on the Fifth Avenue line will be lengthened sufficiently for six-car trains. The headway of the express trains on the Fifth Avenue division will be reduced to 7½ minutes during the busy hours of the day, and the running time will be reduced.

## CHICAGO TRACTION MATTERS

The local transportation committee has decided to draw up at once a franchise ordinance for the Union Traction Company on lines similar to those governing the grant of the Chicago City Railway Company. This decision was reached, notwithstanding the fact that Judge Grosscup, in a letter, urged delay, pending the amalgamation of all the lines in the city. Concerning this amalgamation Judge Grosscup, in his letter, says: "The movement to that end has progressed favorably and will, I believe, be consummated within a few days. In that case the city would, of course, wish to deal directly with the new interests."

The reason for the seeming haste on the part of the Council committee was that, if referendum be had next spring, the ordinance presented to the voters should cover the entire city. If, during the intervening time the combination between the Union Traction Company and Chicago City Railway Company be effected, the two ordinances could be combined.

## ANNUAL REPORT OF THE MASSACHUSETTS ELECTRIC COMPANIES

The annual report of the Massachusetts Electric Companies for the year ending Sept. 30, 1904, has just been published. In his report, President Abbott states that the winter expenses of the roads were \$250,000 more than those of an average winter, while the decrease in gross receipts compared with the winter before amounted to \$110,000, and that the summer was more than usually cool; these facts prevent a better showing. The Railroad Commissioners last spring authorized the issue of bonds to refund existing bonds, and also of \$3,372,500 to pay for work already done or in progress. The new turbine station at Newport is working satisfactorily, and the new Quincy station has been running since Oc-

tober. Several old stations have been shut down. During the year 127 miles of new track have been either built or acquired by purchase; three new car houses have been built, and six enlarged; 679 new cars and snow plows have been bought or built, and 1446 motors. The consolidated income account and balance sheet of the different street railway and lighting companies, and those of the Massachusetts Electric Companies are given below:

CONSOLIDATED INCOME ACCOUNT	
Gross earnings .....	\$6,380,863
Oper. expenses .....	4,479,520
Net earnings .....	\$1,901,343
Interest, rentals, and taxes.....	1,462,626
Net divisible income .....	\$438,717
Dividends .....	466,003
Deficit .....	\$27,286

CONSOLIDATED BALANCE SHEET	
ASSETS	
Property account .....	\$35,560,015
Cash .....	770,429
Accounts receivable and open accounts .....	160,708
Newport & Fall River and Nashua lease accts.....	144,390
Coupon deposits .....	84,037
Sinking and redemption funds.....	70,440
Prepaid taxes, insurance and rentals.....	68,920
Materials and supplies .....	708,789
Totals .....	\$37,567,727
LIABILITIES	
Capital stock .....	\$16,760,100
Funded debt .....	15,159,500
Notes payable .....	*2,430,500
Accident association .....	1,852,502
Vouchers and accounts payable.....	438,812
Salaries and wages .....	41,082
Tickets outstanding, employees deposits, etc.....	102,714
State and local taxes .....	340,490
Coupons outstanding .....	84,037
Unpaid dividends .....	54,233
Accrued interest and rentals .....	214,281
Renewal fund .....	10,000
Surplus .....	79,473
Totals .....	\$37,567,727

\*\$1,372,500 par value 4 per cent bonds have been authorized by the Railroad Commissioners for the purpose of funding floating debt.

THE TRUSTEES' PROFIT AND LOSS ACCOUNT	
Total income .....	\$571,197
Total expenses .....	15,222
Net income .....	\$555,975
Charges .....	121,500
Balance .....	\$434,475
Dividends .....	\$822,296
Less amount accrued Sept. 30, 1903, and charged to profit and loss on that date....	205,574
Deficit for the year .....	\$182,246
Surplus Sept. 30, 1904.....	29,419

THE TRUSTEES' GENERAL BALANCE SHEET	
ASSETS	
Sundry stocks in treasury .....	\$33,026,745
Stocks deposited under indenture of trust.....	2,711,000
Notes receivable with operating companies.....	1,750,000
Cash .....	69,770
Dividends due from operating companies.....	54,170
Cash deposited to pay dividends and coupons.....	2,450
Totals .....	\$37,614,134
LIABILITIES	
Preferred shares .....	\$20,557,400
Common shares .....	14,293,100
Coupon notes .....	2,700,000
Vouchers payable .....	1,390
Accrued interest on coupon notes.....	30,375
Unpaid dividends and coupons .....	2,450
Profit and loss surplus.....	29,420
Total .....	\$37,614,134

## A LONG TROLLEY TRIP THROUGH INDIANA AND OHIO

Probably the longest continuous electric railway journey ever undertaken started Monday morning, Dec. 12, when some thirty gentlemen representing Indiana properties left Indianapolis for a trip over connecting Ohio roads. The trip was arranged for by J. W. Chipman, manager of the Indianapolis & Eastern Railway, and was made with a view of demonstrating to the public the possibilities of through traffic by electric roads in the central West, also to enable the Indiana managers to become acquainted with the Ohio properties, the personnel of their management and their methods of operation. The through interline business has already become a strong factor in the industry in the Central West, and this trip was an important step in the direction of a closer association for mutual benefit between the systems in the two great States. In planning for the trip, Mr. Chipman communicated with the officers of the Ohio Interurban Association, suggesting the advantages that might derive from such a trip, and as a result the executive committee of the Ohio Association appointed a committee headed by Edward C. Spring, instructing them to make all arrangements for the reception and entertainment of the visitors. Mr. Spring planned an itinerary, and the various roads over which it was desired to run gladly agreed to co-operate. In brief, the plan laid out provided for a trip from Indianapolis to Dayton to Springfield to Columbus to Zanesville, back to Dayton, to Lima to Cincinnati to Dayton, and return to Indianapolis, a total of 644 miles, occupying three days. The car used was the parlor car of the Indianapolis Eastern Railway. Its dimensions, 44 ft. over all, 8 ft. x 8 ins. wide, 11 ft. 11 ins. high, were sent to the various managers to provide for clearances. Despite this precaution, allowance was not made for the fact that the car was placed 3 ins. off center as is common with Indianapolis cars, and it was only by a very narrow margin that it was enabled to clear a number of places.

The party leaving Indianapolis included the following: Hon. Charles W. Miller, Attorney-General of Indiana; Hon. John W. Kern, president Commercial Club, Dayton; Clarence Kenyon, Henry Kothe, Wm. Fortune, Frank Stalnaker, J. Clyde Power, committee of the Commercial Club, Indianapolis; Wm. G. Irwin, general manager Indianapolis, Columbus & Southern Traction Company; A. L. Drum, general manager Indiana Union Traction Company; C. C. Reynolds, general manager Indianapolis & Northwestern Traction Company; Paul H. White, general manager Indianapolis & Martinsville Rapid Transit Company; Chas. Murdock, secretary Richmond Street & Interurban Railway Company; F. M. Fauvre, president, C. E. Coffin, vice-president, M. R. Wilson, treasurer, and J. W. Chipman, general manager Indianapolis & Eastern Railway Company; L. E. McDonald, cashier Capital State Bank, Greenfield, Ind.; J. J. Appel, vice-president Indianapolis Traction & Terminal Company; T. B. Laycock, president T. B. Laycock Manufacturing Company; Earnest Bross, editor "Indianapolis Star"; representatives of the "Indianapolis News"; "Indianapolis Sentinel", and George S. Davis of the STREET RAILWAY JOURNAL, Cleveland.

The start was made from the Indianapolis Terminal Station at 7:50 a. m. The 52 miles over the Indianapolis & Eastern were made in 1 hour and 40 minutes. Dublin was passed at 9:30, and the 16 miles over the Richmond Street & Interurban Railway were made in 1 hour and 15 minutes. This included a delay of 32 minutes at the famous undergrade crossing, which has long separated Ohio from Indiana. The bridge is on the outskirts of Richmond. It has a height from trolley wire to rail of 13 ft. 3 ins., and the Richmond cars are especially designed to go under it. The difficulty will soon be done away with as the street is being lowered 10 ins. Once before a larger car was run under with a delay of 18 minutes for removing the trolley stand and base. This time through a misunderstanding the trough had not been removed, and the delay caused a loss as above stated, which completely knocked out the schedule for the day.

Leaving Richmond at 10:45, the run over the Dayton & Western to the Dayton City limits was made in exactly 1 hour for the 38 miles. This included very slow passage over two bridges where every strut rod scraped the pilot of the car, necessitating extreme care. A temporary bridge in Dayton was described as being "15 minutes long," as it took that amount of time to cross it. A railing had to be knocked off in a number of places, and it took much hard work to get the car across at all.

At Dayton, a number of Ohio managers boarded the car, including Harrie P. Clegg, manager Dayton & Troy; Valentine Winters, president Dayton & Western; F. D. Carpenter, manager Western Ohio; Theodore Stebbins, manager Appleyard properties; A. H. Haywood, superintendent Dayton, Springfield & Urbana; W. E. Robinson, attorney Appleyard system, and C. C. Collins, freight and passenger agent Dayton, Springfield & Urbana. Going over the Dayton, Springfield & Urbana, Springfield was reached at 1:07

p. m., thirty minutes behind the schedule. Here a 1½ hour stop was made for lunch.

The Indianapolis & Eastern car was a single-ender, and the peculiar layout at Springfield necessitated turning the car to get out of the city. As there were no facilities for doing this, Manager Chipman reluctantly accepted the proposal of Mr. Stebbins, to leave the car there and go on with the fine parlor car of the Columbus, London & Springfield. Springfield was left at 2:42, and the 45 miles to the Columbus City limits were covered in 1 hour 18 minutes. At Columbus General Manager Harrigan, of the Columbus, Buckeye Lake & Newark, and the Columbus, Newark & Zanesville, took charge of the party. At his request another change was made to his parlor car, leaving Columbus at 4:40. From the Columbus City limits to Hebron, 24 miles were covered in 35 minutes. Newark was reached at 5:58, and Zanesville at 7:19; the continuous run of 250 miles being made in 11 hours 30 minutes elapsed time. Mr. Harrigan planned to cover his 65 miles in 2 hours flat, to make up for lost time, but approaching Zanesville the car was delayed for about 20 minutes by a minor mishap. After supper, at Zanesville, the return trip to Columbus was made in a trifle over 2 hours, reaching there at 11:50, when the party stopped for the night. The total mileage for the day was 315 miles.

This report is written on the trip from Columbus. On Tuesday the party is planning to leave this city at 7:30 a. m., reaching Lima by way of the Dayton & Troy and Western Ohio, at 11:30, then to go back to Dayton at 4:30 p. m. over the Dayton, Covington & Pique. Wednesday the itinerary is to Cincinnati, and back to Dayton over the Cincinnati, Dayton & Toledo, and then back to Indianapolis.

---

## THE NEW BALTIMORE ELECTRIC POWER SYSTEM TO USE TURBINES

---

An interesting feature of the recently announced developments in the Baltimore electric power enterprise is the exclusive adoption of steam turbines as the prime movers. A contract recently closed with the Westinghouse Machine Company provides an initial equipment of 4000 kw. in two turbo-generator sets of 2000 kw each, using also Westinghouse electrical equipment. Officers of the company state that the power plant will embody the latest developments in steam and electrical engineering. The building is to be of fireproof construction throughout, the structural steel frame also serving as supports for the boilers and the overhead coal bunkers. Being located outside of the congested districts of the city, all the boilers and heavy machinery will be on the ground floor. Floors and roofs will be of steel-concrete construction.

The company has secured a lot fronting on Gould Street and extending to the Patapsco River. This property comprises 6.4 acres, and by filling in to the wharf line, over three acres will be added to the area, which will give the company sufficient space to take care of the electrical needs of Baltimore for a long period. The location of the plant on the water front, with the Baltimore & Ohio and Wabash Railroad systems adjoining, affords ample facilities for securing coal either by rail or water. The distance from the center of the city to the new power house is about 2½ miles.

The steam turbine plant will operate with a boiler pressure of 175 lbs., and a superheat of about 100 degs. Fahr. A high vacuum condensing system will be installed, capable of sustaining a vacuum of 28 ins. at full load on the plant. The plant in its entirety has been designed on the separate unit plan, which virtually consists of a number of distinct power plants placed side by side, each entirely separate from the other, but capable of helping out each other in case any link in the system should be disabled. This holds good through the coal-handling apparatus, the boilers, steam piping, turbines, condensers, generators, switchboard, underground cable, etc., from the coal pile to the customer's building. In addition to this precaution against interruption of service which is thus insured, the company will install a large storage battery which will ordinarily "float" on the system.

The Baltimore Electric Power Company was recently organized with an authorized bond issue of \$7,500,000, and a capital stock of \$3,500,000. The officers of the new company are: D. E. Evans, president; R. F. Bonsall, treasurer; W. T. Spring, secretary. Pending a permanent organization, the directors of the new company are H. W. Webb, D. E. Evans, John T. Stone, W. T. Burroughs, R. F. Bonsall, W. T. Spring and George R. Webb. The construction work is already under way and will be pushed as rapidly as possible that the plant may be complete in all respects and running smoothly by July next.

## IMPROVEMENTS UPON THE DETROIT, YPSILANTI, ANN ARBOR & JACKSON RAILWAY

Since the recent perfection of arrangements for the operation by the Detroit, Ypsilanti, Ann Arbor & Jackson Railway, of the consolidated city and interurban lines of the Jackson, Ann Arbor & Detroit Traction Company, a new era has been instituted upon both systems, and many important improvements are under way. The latter company operates the city lines in Jackson and had an interurban line paralleling the lines of the former company from Jackson nearly to Ann Arbor, of which the first 10 miles (to Grass Lake) was under operation. This covered a section where such competition was not warranted by density of traffic, and consequently the newly perfected arrangements of consolidated operation will result in a much more harmonious and settled condition of affairs, and will insure a sufficient paying patronage to the operating company to warrant the best possible service.

The improvements under way consist of not only extensions to the repair shops and the power plant equipment at Ypsilanti, but also extensive improvements upon the roadbed, and the addition of a limited car service which will materially reduce the time between the two terminals. The new track work is particularly notable; a large amount of grading is being done at various points, and the line between Detroit and Ypsilanti is being heavily ballasted and strengthened in preparation for the winter. For facilitating the handling of the limited cars, several additional turn-outs have been installed, upon which it will be arranged to switch the local cars in order not to delay the high-speed limited cars. These turn-outs are provided with switches set permanently for the main line, switch stands with semaphore type indications, as built by the Buda Foundry & Manufacturing Company, being provided for facilitating operation. The operating company will, for the present, abandon its own right of way between Grass Lake and Jackson, and run its cars in that section over the line of the new company, which lies through a more favorable section for local traffic. The completed but unoperated line of the new company, east of Grass Lake, will be torn up and the material used in the construction of a new line from Jackson north to Lansing.

The repair shop facilities at Ypsilanti will be largely increased by the addition of a large and completely equipped woodworking shop for handling all repairs to car bodies, and also the machine shop facilities will be proportionately increased. The company is also operating a brass foundry in connection with the machine shop work, this important factor having been in use now for several months past; here all brass castings are made as required, thus materially facilitating the repair work. The list of woodworking tools to be installed in the woodworking shop includes a wide range of machinery of the latest and most improved type, including band and table saws, planers, surfacers, molders, etc., all of which were supplied by the J. A. Fay & Egan Company, Cincinnati.

The extensions to the power plant equipment involve principally an enlargement of the present coal storage and also the addition of an ash conveyor, for handling ashes directly from the ash-pits into an outside ash pocket. A large tract of ground has been purchased at the rear of the present plant, on which the outside coal storage will be provided, coal being brought in upon an elevated track and dumped directly at the rear of the boiler room. It will be so arranged that after the coal is unloaded the cars may be filled with ashes from the ash pocket, for facilitating their removal.

Five of the largest cars of the company have been fitted up for the limited service, which will be thoroughly tried to see if it proves satisfactory. This service was inaugurated Nov. 28. The time between terminals is to be three hours for the distance of 76 miles, the only stops permitted being at three points each in Ann Arbor and in Ypsilanti, one each in Grass Lake and Chelsea, and upon signal only in Dearborn and Wayne, thus cutting down the possible maximum to ten stops. The limited cars will, for the present, be run from both terminals every two hours throughout the day. An extra charge of from 5 to 20 cents, according to the distance traveled, is made for passage upon the limited cars. The new service has been well patronized from the outset and promises to prove very successful.

The principal feature of the change in the cars for this service is to be noted in the smoking compartment at the front end of the car, in which the former rattan-covered cross seats have been removed and replaced by comfortable wicker chairs. The floor in this portion and the aisle in the main portion of the car is carpeted with velvet, which renders the general effect very attractive, and will, it is thought, tend to make the service popular. No change is made in the outside of the car, except in the addition of a very prettily colored sign upon the front to distinguish them from the local cars, and also a safety gate closing permanently the front en-

trance to the cars, and thus compelling entrance and exit at the rear platform only. If the service proves satisfactory, the intention is to provide new cars especially designed for the service as experience directs.

## PAPER ON SINGLE-PHASE SYSTEM PRESENTED BEFORE THE CLEVELAND ELECTRIC CLUB

At the December meeting of the Electric Club of Cleveland, held last Wednesday, Clarence Renshaw, of the Westinghouse Electric & Manufacturing Company, of Pittsburg, presented a paper on the single-phase motors for traction work. He described the principles of the system, the construction of the motors, the overhead work, and the sub-station equipment and illustrated the various points by lantern slides. At the present time the Westinghouse Company has contracts for, and is at work on, 49 equipments for nine different roads, the equipments aggregating 11,000 hp.

S. T. Dodd of the General Electric Company, of Schenectady, spoke relative to the practicability of the a. c. system and described some of the results obtained on the Ballston division of the Schenectady Railway, where the system is in experimental use. This equipment was described in a recent issue of the STREET RAILWAY JOURNAL.

The meeting was held in the handsome new club rooms recently fitted up in the Schofield Building by the Associated Technical Clubs of Cleveland, of which the Electric Club is a member.

## THE 1905 MEETINGS OF THE MASTER CAR BUILDERS AND THE MASTER MECHANICS ASSOCIATIONS

The Master Car Builders', the American Railway Master Mechanics', and the Railway Supply Men's Associations, have decided to hold their next annual conventions at Manhattan Beach, New York, on June 14-21, 1905. The Master Mechanics' meetings will occur on Wednesday, Thursday, and Friday, June 14, 15, and 16, and the Master Car Builders' on the following Monday, Tuesday, and Wednesday, June 19, 20, and 21.

Three hotels will be thrown open for the exclusive use of the conventions—the Oriental, the Manhattan Beach and the Brighton Beach hotels. Applications for rooms in either the Oriental, which will be the headquarters hotel, or the Manhattan Beach, should be addressed to the Manhattan Beach Hotel & Land Company, 192 Broadway, New York, and applications for accommodations at the Brighton Beach Hotel should be addressed to George B. Parker, Grand Hotel, Broadway and Thirty-First Street, New York.

The meetings of the associations will be held in the ballroom of the Oriental. The light exhibits will be stationed on the piazza of the hotel, while the heavy exhibits will be on adjoining ground, which is amply large for all possible requirements. Application for exhibit space should be made to J. Alexander Brown, 24 Park Place, New York City.

## AN IMPORTANT SOUTHERN PROJECT

Of the companies recently organized to build electric lines in the South, the Raleigh-Durham Passenger & Power Company is one of the most pretentious—pretentious in that it is to be a truly public service corporation. The company plans to build an electric railway between Raleigh and Durham, two belt lines in Raleigh, a line in Durham, a light and ice plant for that city, a pleasure park and possibly a resort hotel between the cities. Franchises will have to be secured in Raleigh and Durham and in Wake and Durham Counties. An application for franchise rights is now pending in Raleigh, and the petitions of the Commissioners of Wake and Durham Counties, and to the Aldermen of Durham will be presented at once. Interested in the enterprise are men well acquainted with the possibilities of the South as a field for enterprises of this kind. Perhaps the most prominent of those connected with the company is W. J. Nelms, who is president of the Hampton Roads Railway & Electric Company, of Newport News, Va. Mr. Nelms was one of the incorporators of the company, and has been elected its vice-president. The other incorporators of the company were T. B. Fuller, B. S. Jerman, Jones Fuller, F. L. Fuller and T. S. Fuller. The company is organized as follows: B. S. Jerman, of Raleigh, president; W. J. Nelms, of Newport News, Va., vice-president; Thomas S. Fuller, of Raleigh, secretary and treasurer; T. B. Fuller, of Durham; W. J. Nelms, of Newport News, Va.; F. L. Fuller, of Durham; Jones Fuller, of Durham; B. S. Jerman, of Raleigh; Thomas S. Fuller, of Raleigh, directors.

## LONDON OFFICE OF THE ST. LOUIS CAR COMPANY

On Nov. 21, the St. Louis Car Company officially opened its London office, which is located at Queen Anne's Chambers, S. W., and is in charge of Aaron S. Everest, resident manager. This office will be the headquarters of the St. Louis Car Company in Europe for its car and truck business, as well as for the sale of automobiles, in which branch of manufacture the company is about to engage. A large number of types of automobiles are now under construction, ranging from the highest class machine to those which can be sold for a moderate price, and will be placed on the market by the St. Louis Car Company, within the next six or seven months.

The London office will also be the branch office in London of the H. Boeker Supply Company, of Germany, which has charge of the St. Louis Car Company's interests in South America, Germany, Italy and Russia. A special feature of the London office which will appeal to tourists in Europe, is that the company is planning to arrange automobile tours for those who desire to engage in them. In other words, the company will have an automobile meet the tourist when he gets off the steamer at Plymouth, Liverpool, or any other European port, with a chauffeur and competent guide, all prepared to make any tour in England or on the Continent which may be decided upon. Those American managers who intend to visit Europe next year and who wish to arrange for such entertainments, can obtain all the necessary information in this matter from the London office. Arrangements are also being made to forward mail and perform other services for tourists. H. F. Vogel, vice-president and general manager of the St. Louis Car Company, who has just returned from Europe, was present at the opening of the London office and reports that this office is fully prepared to undertake any orders which may be sent to it.

## INDUSTRIAL ECONOMICS

The initial membership of the new Department of Industrial Economics is published in "The Monthly Review" of the National Civic Federation. A perusal of the list shows that it is composed of editors of the daily press, and of politico-social magazines, trade papers, whose readers include all the great employing interests of the country, and labor journals that reach millions of wage-earners; and of economic and legal authors, lecturers, the heads of the departments of political economy in universities and representatives of the pulpit. The new department was formally organized and honored by a general banquet given by the Federation on Thursday evening, Dec. 15.

This department represents the most comprehensive and far-reaching movement for popular education upon industrial subjects yet inaugurated in this country. Its members are to meet at informal dinners to discuss such practical topics as "Trade Agreements," "Wages and Cost of Living," "The Shorter Work-Day," "The Open and Closed Shop," "The Minimum Wage," "Restriction of Output," "Piece Work and Day Work," "Arbitration," "Apprentices," "Introduction of Machinery," etc. That these discussions will have both practical and scientific value is apparent from the character of the participants. All of them are instructors of the public, each in his own field, and all of them are able to teach and to learn from one another.

The membership includes such economists and sociologists as Professors F. W. Taussig, of Harvard; Edwin R. A. Seligman and Felix Adler, of Columbia; J. W. Jenks, of Cornell; R. T. Ely, of Wisconsin; Henry C. Adams, of Ann Arbor; Henry W. Farnam, of Yale, and Washington Gladden. Legal authorities who will share in the work are Louis D. Brandeis, of Boston; Henry D. Esterbrook, of New York, Frederick N. Judson, of St. Louis, and Frederick H. Cook, of New York. Among the financial members are Herbert H. Vreeland, Charles S. Fairchild, Frank A. Vanderlip and Charles A. Conant. Among the editors of periodicals are Albert Shaw, of the "Review of Reviews;" Richard Watson Gilder, of the "Century;" G. B. M. Harvey, of the "North American;" John A. Sleicher, of "Leslie's Weekly;" Walter H. Page, of the "World's Work;" George C. Lorimer, of the Philadelphia "Saturday Evening Post;" Hamilton Holt, of the "Independent," and Roland Philips, of Harper's Weekly." Trade journals are represented by C. W. H. Kirchoff, of the "Iron Age;" W. H. Boardman, of the "Railroad Gazette;" James H. McGraw of the STREET RAILWAY JOURNAL; T. C. Martin, of the "Electrical World and Engineer." Writers upon commercial and financial topics include Thomas F. Woodlock, of the "Wall Street Journal;" Amos K. Fiske, of the New York "Journal of Commerce;" John Green, editor "Bradstreet's Journal;" Henry C. Watson, editor "Dun's Review," and Edward Payson Call, of the New York "Commercial."

## CLEVELAND ELECTRIC PLACES LARGE ORDERS

The Cleveland Electric Railway Company has just closed several important contracts for material. The National Electric Company has been given an order for 700 air brake equipments with which to equip all the company's double truck cars. These brakes are to be standard Christensen B-2 with independent motor and compressor. This is a high-pressure brake, but it was adopted to render it possible to use trailers; also to use such modern appliances as air sanders, air whistles, etc., that might be adopted in the future. Within a few days the company will order fifty double truck convertible cars of a type similar to those now in use in Cleveland. Fifty two-motor equipments of the Westinghouse No. 101 type have been ordered for these cars. A contract has been placed with the General Fire Extinguisher Company for equipping the Lake View repair shops and the Miles Avenue car house with the modern type of fire extinguisher designed for car house, which was tested in Cleveland a short time ago. Contracts for equipping other car houses will be placed in the near future. On a number of down-town streets where the traffic is the heaviest, the company is laying some very heavy "Trilby" rail, of the Lorain Steel Company's 371 section. This rail is first painted with a heavy coating of asphalt paint, and is then laid in concrete. The joints are then welded by electricity, and another coat of the paint is applied, particular care being given to covering the weld. Engineer of Maintenance of Way Clark, believes that the painting will do away with any possibility of leakage and electrolysis troubles.

## INDIANA ELECTRIC RAILWAY ASSOCIATION

The Indiana Electric Railway Association was organized at a meeting in Indianapolis, Dec. 9, by individuals interested in the construction and operation of electric railways in Indiana. At this meeting a constitution and by-laws for the association were adopted, and arrangements were made for the first annual meeting to be held at Indianapolis, Jan. 12, 1895. A committee composed of officers of several of the Indiana interurban lines was appointed to provide a programme for the meeting of January 12, and to make nomination for officers of the association. The committee as appointed consists of Gardner F. Wells, general manager, Terre Haute Traction & Light Company; Paul H. White, general manager Indianapolis & Martinsville Rapid Transit Company; C. C. Reynolds, general manager Indianapolis & Northwestern Traction Company; J. W. Chipman, general manager Indianapolis & Eastern Traction Company; A. L. Drum, general manager Indiana Union Traction Company. At the coming meeting it is expected that papers on general topics of interest to electric railway men of Indiana will be read and discussed.

## PACIFIC ELECTRIC PLANS WORK TO COST \$2,000,000

Work to cost about \$2,000,000 is planned by the Pacific Electric Railway Company on proposed interurban railways out of Los Angeles. This amount of money, it is said, is to be spent on a road to Covina, and another to Santa Ana, both from Los Angeles. Work is to be begun in the immediate future, provided no great obstacle arises in the reception of the plans by the people interested.

The proposed line to Covina will run direct from Los Angeles to Covina, via the line of the old road to Dolgeville, Alhambra and San Gabriel, and thence along a route to be chosen, but for the most part paralleling the Southern Pacific.

The plan to build to Santa Ana was referred to in the last issue of the STREET RAILWAY JOURNAL. Rights of way for the line have practically all been obtained, although there have been many delays in this work. Using the rapid transit right of way to Dolgeville will open to settlement a large area of land heretofore debarred from active improvement by the lack of transportation facilities. On the east side of the Los Angeles River the line will run through the region east and south of the main line of the Southern Pacific. The fact that so much of the Southern Pacific is to be paralleled seems to be corroboration of the assertion that Mr. Harriman is in full sympathy with Mr. Huntington's projects for gridironing Southern California with electric roads.

When Mr. Huntington came to Los Angeles about two years ago, he stated that his plans in this part of the State would need about \$30,000,000 for their execution, and already he is said to have expended more than half of that amount in and about Los Angeles and vicinity.



## PROPOSED BRAKING TESTS AT WILMERDING

At the annual meeting of the inspectors and commercial representatives of the Westinghouse Traction Brake Company, held in Wilmerding, Pa., Dec. 1-3, one of the subjects discussed was the effect of the rotative energy of heavy armatures on the braking force at the wheels of a motor car. It is understood that the Westinghouse Company proposes to make some exhaustive tests to determine the force necessary and advisable to apply to motor axles in order to secure the best braking results. These tests will probably be conducted on the Westinghouse Interworks Railway between East Pittsburg and Trafford City, Pa.

## REPORT OF THE BRITISH WESTINGHOUSE COMPANY

The directors of the British Westinghouse Electric & Manufacturing Company, Limited, in their report for the year ended July 31, 1904, just rendered, state that the accounts show a profit of £50,550. After providing for debenture and loan interest, and for the further items set out in the profit and loss account, a balance of £2,809 remains, which the directors propose to carry forward. A considerable sum for the maintenance of the large machine tools has been charged to revenue during the year under review, and, latterly, patterns, drawings, etc., have been charged to revenue. The directors, therefore, are of the opinion that the sum of £10,500 provided for depreciation is sufficient to meet requirements. The result obtained at the close of this, the first complete year of manufacture, has shown that the general expense and outlay incident to the development required in connection with the company's plant at Trafford Park has been considerably greater than the management anticipated. These expenditures have, however, placed the factory in an advantageous position to execute orders in the future for large generating units. The following particulars are given covering orders received during the past three years: Orders received during the year ended July 31, 1902, £932,000; during the year ended July 31, 1903, £1,657,114; during the year ended July 31, 1904, £927,336. During the year under review business was inactive, and few large contracts were placed; but, notwithstanding the general depression, the keen competition between manufacturers at home and the vigorous efforts of continental firms to secure British business, the company has taken orders during the first three months of the current year aggregating £311,000, as compared with a total of £210,000 for the corresponding period of last year.

## STREET RAILWAY PATENTS

[This department is conducted by Rosenbaum & Stockbridge, patent attorneys, 140 Nassau Street, New York.]

### UNITED STATES PATENTS ISSUED DEC. 6, 1904

776,735. Trolley wire clamp and feed support; Thomas A. Furniss, Cannonsburg, Pa. App. filed Sept. 7, 1904. The trolley and feed wires are supported side by side by one clamping device.

776,803. Trolley operated electric switch; John J. Ruddick, Newton, Mass. App. filed March 28, 1904. The switch is mounted above the trolley wire and actuated when the pressure of the trolley wheel lifts the wire.

776,826. Electric propulsion of cars or the like; Orestex H. Caldwell, Indianapolis, Ind. App. filed Feb. 15, 1904. The attraction of magnets successively arranged in the road-bed propels the car by acting upon a polarized magnet on the car.

776,843. Street car signal; James H. Howard, Kansas City, Kansas. App. filed Feb. 27, 1904. A signal placed at the rear end of a car, and adapted when "set" by the motorman to warn persons attempting to cross the track behind the car that a car is approaching from the opposite direction on the other track.

776,869. Car fender; William H. Sievers, Galena, Ill. App. filed Aug. 5, 1904. Details of construction.

776,895. Controller; John P. Durkin, Philadelphia, Pa. App. filed Oct. 15, 1904. Details of a catch for regulating the movements of the controller handle from step to step.

776,954. Trolley pole; Charles H. Spangler, Atlanta, Ga. App. filed Feb. 14, 1903. Details.

777,039. Electro-magnetic apparatus; Joseph N. Mahoney, Brooklyn, N. Y. App. filed March 19, 1904. Comprises a winding and a shell of magnetic metal inclosing it, a pole-piece projecting within the winding and having through it an opening with inclined walls, and an armature reciprocable within the winding and having its inner end tapered to conform to the taper of the opening in the pole-piece, but of such length as to extend through and beyond it.

777,049. Trolley wheel guard for electric wires; John L. Sullivan, Warren, R. I. App. filed April 19, 1904. The arms of the harp carry guard wheels which normally stand above the trolley wheel and hold the latter on the wire, one arm of the harp being pivoted.

777,052. Trolley guard; George W. Watson, Kearney, N. J. App. filed Feb. 26, 1904. Details.

## PERSONAL MENTION

MR. WILLIAM SCOTT MILLIKEN, chief engineer of the Bonham & McKinney Electric Railway, of McKinney, Texas, is dead.

MR. CHARLES F. LIBBY has been elected president of the Portland Railroad Company, of Portland, Me., to succeed the late Mr. William R. Wood. Mr. Libby has been a director of the company for some time, as well as the attorney of the company.

MR. WILLIAM C. EGBERT, of Cleveland, formerly with the Globe Electric & Manufacturing Company, of that city, has become identified with the lamp department of the Cleveland office of the Westinghouse Electric & Manufacturing Company.

MR. FRANK MURPHY, president of the Omaha & Council Bluffs Street Railway Company, of Omaha, Neb., and one of the best known financiers of the West, died at the Waldorf-Astoria, in New York, on Monday, Dec. 12. Mr. Murphy was born in Pittsburg, Pa., in 1841, and went to Omaha in 1857. He was never married.

MR. EDWIN GOULD, of New York, has been elected a director of the New York Railroad & Development Company in place of Mr. John B. McDonald. This company is to build the New York & Portchester Railway. The names of the other directors were published in the last issue of this paper.

MR. H. F. VOGEL, vice-president and general manager of the St. Louis Car Company, was serenaded by the employees of the company at his residence on Harper Street, St. Louis, one evening last week. Mr. Vogel has just returned from a successful business trip to England, Germany and France, where the St. Louis Car Company has large business interests. A pleasant feature of the evening was the giving of a testimonial to Mr. Vogel, signed by the members of his office corps.

MR. SAMUEL M. MANIFOLD, elected as sheriff of York County, by the Republicans, has announced his resignation as general manager of the York County Traction Company, the York Street Railway Company, and the Edison Electric Light Company of York, Pa. The resignation is to take effect Jan. 1, when Mr. Manifold will assume the duties of sheriff. Mr. Manifold was connected with steam railroad work before he became manager of the associated properties at York.

MR. CHARLES ROBERT PENINGTON, son of Secretary T. C. Penington, of the American Street Railway Association, died in Phoenix, Ariz., Nov. 30. The interment took place in Oakwood Cemetery, Chicago, on Dec. 5. Mr. Charles R. Penington was the paymaster and cashier of the Chicago City Railway Company, and had been in the employ of the company for more than twenty years. His death was the result of a very severe cold which he contracted about a year ago. He leaves a widow and two children.

MR. R. A. C. SMITH has just been elected a director of the New York City Railway Company. Mr. Smith is a prominent capitalist and financier in New York, and is vice-president of the Chicago Union Traction Company. He is also connected with other railway and lighting interests, being a director in the Havana Electric Company, the Connecticut Railway & Lighting Company, the Albany & Hudson Railway & Power Company, the Hudson River Gas & Electric Company, the Continental Tobacco Company, and the Westchester Lighting Company, as well as in many other corporations.

MR. C. C. LEWIS, who for the last two years has occupied the position of chief engineer of the Schenectady Railway Company, will sever his connection with that company on Jan. 1, 1905, when he will sail for London to enter the employ of J. G. White & Company, Ltd. Mr. Lewis has been engaged principally to take charge of the work to be carried out by Messrs. White & Company, at Montevideo, Uruguay, this company having recently secured the contract to electrify the tramways at that place. Mr. Lewis has had an experience of more than fifteen years in railroad engineering, having been connected with the Broadway cable work in New York, afterwards in Baltimore converting the lines of the Baltimore City Passenger Railway from horse to cable, in Wash-

ington on the electric conduit work of the Metropolitan lines, and in Buffalo as engineer of the International Railway Company, where he had charge of construction work involving the expenditure of between \$3,000,000 and \$4,000,000. In 1902 Mr. Lewis accepted the position of chief engineer of the Schenectady Railway Company, having charge of the construction and maintenance of the tracks, buildings, overhead, and mechanical and electrical equipment, as well as the rebuilding of the electric line between Schenectady and Albany, and the construction of the Troy and Ballston line, which has recently been equipped for operation by the compensated single-phase system.

MR. JOHN WILSON ROGERS, formerly superintendent of tracks of the Toledo Railways & Light Company, of Toledo, Ohio, is dead. Mr. Rogers had been with the Toledo Railways & Light Company for the past five years, having entered the service of the Company when Mr. Thomas H. McLean was general manager of the system. Mr. Rogers was an Englishman by birth, but came to America when quite young. He had entire supervision of the building of one of the first cable railways in the United States. This was at Chicago. He later built cable roads in St. Louis and Pittsburg. Mr. Rogers also served in an official capacity with the Chicago City Railway, and the Indianapolis Street Railway, and the railways of the City of Mexico.

MR. E. GERARD, inspector-general of the electrical service of the Belgian State Railways, has been appointed by the Belgian Government an official delegate to the International Railway Congress at Washington next Spring. Other appointees, who have also taken a prominent part in electric tramway work abroad, who will represent their respective governments at the meeting in Washington, are: Mr. Perouse, French Councillor of State and Director of Railways at the Ministry of Public Works, and Mr. Charles N. J. Oliver, J. P., Chief Commissioner of the New South Wales Railways. Up to the present the governments which have appointed delegates to the Congress are: Argentine Republic, Belgium, Bulgaria, China, Denmark, France, Greece, Guatemala, Italy, Mexico, New South Wales, Paraguay, Peru, Roumania, Siam and South African States.

MR. NEWELL C. SMITH, who is to be superintendent of the Groton & Stonington Street Railway, of New London, Conn., when the road is opened for service, began his street railway career in 1883, after having attended the public schools in Harwich, on Cape Cod, where he was born. His first work was with a Boston company operating horse cars. He soon changed his position, and entered the service of another company in the same city. Here he remained until 1890, when he became connected with a street railway company in New York. In 1896 he returned to the vicinity of Boston greatly broadened by his training in the metropolis. He next became connected with the Boston Elevated Company, and soon was made superintendent of the Newton line. When the Boston Suburban Electric Companies obtained control of the Newton line, Mr. Smith was appointed superintendent of the division taking in this line, the Commonwealth Avenue, the Wellesly & Boston, and the Newton & Boston lines, which were combined as one division. Mr. Smith resigned from the Boston Suburban Electric Companies last summer to become connected with the Groton & Stonington Company.

MR. JOHN B. McCLARY, formerly general manager of the railway department of the Birmingham Railway, Light & Power Company, of Birmingham, Ala., has been elected manager of the Sheffield Company's electric railway lines between Sheffield, Tusculumbia and Florence, Ala., and of the company's waterworks and electric light properties. Mr. McClary, who, since resigning from the Birmingham Company in December, 1903, has been a member of the firm of John B. McClary & Company, was connected with street railway work in Birmingham for more than sixteen years, and is well known in street railway circles through his active interest in the American Street Railway Association, of which he was at one time third vice-president. For seven years previous to his connection with railway work at Birmingham, Mr. McClary was associated with the Pratt Coal, Iron & Railroad Company. Later he was secretary of the Woodward Iron Company. Mr. McClary succeeds Mr. L. H. McIntire at Sheffield. It is stated that the business of J. B. McClary & Company in Birmingham, Ala., will be continued and developed along larger lines, the style of the firm being changed to McClary, Jemison & Company, with Mr. John Jemison as manager.

MR. CALVERT TOWNLEY, who for the last four years has been general agent of the Westinghouse Electric & Manufacturing Company, in New York, has just been appointed assistant to President Mellen, of the New York, New Haven & Hartford Railroad,

and will have his headquarters in New Haven. In this position Mr. Townley will have charge of all of the electric railway work of the New York, New Haven & Hartford Railroad Company, and its sub-company, the Consolidated Railway Company, and will act in this capacity for Fourth Vice-President McHenry during the illness of the latter. The ownership by the New Haven Railroad of a number of the most important trolley roads in Connecticut, and its proposed new electrical construction in connection with the Port Morris branch and elsewhere make this office a most important one. Mr. Townley is a native of Cincinnati, and was graduated from Yale in the Scientific Department in 1886. The following year was spent in collegiate work in New Haven in securing the degree of M. E. Immediately after leaving New Haven Mr. Townley entered the employ of the Westinghouse Electric & Manufacturing Company and remained in Pittsburg until July, 1895, when he was appointed manager of its Boston office, where he remained until his call to the New York office of the company in January, 1901. During the last few years Mr. Townley's work has not been confined to any particular territory, but he has devoted his attention to the larger commercial problems as they have arisen, giving special attention to railway work. His knowledge of electric railway conditions from both the theoretical and commercial sides is very broad, and the New Haven road is to be congratulated in obtaining an engineer of his training and experience.

MR. W. J. SANDO, the well-known pumping machinery expert, is one of the important recent additions to the strong organization of the Allis-Chalmers Company. Mr. Sando has been appointed manager of the company's pumping machinery department, with his headquarters in Milwaukee. Although still a young man, he filled many responsible places before joining the Allis-Chalmers forces. His last public service was with the New York City Commission on Additional Water Supply, with which he served from May 1, 1903, to Jan. 1, 1904, as engineer in charge of the pumping department. Mr. Sando was born in Scranton, Pa., in 1864. He took the public school course, and then served an apprenticeship of seven years as a machinist and draughtsman in the works of the Dickson Manufacturing Company at Scranton. In 1886 he became draughtsman and inspector of pumping machinery for E. D. Leavitt, M. E., with whom he remained until August, 1889. In September of that year he entered the government service as draughtsman in charge, in the office of the naval engineers at the shipyards of William Cramp & Sons in Philadelphia. He returned to Mr. Leavitt the following spring, and remained with him seven years, or until May, 1897, when he resigned to become associated with the metropolitan water board, of Boston, Mass. In September, 1900, Mr. Sando joined the International Steam Pump Company as chief engineer and manager of the waterworks department, where he remained until his appointment with the commission on additional water supply in New York city. In January, 1900, he rejoined the International Steam Pump Company and was with that concern until a little while before he took charge of the pumping department of the Allis-Chalmers Company.

MR. LEANDER M. DE LA MATER, treasurer of the John Stephenson Company, of Elizabeth, N. J., died suddenly of heart failure on the morning of Dec. 12. Mr. De La Mater left his home on Cherry Street, Elizabeth, apparently in good health, to go as usual to his office at the John Stephenson Works. He hurried to catch a car and in doing so overtaxed his heart. He collapsed almost immediately after taking his seat. Fellow passengers assisted him till the car reached the Burkely Hotel in Broad Street. He was carried into the hotel and physicians were summoned, but he died before the doctors arrived. Mr. De La Mater was well known throughout the electric railway industry and had many friends, particularly among the early workers in the field. With John Stephenson he was one of the pioneers in the building of horse, cable and electric cars, and in the early days when the works of the old John Stephenson Company were located in Twenty-Seventh Street, New York City, the place was a sort of headquarters for street railway men from all parts of the country. Mr. De La Mater was born in New York City on Oct. 5, 1835, of an old New York family of Hollanders, whose first American antecedents settled in Manhattan in the days of Peter Stuyvesant. He was taught the trade of sash and blind maker and entered the employ of Mr. Stephenson in 1855. His first wife was a daughter of Mr. Stephenson. Later he was made cashier of the company, and upon the organization of John Stephenson & Company he became a member of the firm. When the company was reorganized as the John Stephenson Company, Limited, he was made secretary and treasurer. He had been treasurer of the John Stephenson Company since its reorganization in 1900. Mr. De La Mater is survived by a widow and two sons.