

# Electric Railway Journal

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### THE ATLANTIC CITY CONVENTION

The weather, which at the beginning of the week looked somewhat unpropitious, was again favorable to the association and was an important factor in the pleasure and success of the Atlantic City convention. The meetings as a whole were well attended, and the registration figures of Friday morning indicated that the number of those present was practically equal to that at the large Atlantic City convention of 1911. The somewhat larger registration in 1912 was to have been expected from the fact that the convention was held in a large city and consequently was attended by a large number of men from all branches of the service of the local companies. Every convention has its lessons, and in our interviews with various delegates at the convention we have sought to learn some of their views in regard to the meeting this week. All were enthusiastic in regard to the excellence of the arrangements, the quality and timeliness of the papers and reports presented, the high character and extent of the exhibits, the advantage which Atlantic City affords in permitting those at a convention to meet each other, and the benefit which results from the interchange of experience thus made possible. The attendants at the convention included several managers and engineers from abroad, and they were particularly impressed with the scale and scope of the entire convention, especially of the exhibits. The technical meetings were replete with interest, but in the opinions of some there was an effort to include too many papers and reports in the time allotted, particularly in the case of the American Association. A paper, no matter how excellent, represents the views of one man only, but a discussion is valuable, not only because it embodies the views of many but because those views are expressed in the light of the other testimony offered. Hence, to obtain the full benefit of the convention, the

discussion should be made the most important feature. If there was any lack of this kind in the sessions of the American Association this year, however, it is a matter which can be easily remedied in the future. We have already reviewed a number of the papers and reports presented at Atlantic City, and shall probably have occasion to touch upon others during the next few weeks.

### AN OPEN FIELD FOR SIGNAL SYSTEMS

While the recommendation of the committee on block signals presented at the joint session of the Engineering and Transportation & Traffic Associations on Tuesday did not bind the association to the policy "that for high-speed interurban service automatic signals should be controlled by the use of continuous track circuits, and that expenditures should be concentrated on continuous track circuit control with a cheaper form of indication in preference to a more expensive form of signal and a less reliable control," a number of the members and manufacturers, representing both those using intermittent control and those using continuous track circuits, stated that they believed it would be unwise to make a positive commitment to any particular signaling principle at this time. Many arguments exist in favor of the continuous track circuit form of signal control; but, on the other hand, no one can foretell what new developments may be forthcoming in block signaling, and this feeling was most emphatically expressed in the unanimous vote of the association to adopt C. L. Henry's amendment, which left the signal situation open to future consideration of any improved system.

### THE PROBLEM OF SANITATION

A paper presented at the convention on Thursday, and one which was somewhat off from the beaten path, was that by W. C. Rucker, M.D., assistant surgeon-general United States Public Health Service, entitled "Regulations on Sanitation as Relating to Public Carriers." Dr. Rucker explained how common carriers are frequently the transmissal agencies of disease, not necessarily through their own fault, but through the thoughtlessness of some of the traveling public. This is true, of course, of the steam railroads as well as of the electric railways, but it is gratifying to state that the electric lines do a great deal more to keep their cars clean and sanitary than the majority of people realize. Few electric lines fail to wash and fumigate their cars every night, some interurban cars, in fact, being cleaned in some way so far as the time permits at every layover. On the other hand, steam railroad cars on a long run may not be thoroughly cleaned for days at a time. The fact that an electric car is untroubled by smoke makes it possible to supply sufficient fresh air to act as a germicide without serious annoyance to the passengers. But in other ways as well

the electric railway lines have shown their progressiveness in sanitary construction. Perhaps, the greatest improvements of this class are the non-absorptive cements or other composition floorings and the several odor-proof compositions used for panels, headlinings and the like. Nowadays, even hand straps come with sanitary sleeving to discourage the omnipresent bacilli. There has been equal improvement in construction and interior decoration, and the ornate but dust-collecting moldings and fixtures of the past have given place to forms simple in design and easily kept clean. The problem of keeping healthful a vehicle which is used by hundreds of all sorts and conditions of people every day is not an easy one, but the practices cited make it evident that electric railways realize their responsibility in helping maintain the public health.

#### SELF-PROPELLED CARS

The 1912 report of the committee on equipment, read at the convention at Atlantic City yesterday, was notable for its elaborate and valuable treatise on the development and use of self-propelled cars. In the report of the same committee for the current year this subject and its bibliography have been brought down to date. This continuation is fully justified by the extensive revival of this branch of transportation. It has not been considered necessary to publish any extended abstract of this supplementary report in these pages, inasmuch as its data necessarily coincide with much of that which has been published during the past year in the columns of this journal, and especially in the Convention Number chapter entitled "Self-Propelled Cars." A comparison of the years 1912 and 1913 shows appreciable increases in the number of cars and applications. The gasoline car is still practically limited to steam railroad branches of considerable length, although single-truck cars for city purposes have been developed as noted in recent issues of this journal. The gasoline-electric car is not only a competitor of the gasoline car for long-distance work, but it has even encroached successfully on purely interurban territory. The storage-battery car, which has been applied chiefly to short interurban and small city systems in this country, has lately been operated in trains under certain exceptional conditions in Cuba and Montana. In short, the increase in the number of self-propelled cars of all types is reasonable proof that they have been greatly improved in reliability, for else they would not be acceptable for the isolated lines and small roads on which they are most desirable. Not the least valuable feature of this development is that it will do much to prevent the premature construction of full-fledged electric railways and subsequent receiverships such as followed the interurban boom of ten to fifteen years ago. The discussion on this report, as published elsewhere in this issue, brought out some most interesting figures on the costs of different types of batteries. It revealed, in particular, that the choice of battery type depends very largely upon the cost of energy per kw-hour, that only very exceptional conditions can justify battery train units and that trolley engineers freely recognize what the builders of storage battery cars have done in the way of advancing light construction.

#### THE SIGNIFICANCE OF THE EXHIBITS

The experiences of the week have demonstrated that the appeal of the exhibits never grows less to the convention delegate. His eyes, ears and hands are always open to receive the latest information bearing upon equipment progress. Even if the fundamental object of the display of apparatus is purely commercial, it none the less follows that here is an unrivaled opportunity for a sort of post-graduate course of a few days' duration in the technique of the transportation art. The apparatus shown is all more or less designed to advance the status of the industry as a whole and of each individual road in particular, and it deserves more than passing study. One may be tempted sometimes to pass by certain exhibits without slackening one's gait because outwardly they look very much the same as in other years, but one does this at the risk of missing some point of real advance in design or construction which may mean a hundred times the cost of the delegate's trip in money saved if applied on some local system where the conditions are favorable to its use.

It is a fact, however, that not all of the exhibitors of well-standardized equipment made the utmost of their opportunities along the line of placarding new developments which might be non-apparent to the passer-by in the aisles. The result is that a good many experienced convention attendants have made a point of getting at the new developments first by striking directly at the root of the matter and putting point-blank inquiries to those in charge as to the latest progress exhibited. Another matter of apparently trifling importance which we find the experienced convention visitor intent on making the most of his time never overlooks is the desirability of carrying a good supply of business cards when touring the displays, to facilitate getting "en rapport" with those who have information to impart or to forward. It happens not seldom that exhibits are left for short periods in charge of persons entirely unacquainted with their technical interest, or even inexperienced in the collection of visitors' names and addresses. The value of the business card in such cases is obvious.

Another hint, taken from the Atlantic City convention, is worth recording. In a large display of machinery by many different manufacturers such as was made at the convention this week, it often happens that some of the manufacturers have designs or products coming along in the factory which could not be completed in time for demonstration or exhibition. It is an excellent plan to make inquiries along this line also in studying apparatus in convention assembled. Then, too, a good many people go through exhibits without questioning whether the equipments shown represent the upper or lower limits of effective design or manufacture and apparently without realizing that only a very small part of the resources of their makers can possibly be shown under a single roof. Well-selected exhibits are often intrinsically valuable, and in not a few instances they are suggestive of great reserve capabilities in production. They may be significant of the varied product of a manufacturer, or they may illustrate the solution of a single problem for the time being, and it is important not to judge the exhibitor too hastily

if his display is small and concentrated. All of this simply leads up to the value of inquiries by the broadside. The visitor should remember that the exhibit is there for no other purpose than to have its merits explained in any desired detail by the representative who is in charge. Common courtesy, of course, forbids the latter from obtruding himself so that the initiative must be taken by the delegate.

At all conventions where electrical apparatus is displayed on a large scale the close student of its progress in different lines is likely to come away with a feeling of discouragement that his knowledge has been getting so rusty in fields outside his own immediate specialty. Modern manufacturing methods are so far in advance of those in vogue only a few years ago, and modern designing is so often conducted in such a way, that the general visitor is very apt to find himself a long way from the forefront of practical realization of advances made just outside his daily lines of work. If he has read the technical press faithfully, his troubles will be much smaller, but in any event he is pretty certain to regret his lack of knowledge of many important details as he goes about the displays. Let all such be of good courage, for this great tide of advance marks the railroad profession as a lifework immeasurably separated from routine tasks repeated with little or no variation from day to day. It challenges the efforts of able minds to keep up with its pace, and when viewed from the right coign of vantage—an appreciative standpoint—should inspire the railroad man to do better work himself in emulation of the improvements in the tools of the great industry of which he is a part.

#### STOREHOUSE AND MATERIAL YARD EFFICIENCY

A centrally located stock of material sufficient to meet electric railway requirements, all will agree, is a necessity, but the interest on its cost, the cost of storage and insurance and the risk of loss through obsolescence and depreciation all urge the desirability of keeping the stock low. The storehouse on any road is a subject which will well bear study by the manager desirous of reducing the items of expense already mentioned, as well as the cost of storing and handling material.

On the latter points the first consideration is that of the location of the storeyard or storehouse. It should be centrally situated, not especially with regard to the road it serves, but with regard to the points to which most of the material must be delivered. This arrangement will reduce the cost and time of delivery, and in many instances the time of delivering is of ruling importance.

The cost of rehandling various materials is probably the largest item of expense of maintaining a storehouse and yard. Every effort should be exerted to reduce this to a minimum. Material stored either in the open or in the storehouse should be distributed with reference to the quantity required during any given period. This should not always rule its location in the yard or storehouse, however, for it is also well to place bulky material as near the receiving and delivery point as possible. Another point to consider is that of storing by department requirements. For instance, material required by the mechanical department

should be stored in a certain portion of the storehouse so as to eliminate lost motion as much as possible in filling an order. This is also true of material in the open. Rail, fastenings, special work, etc., should be stored on adjoining ways so that it will not be necessary to shift a car very far in loading out a given order.

All bulky material in open storage should be sorted as to size, length, etc., and the section containing each should be marked so that there will be no delay in picking it out when it is required. A great source of economy in handling material in small yards, where mechanical unloading is not warranted, is to build ways for storing material at the same height as the car floor. When it is economical to install mechanical devices for unloading and handling various materials, the ways should be installed for this purpose so that material can be stored well up above the ground, a plan which will reduce corrosion if the material is steel or iron and will retard decay in case it is timber.

Another source of economy, on interurban railways in particular, which does not seem to receive proper consideration is that of practically eliminating the rehandling of bulky materials. In most instances when special work is ordered in track renewals or extensions it is possible to deliver this heavy material at the point where it is to be used instead of shipping it to the general storehouse for rehandling. This is especially true of bridge timber and poles. If the usual course is followed, a bill of material is made out for each particular job considerably in advance of the time it is required, and it is possible to make deliveries on the ground without re-sorting. Orders should be placed and deliveries required with a view to reducing all sorting and rehandling to a minimum. With heavy material this work becomes a considerable source of expense which could well be eliminated.

The quantity of material on hand at any given time is also an important factor, due consideration of which will greatly reduce the cost of maintaining a storehouse. Some companies fail to consider the item of interest and insurance unnecessarily spent upon portions of the stock which are not replenished for a whole year. A good rule to follow, and one which has proved satisfactory by experience, is to keep the quantity of material down to that required until a duplicate delivery may be had. This method has been solved on certain roads by carrying a maximum and minimum stock which has been computed after several years' experience. When the stock drops to the minimum automatically the maximum is ordered. These requirements may be based on the number of cars and miles of track or overhead, and the average requirements for a given period will increase, of course, with an increase in mileage or number. If this method is employed, the quantity purchased at any given time may be small, but the total for the year would be sufficient to make the company supplying it give the road the advantage of its best price. In other words, the total quantity required will be large but the deliveries will be scattered. In this way the manufacturer of the material carries the interest and insurance charge instead of the railroad. In summing up the possibilities we believe that many economies are possible in storehouse management, and it resolves itself into a question of careful consideration of methods to produce the best result.

# Kenmore Shops of the Northern Ohio Traction & Light Company

This Company Has Recently Constructed an Unusually Complete Car Maintenance Plant Near Akron, at Which Point the Greater Part of the Heavy Repair Work Will Be Done for the Cars on All of the Company's Lines.

BY JAY C. LATHROP

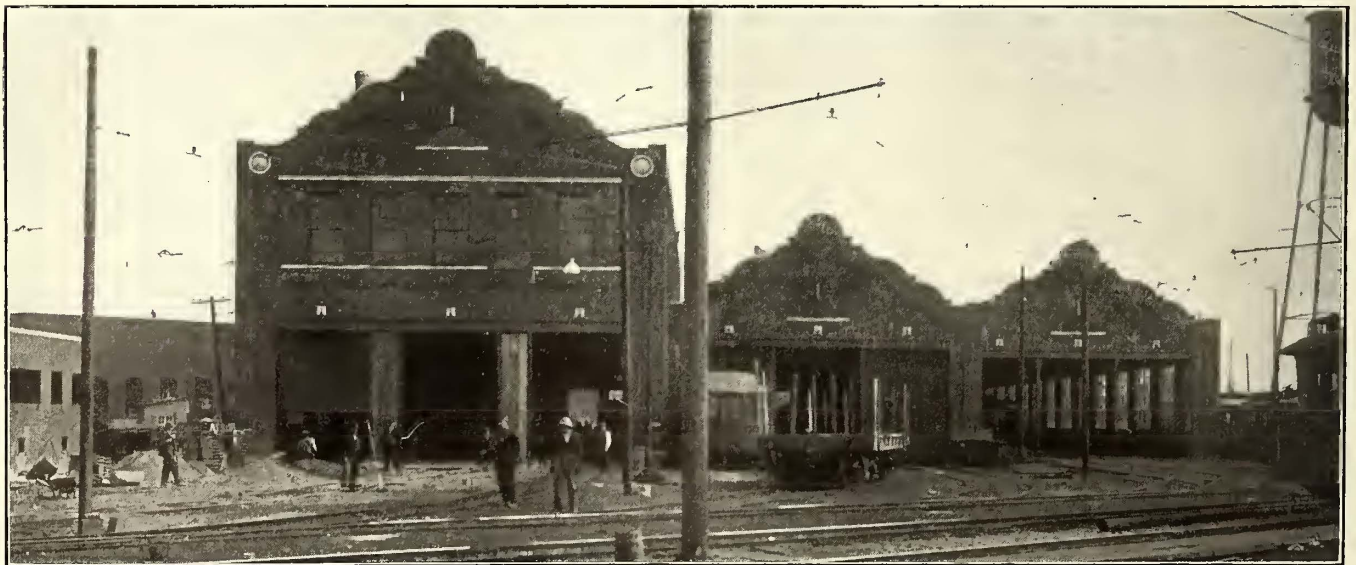
The Northern Ohio Traction & Light Company has recently built a complete set of repair shops on a property located just south of the Akron city limits on the interurban line between Akron and Barberton. The property consists of a tract of about 10 acres which lies adjacent to the Ohio Canal between the company's tracks and the main line of the Erie Railroad, and it is very conveniently situated to serve as a center for the maintenance work of the whole line.

The company now has in service a total of 343 cars, of which 164 are for interurban service. The others include 147 city cars, twenty-four miscellaneous, such as work cars, snow plows, etc., and eight baggage cars. Of the above, 130 interurban cars are in service on the lines north, east and west of Akron, the remaining thirty-four being used south of Akron to Canton, Massillon, and other towns.

These buildings, together with the yard tracks, have occupied practically all of the lot except low, swampy portions which will be filled in the future. When filling has been completed there will be room for considerable growth.

A complete sewerage system has been provided, the storm water from the roofs and car-washing pits being cared for by one system which discharges into a swamp adjacent to the canal. Sanitary sewers from the toilet room and lavatories are connected to an 8-in. cast-iron sanitary sewer which passes through the company's property parallel to the carhouse and discharges into one of the main sewers of the Akron city system. All sewers within the building limits, with the exception of the sanitary sewers, are of glazed terra cotta tile.

The relation of the three main buildings is clearly shown in the general plan. The two shop buildings are arranged



Northern Ohio Shops—Entrance End of Carhouse

the city cars sixty-six belong in Akron, forty-one in Canton, twenty-five in Massillon and fifteen in Canal Dover.

Heretofore this equipment has been stored and maintained at Silver Lake Junction, South Akron and Canton. For several years the carhouses and shops at the above points have been badly crowded, and early in 1912 fifty-five new cars were purchased and it was decided to erect new storage houses and shops. These shops are intended to care for the greater part of the heavy work, the shop at Canton being retained for the Canton city cars and the other two for minor repairs, inspection, etc. Although plans were rushed and most of the contracts were let in the spring of 1912, owing to the press of other work, the scarcity of labor and other unexpected delays, the buildings were completed and occupied only recently.

The complete layout is shown on one of the accompanying illustrations. The group consists of six buildings, the three largest being the carhouse, the truck shop and storeroom, and the paint and carpenter shop, the other three being a dispatcher's office, a pump house, and a substation furnishing electric power and light.

on either side of the transfer table pit, which also passes the rear of the carhouse. Thus cars can easily be shifted from the carhouse to any of the shops or from one shop to another. This transfer pit is 66 ft. wide and 3 ft. 6 in. deep. A motor-driven transfer table was installed at the earliest possible date and proved to be a great aid to construction as cars of material of all classes could then be delivered almost to the exact point at which they were to be used.

#### FOUNDATIONS

The foundations for the main buildings, together with the pits and floors in the carhouse and truck shop and the sewerage system, were let in one contract early in 1912. Good gravel foundations were found under the carhouse and fairly good soil under the paint and carpenter shop. In fact, the only real troublesome part of the work was under the storeroom and east end of the truck shop, which had to be filled for about 10 ft. An attempt was made to build a spread concrete footing under these walls, but a decided settlement was observed before the walls were begun. Under these circumstances it was thought best to

remove these footings and drive piles under the walls. This was especially desirable under the storeroom as the weight of the shelving and supplies will probably exceed that to be expected in any other portion of the buildings. All wall footings, pit walls, floors, etc., throughout the work are of 1:3:5 concrete, except reinforced floors, platforms, etc., which are richer, being made of concrete in the proportions 1:2:4.

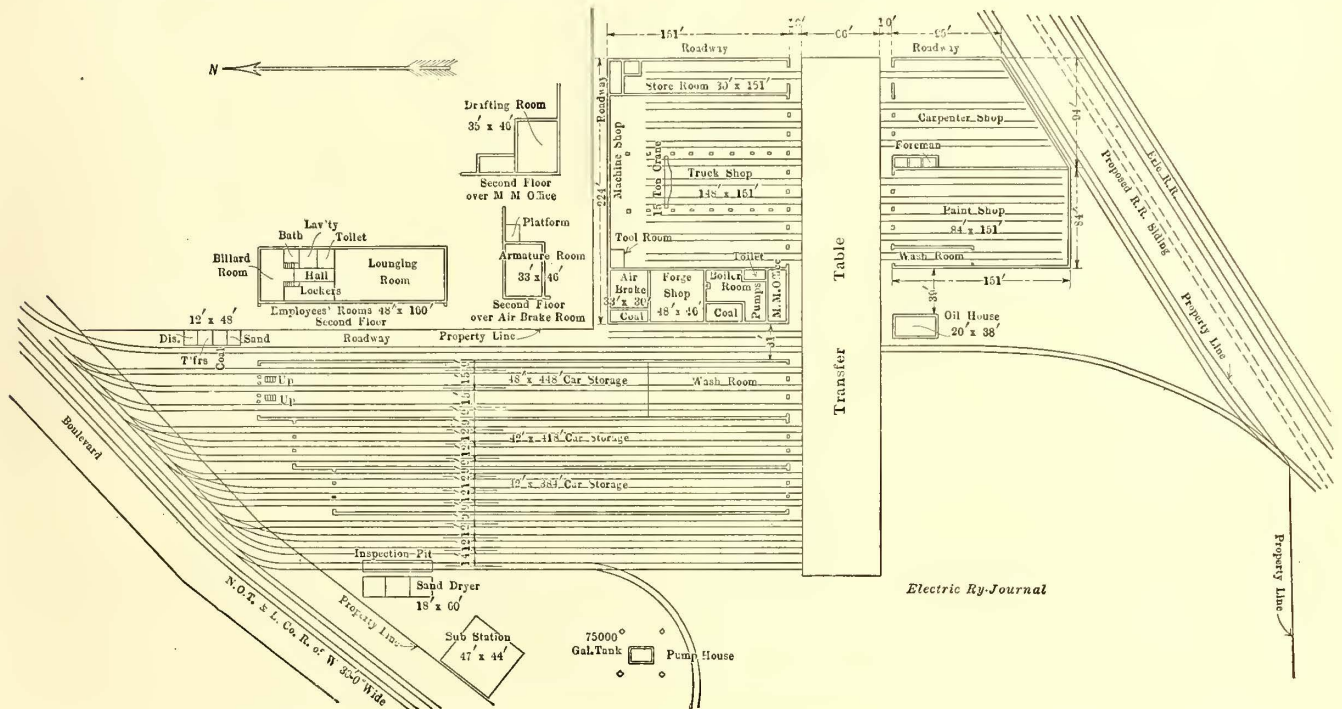
To facilitate the installation of heating and plumbing mains and other piping of various sorts a system of tunnels was provided, starting at the boiler room. In one direction this tunnel passes from the boiler room to the carhouse and extends its full length along the east foundation wall. In the other it passes through the truck shop just below the level of the pits, with a branch passing under the transfer pit to the paint and carpenter shops.

The structural steel for the three main buildings was furnished and erected by the McClintic-Marshall Construction Company under one contract. A number of the tracks were laid by the traction company prior to the erection and the entire job was erected with a locomotive crane. The walls for the entire group of buildings were designed on

on either side of the pit. All wires are carried in conduit, and adjacent to each lamp on one side is an additional socket to which extension lamps can be connected.

Air lines are provided in each pit with valves at frequent intervals, and near the front of the building a connection has been provided in each pit for a steam hose to be used for melting snow and ice from trucks before inspection. An attempt was made to provide all such conveniences during construction instead of leaving them for an after-thought as has been all too common in the past.

Above this bay a second floor was built, extending 160 ft. from the front of the building. This floor is for the use of the carmen, and ample facilities for their pleasure and comfort have been supplied. As the 15-ft. track centers are wide to allow for car washing, it has been found possible to place the stairways to the second floor between the tracks and allow sufficient clearance between the cars and the stairway. The stairs land in a main hall which leads to an assembly room in the rear. On one side of the hall is a locker room containing 400 metal lockers, and on the other side are found toilet rooms together with showers and tub baths. The whole front is arranged for a bil-



Northern Ohio Shops—General Layout, Showing Location of New Shops

the same general architectural lines, being built of common red brick laid in Flemish bond with raked black mortar joints. Gray terra cotta trimming and steel window sashes were used throughout.

CARHOUSE

The carhouse really consists of three separate buildings, the three three-track bays being separated by solid 13-in. brick fire walls. The only break in these walls is a door opening about midway of their length which is protected by a metal fire door.

The east section is 48 ft. wide by 448 ft. long. Inspection pits run nearly the full length of each of the three tracks. Between the pits are concrete floors sloped to drain into the pits, which have cesspool drains at frequent intervals. It is intended that any portion of this section may be used for car washing, and hose bibs have been provided at frequent intervals on both hot-water and cold-water lines.

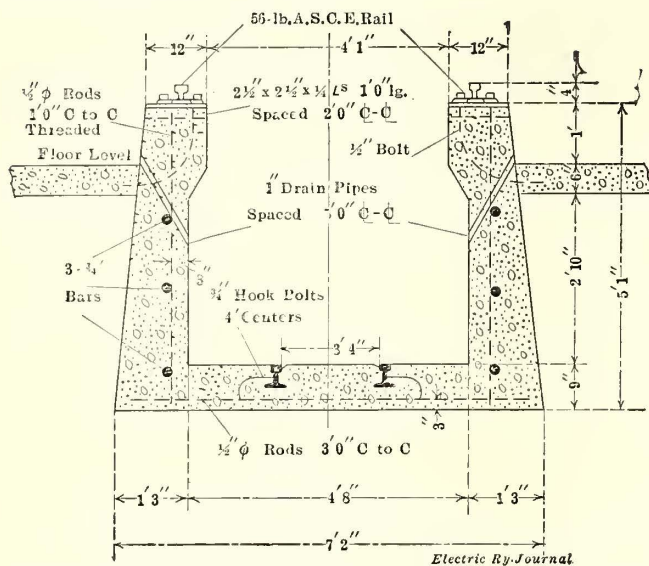
The walls of all pits were designed with a recess from the floor to within 1 ft. of the rail. In this recess are placed lights, the heating coils and other piping. The pits are amply lighted by 50-watt tungsten lamps at 10-ft. intervals

liard room and is very well adapted for that purpose, being lighted from three sides as well as from above.

The other two sections of the carhouse are each 42 ft. wide, one being 416 ft. long and the other 384 ft. long. As they are intended for storage purposes only, a cinder floor was made and no heat was provided. As the cars of different types vary greatly in length, no exact statement of the total storage capacity can be given. However, the three bays will hold eighty-four of the standard 42-ft. double-truck cars used in the Akron city service. In addition, four storage tracks have been laid just west of the carhouse, and each of these will hold ten cars. All tracks in the carhouse and storage yard slope about 18 in. in the length of the building, the front end being the lowest.

The carhouse roof is supported on steel roof trusses of the Fink type and steel channel purlins. These purlins support reinforced concrete tile about 2 ft. by 4 ft., made by the Federal Cement Tile Company. In the center bay and on the inside slope of the roof on the two outside bays tiles with glass insertions 12 in. x 24 in. were used instead of skylights. This method of lighting has proved very

successful indeed, and as a matter of fact the lighting of the center bay is better than that of the two outside bays in spite of the large amount of window surface on the outside walls. Especially is this true when a row of cars is on the track adjacent to the windows. In the writer's opinion, this style of roof is especially well adapted to car-house construction.



Northern Ohio Shops—Cross-Section of Pit in Truck Shop

Ventilation is provided in the center bay and the carmen's quarters by 30-in. Swartwout revolving, ball-bearing ventilators on 32-ft. centers. Kinnear rolling steel doors are used for both ends of the building. The trolley wires inside the building are protected from accidental short-circuit through the steel roof by wooden troughs which are fastened to the bottom chords of the roof trusses.

#### REPAIR SHOP

Both main shop buildings are similar to the carhouse except the roofs, which are of the Aiken type of depressed bay with wood sheathing and composition roofing. The larger of the two buildings is north of the transfer table and includes the storeroom, truck shop, machine shop, tool room, armature room, forge shop, boiler room with coal storage bins, offices, toilet rooms and lavatories.

The storage room is in the east end of the building. A storekeeper's office is in one end, separated from a passage to the machine shop by a wire partition and counter, over which supplies may be delivered to the men. A large door opens on the north end through which supplies may be received when delivered by wagon. When delivered in carload lots the car is set on a track in the storeroom by the use of the transfer table. An unloading platform built of reinforced concrete is provided. An incline leads from this platform to the main floor and another incline leads from the main floor to a depressed area below the platform.

A complete outfit of steel shelving 10 ft. high has been installed. In case more shelf room is desired at some future time a mezzanine floor can be built and additional shelving installed above. The shelving is arranged in sections marked in alphabetical order, and the vertical shelves are numbered from top to bottom and by the divisions of each section from left to right. The various supplies pertaining to different departments have been grouped as much as possible, but each article will be known and called for by the letters and numbers indicating its location. Thus F820 will be found in section F, on the eighth shelf from the bottom and in division 20 longitudinally. The numbers are plainly shown on metal tags attached to the shelves. Additional storage spaces for bulky material are indicated by lines on the floor, each space having a section number.

The truck shop and machine shop just west of the store-

room is divided into three bays 50 ft. wide and 150 ft. long. Each bay has three tracks which run from the transfer pit to within 40 ft. of the rear wall, leaving ample room for machines of all kinds. Pits are provided under all but one of these tracks similar to those in the carhouse. In this case the devil-strips are depressed 1 ft. for the convenience of the man working on journal boxes, etc.

In the center of one of the pits provision has been made for the installation of a wheel-grinding outfit. In three others pits for changing wheels have been provided. In each pit a track has been installed with a gage of 4 ft., and on this hydraulic motor lifts are installed. The motor lifts can also be used for changing wheels. They have double cylinders and were built to order in Cleveland, Ohio.

In the center bay a 15-ton Cleveland electric traveling crane equipped with two 7 1/2-ton trolleys was installed. This crane is floor-operated, and it is useful for a great variety of work. Runway girders have been furnished in the other two bays for future cranes.

#### MACHINE SHOP

The machine shop is unusually well provided with machine tools, as a number have been moved from the old shop and more have been purchased for the new installation. As most of the older tools were belt-driven, arrangements were made for a line shaft to drive these as well as other minor tools. With these exceptions, however, all constant-speed machines are driven by 220-volt, three-phase, 60-cycle induction motors, and all variable-speed machines by 550-volt, d.c. motors taking current from the trolley circuit.

Following is a complete list of tools in the machine shop:

- 18-in. lathe.
- 36-in. drill press.
- Wheel press.
- Carwheel lathe.
- 30-in. x 30-in. x 6-ft. heavy Pond planer with one head and reversing drive.
- 30-in. x 16-ft. Pond lathe.
- 2-in. Landis single-spindle bolt cutter.
- 24-in. Stockbridge shaper.
- No. 3 Williams pipe machine.
- Double emery grinder.
- Buffing machine.
- 20-in. back-gear, upright drill.
- 9-in. x 5-ft. lathe.
- Robertson power hack saw.
- Wet tool grinder.

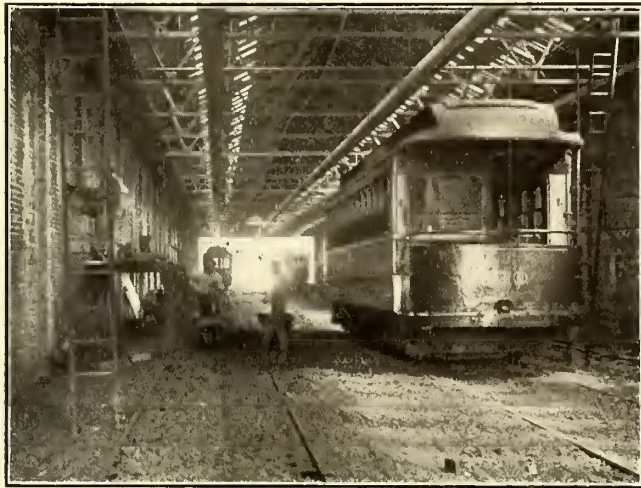


Northern Ohio Shops—View Showing Metal Cupboards in Storeroom

The tool room is in one corner of the machine shop. Just above the tool room is a concrete platform upon which armatures can be lifted by hoists or a jib crane. This platform leads directly into the armature room, which is located on the second floor over the air-brake room and coal storage bin. The armature room has the following equipment:

Three armature buggies.  
 One armature winding machine.  
 One armature heading and banding machine.  
 One axle-bearing babbitt mold.  
 Two pinion pullers.

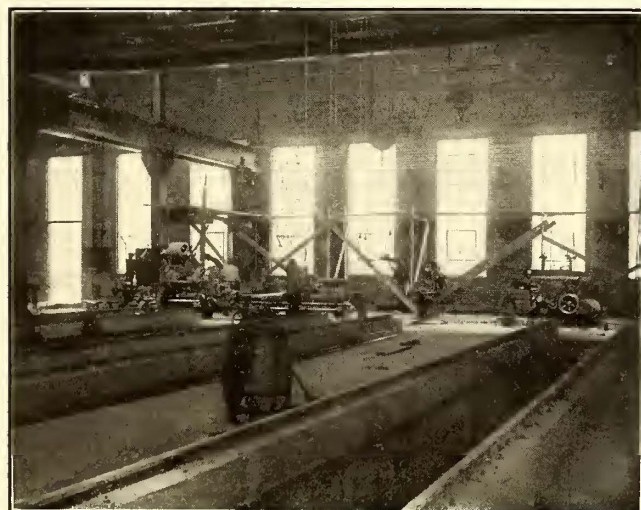
The forge shop is adjacent to the truck shop and occupies a room about 40 ft. square. A 500-lb. Beaudry power hammer is placed in the center of this room and three Buffalo forges are arranged in a row along the west side.



Northern Ohio Shops—Interior of Center Sections of Carhouse Used for Storing Cars

A motor-driven blower supplies air to these forges through tile conduits laid under the floor, while the gases are carried overhead to the stack, which is placed between the boiler room and the forge shop. A Ferguson melting furnace is also located in the forge shop.

The southwest corner of the building is devoted to the boiler room, pump room, master mechanic's office, lavatories, etc., the general layout of which is shown on the accompanying plan. A description of the boiler room equipment will be found in connection with the heating system. A Clayton air compressor with a capacity of 100 cu. ft. of free air per minute, driven by a 20-hp G. E. in-



Northern Ohio Shops—Interior View of Truck Shop, Showing Crane Runway Over Center Bay

duction motor, is located in the pump room. This motor has an automatic starter arranged to start the motor when the air pressure in the receiver drops to 80 lb., and it stops when the pressure reaches 110 lb.

A main line from the receiver drops into the tunnel and branches both ways to the carhouse and truck shop, where numerous outlets are provided with suitable valves.

PAINT AND CARPENTER SHOP

The third main building is 150 ft. by 178 ft. and is divided into two approximately equal parts, one of which is the paint shop and the other the carpenter shop. A portion of the latter is taken up by offices for the painter foreman and carpenter foreman and by toilet rooms. Above these rooms is a concrete-floored balcony running the full



Northern Ohio Shops—East Section of Carhouse Used for Car Washing and Light Repairs

length of the carpenter shop which is intended for the storage of the finer grades of lumber.

The paint shop has five tracks, each of which will hold three or four cars. In one corner of the room a space large enough to hold one of the longest cars has been inclosed by tile partitions for use when burning or scraping off old paint.

The carpenter shop has four tracks, each of which will hold two or three cars, depending on their length. In the rear of this shop a very complete equipment of woodworking tools has been installed. These are all constant-speed machines, and therefore each is driven by a 220-volt, three-



Northern Ohio Shops—Interior View of Carpenter Shop and Wood Mill

phase, 60-cycle induction motor. In most cases the motors are direct-connected by flexible couplings.

The following tools have been installed:

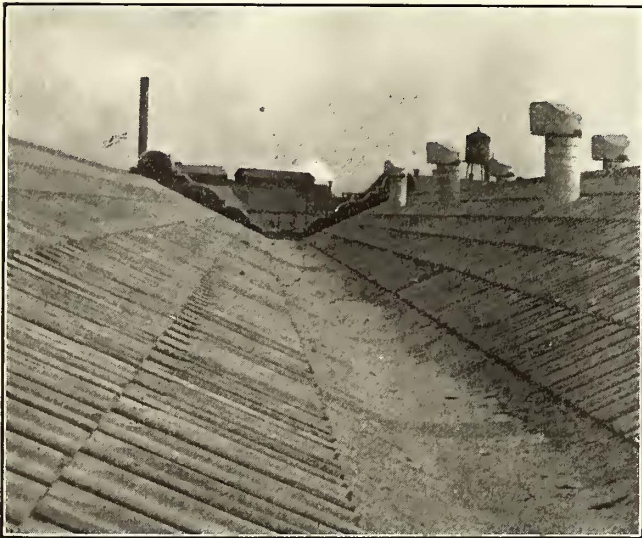
- Surfacer.
- Molder.
- Single-spindle shaper.
- Band saw, 36-in.
- Tenoner.
- Jointer.

Double revolving saw.  
Single spindle vertical boring machine.  
Belt sander.  
Swing saw.  
Vertical hollow-chisel mortiser.  
Foot-power mitring machine.  
Pattern maker's lathe.

The small building near the carhouse is the dispatcher's office. This office was so placed and windows so located that the cars could be seen while in the yard and also when coming from either direction toward the carhouse. In the rear of this office two bins were built under the same roof, each holding about a carload. One of these is for dry sand and the other is for anthracite coal for the cars.

#### FIRE PROTECTION

The three main buildings are protected by an automatic sprinkler system which is supplied initially from a 75,000-gal. steel tank on a 100-ft. tower. At the base of this tower is a pump house in which is installed a fire pump with a capacity of 1000 gal. per minute. This pump is driven by a 100-hp, 500-volt direct-connected motor. The supply for this pump will be drawn from a large well through a 10-in. suction line. The tank is of the spherical-bottom type and was furnished and erected by the Des Moines Bridge & Iron Works Company. In addition to the automatic sprinklers in the buildings, which were installed by the Automatic Sprinkler Company, the four tracks just west of the carhouse are protected by five monitor nozzles



Northern Ohio Shops—View of Roof of Carhouse, Showing Ventilators and Tile Roofing

mounted on pipes about 25 ft. high. These monitor nozzles are so arranged that one man can handle the nozzle and direct the stream upon any portion of the yard, the five nozzles being spaced at such a distance that no portion of the yard is left without protection. An electric connection to the fire pump is provided at each of these nozzles so the operator can start the fire pump without losing any time.

From this tower an 8-in. cast-iron underground main runs parallel with the carhouse along the west side and thence across the end of the carhouse along the transfer table pit. From the other end of this main a line leads across the front of the carhouse and serves a hydrant near the dispatcher's office and one in front of the carhouse. From this 8-in. main 6-in. lines are run to the valves throughout the three buildings.

In the two westerly bays of the carhouse no heat has been provided, and for this reason the dry-pipe sprinkler system is used in them. International dry-valves are used in this section, while in the bays of the carhouse and in the two shop buildings where the wet system is installed and Niagara alarm valves are used.

The carhouse has two sprinkler systems, one being above the roof of the cars and the second being in the aisle between the cars about 6 in. below the top of the windows. This latter system is on a separate valve and is designed to control fires inside the car when the heat has increased to such a point that the windows break out. In the two shop buildings a similar system was used, with the exception that the aisle lines are omitted in the truck shop on account of their interference with the traveling cranes.

#### HEATING SYSTEM

The central heating plant for the entire group of buildings is located in the boiler room adjacent to the forge shop. A radial brick stack of 3-ft. inside diameter and 125-ft. height was built by the M. W. Kellogg Company. The boiler is a 250-hp Stirling, which was taken from one of the dismantled power stations. This will be operated at a pressure of 61 lb. All miscellaneous equipment such as the boiler-feed pump, drip tank, etc., is located in the boiler room. In addition, a small heater connected to a hot-water tank has been installed in this boiler room for general service the year round.

Steam is taken from the boiler at high pressure through a 7-in. pressure-reducing valve which lowers the pressure to that suitable for the Warren-Webster two-pipe vacuum heating system which has been installed in all the buildings. Steam is conducted to the carhouse through a 7-in. main and to the shop buildings through a 9-in. main which reduces to 6 in. and passes under the transfer table pit to the paint and carpenter shop. The greater portion of the radiation in this system is from pipe coils placed along the side of the pits in the truck shop and carhouse. In all other parts of the works standard cast-iron radiators were used. The substation and the pump house are heated by means of an underground branch line from the main in the carhouse.

All supply mains throughout are covered with 85 per cent magnesia lagging. Where the pipes are in the open they are covered with canvas, but those that are laid in the earth are covered with an outside shell of Argemum. Under the specifications for this heating system, the H. P. Cahill Plumbing Company, by which the installation was made, is to fire up and run the plant for two weeks, putting everything in perfect running order. The total amount of radiation covered under the contract is something over 22,000 sq. ft. All the buildings and the yard are lighted by tungsten lamps. All wiring is placed in conduits, and these are hidden where possible.

The C. M. Neeld Construction Company, of Pittsburgh, was the contractor for the concrete foundations, while the superstructure was built by the Carmichael Construction Company, of Akron. All track work, filing, grading, etc., was done by the company's forces. The late J. T. Ross, of Cleveland, was consulting engineer, while the writer had immediate charge of the design and construction of the work.

The number of passengers transported by the Paris subway in 1912 was 310,782,098, or an average of 850,000 per day. The tickets collected were divided into the following categories: Workmen's, 79,877,382; first-class, 32,883,335; second-class, 198,060,192; collective (school), 71,189. To these should be added the return coupons of the workmen's tickets (79,877,382), making the total passenger traffic for the year 390,659,480. The number of tickets delivered in certain of the last ten years was: 1903, 100,090,833 tickets; 1905, 148,700,821 tickets; 1907, 194,823,182 tickets; 1909, 254,445,992 tickets; 1911, 305,442,992 tickets; 1912, 310,782,098 tickets. Comparing the figures of 1912 with those for 1911, there is an increase of 5,339,106, due to the larger number of return and collective tickets sold. First-class tickets decreased by more than 500,000. The receipts of the subway for 1912 were \$10,457,280.



# Specifications for Overhead Trolley Construction

The American Electric Railway Engineering Association Has Adopted as Recommended Practice a Specification for 600-Volt Overhead Construction Which Is Published in Abstract

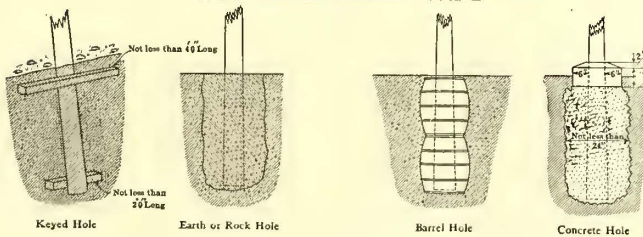
The committee on power distribution of the American Electric Railway Engineering Association submitted for consideration at the convention a set of specifications for standard overhead construction. These specifications, after a general discussion on the convention floor, were adopted by the association as recommended design with minor modifications. In view of the importance of the matter the changes have been incorporated and the specifications are published in abstract herewith in their amended form. These are intended for use only where the workmen employed on the construction have had experience and are so skilled in the work that details such as grading poles to bring the tops in line, setting cross-arms square, cutting in strains at the same relative points and the like, will be attended to without necessity for detailed instruction.

### SUPPORTING STRUCTURES

The type of supporting structure will largely be governed by local conditions. In general, natural wood or concrete poles will be used for all interurban construction and wherever else practicable; steel poles may be used in streets if so desired; sawed poles and tree attachments should not be employed, and building attachments should be used only when local authorities compel such use, in which case special precautions and construction will be necessary.

Before setting, wood poles shall be roofed, butts squared, entire pole rough shaved, knots smoothed, gains and faces made, and roof, gains and faces given a coat of approved preservative or paint. The size, number and location of holes, faces and gains vary and will be given specifically for each case. In general: (a) Holes, unless specifically noted otherwise, shall be of same size as bolt or rod for which intended. (b) Faces must be of sufficient area and of proper shape to receive their fittings, and must have about 1 in. margin outside; they should be slightly hollowed to prevent rocking of fitting. (c) Gains must be square with axis of pole, 3/4 in. minimum depth, of width to secure snug fit of arm, and slightly hollowed to prevent rocking. The roof shall have a pitch angle of 45 deg. and shall be either a wedge with edge parallel to line when pole is set, or a cone.

Pole Length	Depth of Hole	
	In Rock or Concrete	In Earth
30 Feet	5 Feet 0 Inches	6 Feet 0 Inches
35 "	5 " 6 "	6 " 0 "
40 "	6 " 0 "	6 " 6 "
45 "	6 " 6 "	6 " 6 "
50 "	6 " 6 "	7 " 0 "
55 "	6 " 6 "	7 " 6 "
60 "	7 " 0 "	8 " 0 in.
65 "	7 " 0 "	8 " 6 in.
70 "	7 " 0 "	9 " 0 "



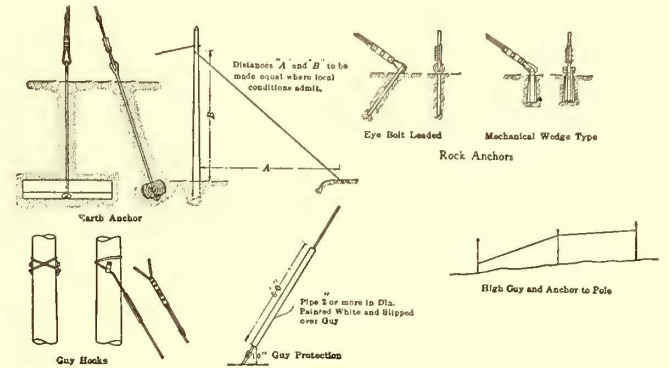
Overhead Construction—Method of Setting Poles

For steel and concrete poles, and supporting structures other than wood poles, special castings and fittings will be used, to be specifically detailed for each case.

### POLE CLEARANCES AND SPACING

On private right of way and wherever else practicable, side supports shall be set with a minimum clear distance of 7 ft. from the center line of track to face of support at

level of top of rail, and center supports shall have a minimum clearance of 7 ft. from center of track, this clearance to be increased if necessary on curves to allow for rail elevation and car overhang. Where curb lines are established, poles shall be set just behind the curb itself unless local ordinances or conditions prescribe other location.



Overhead Construction—Method of Making Up Guys to Anchor

Poles on tangents shall be normally spaced not less than 90 ft. and not more than 110 ft. apart. Poles on curves shall be set as nearly as practicable as in the following table:

Radius of Curve (ft.)	Pole Spacing (ft.)
40	35
50	40
60	45
70	50
80	55
90	60
100	65
125	70
150	75
200 to 500	80
750 and above	100

### POLE SETTING

Pole holes in level ground shall have depths as follows:

Length of Pole, Feet	Depth of Hole	
	In Rock or Concrete	In Earth
30	5 ft. 0 in.	6 ft. 0 in.
35	5 ft. 6 in.	6 ft. 0 in.
40	5 ft. 6 in.	6 ft. 6 in.
45	6 ft. 0 in.	6 ft. 6 in.
50	6 ft. 6 in.	7 ft. 0 in.
55	6 ft. 6 in.	7 ft. 6 in.
60	7 ft. 0 in.	8 ft. 0 in.
65	7 ft. 0 in.	8 ft. 6 in.
70	7 ft. 0 in.	9 ft. 0 in.

In every compact soil pole holes may have depths intermediate between those for same lengths in rock or concrete, and in earth.

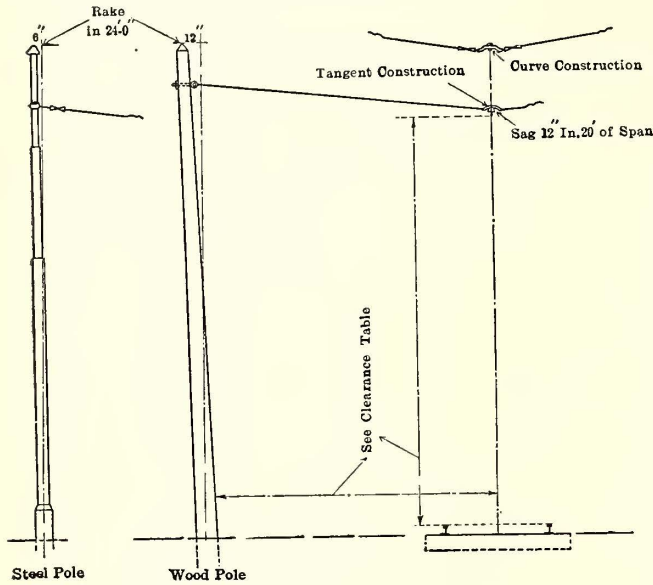
The depth of a hole on sloping ground shall be measured from the lower side of the hole; and in very steep slopes and in loose or otherwise doubtful material the depth may be increased over the standard depth by an amount to be determined for each case on the ground.

In material which caves freely one or more barrels or the like may be used as casing, and driven down as the material is dug from inside. Such barrels or casing may be of wood or steel, and shall be of sufficient size to give clear tamping room of at least 6 in. around the pole without cutting the latter.

Wood poles with brackets shall in general have a rake from the track of 6 in. in 24 ft.; steel poles with brackets, of 3 in. in 24 ft. Wood poles with span shall have a rake from the track of 12 in. in 24 ft.; steel poles with span shall have rake from track of 6 in. in 24 ft. When the strain is

from the track, as with poles on the inside of a curve, brace poles or head guys shall be used, and standard rake maintained. Double bracket poles shall be set without rake; other poles between tracks and poles under outside jurisdiction may be so set if necessary or required.

All bracket poles on curves of radius less than 2400 ft., and such other poles as may be designated because of unusual load conditions, shall be provided with suitable keys



Overhead Construction—Span Support

of wood, stone, or concrete, at least 4 in. thick with a cross-section not less than 32 sq. in. One key 2 ft. long shall be placed on edge behind the pole at the bottom of the hole; the other key, 4 ft. long, shall be placed on edge in front of the pole, just below the surface of the ground.

In setting poles the excavated material, if suitable, shall be replaced in thin, even layers, and firmly and thoroughly tamped, not more than one shoveler serving three tampers, until the hole is completely filled, after which earth shall be well packed around the hole in a small mound, and if on a slope there shall be made on the lower side, a berm at least 6 ft. wide from pole to edge. In rock holes the broken rock shall be used to wedge the pole thoroughly in place. Black loam and similar poor material shall be replaced by suitable material.

Poles subject to heavy lateral strains which cannot well be met by guying or bracing shall be set in concrete mixed wet and consisting of one part Portland cement, three parts clean sharp sand, and five parts good hard gravel or broken stone of size to pass screen with holes 2 in. in diameter, and to be retained by screen with holes 3/4 in. in diameter.

Concrete settings shall have a diameter at least 12 in. greater than that of pole, and shall completely fill pole hole to a level 6 in. below surface of the ground. In parking strips the authorities may require the concrete to finish at this level, but such latter practice is undesirable. Wherever practicable the concrete from a level 6 in. below the surface of the ground to a level 6 in. above the surface of the ground shall be smoothly finished to a diameter 8 in. greater than that of pole, and from the upper level shall slope up to pole on an angle of 45 deg.

SPAN AND GUY ATTACHMENTS

Span and guy attachments shall be made up with such of the following forms as may be prescribed:

Thimble end shall be made by bending strand around thimble of proper size. The strand end shall extend 15 in. beyond thimble, and shall be secured by a three-bolt clamp close to thimble, and by a serving of about ten turns of No. 12 galvanized wire 1 in. from end of strand.

Two-turn wrap shall be made by taking strand around

pole two times. If at end of span or guy the end of the strand shall extend 30 in. beyond face of pole, and shall be secured to main part by a three-bolt clamp 15 in. from face of pole and by a serving of about ten turns of No. 12 galvanized iron wire 1 in. from end of strand. If hitch is at an intermediate point in span or guy it should be secured by a three-bolt clamp on the outside parts of the strand, center bolt of clamp being replaced by a lag screw into the pole.

Three-bolt clamp hitch shall be made by securing strand in upper groove of three-bolt clamp, fastened to pole in proper position by a lag screw through center hole of clamp.

Close tie shall be made by bending strand tightly around attachment, leaving a free end about 15 in. long. One wire of this end shall be unlaidd back to the attachment and served on main part and remainder of end; the other wires shall be in turn unlaidd back to the last wrap, and several over main part and remainder of end until latter is all served on.

Temporary tie shall be made like permanent tie of same kind, but end shall be left amply long to allow for adjustment and permanent make-up, and shall be secured to main part by one or more servings of wire. In making temporary ties bends should be of as large radius as possible until permanently secured.

ANCHORS AND GUYS

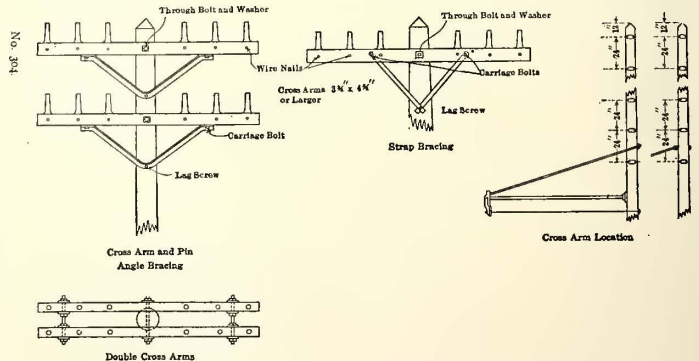
Anchors in earth shall consist of a wooden deadman 4 ft. long, at least 6 in. thick, and having a cross-section not less than 48 sq. in., buried at least 4 ft. below the surface with not less than 2 ft. of rock if reasonably obtainable well packed into hole, and the earth filling above thoroughly tamped.

The anchor shall pass through center of deadman, and must lie in line of pull of guy, to prevent bending. Patent anchors of holding capacity equal to the breaking strain of the strand to be used with them, and having rugged parts sufficiently large to allow a reasonable amount of corrosion without reduction in holding capacity, may be used in place of rod and deadman where conditions are favorable.

Anchors in rock shall consist of eye-bolt securely leaded or sulphured for entire length of shank in hole inclined at right angles to pull of guy. In rock of sufficient strength to withstand safely the action, mechanical wedge-type eye-bolts may be used, and the lead or sulphur omitted.

Where practicable guys shall be anchored to adjacent pole at point not less than 7 ft. above ground.

Guys shall be used where practicable on wood poles on



Overhead Construction—Cross-Arm Assembling

curves of radius less than 900 ft.; on poles to which are attached strain plate guys, trolley guys, and head guys; and on such other poles as may be specified.

Guys shall be used on steel poles only where specifically required.

Guys shall be of galvanized seven-wire steel strand with thimble end at anchor attachments, and two-turn wraps at proper height, for attachment.

The lead or horizontal distance from pole at ground line

to guy at same level whenever practicable shall be equal to the distance from ground line at pole to guy wrap.

Guy wires located where there is a liability of persons or animals running into them shall be made conspicuous by a piece of pipe 2 in. or more in diameter and 6 ft. long, painted white and slipped over guy, resting on anchor rod eye. Where guy is already installed a wooden casing, 3 in. in diameter or square, and 6 ft. long, may be used in place of the pipe. The halves shall be well white-leaded, and shall clamp the guy tightly when screwed together, the bottom resting on an anchor-rod eye.

Guy hooks attached one on each side of pole at level of guy wrap by a through bolt at right angles to line of pull shall be used where local conditions compel the use of a lead less than one-fourth distance from ground line at pole to guy wrap.

Where guys cannot be run directly to secure attachments they may be carried high on adjoining poles to a point where anchorage can be obtained.

STRUCTURE ATTACHMENTS

Cross-arms shall be given one coat of approved preservative or two coats of paint before pins are installed. Pin shanks shall be dipped in the preservative or paint, and while wet firmly seated in hole and secured by a wire nail 2 in. long driven through side of arm into pin.

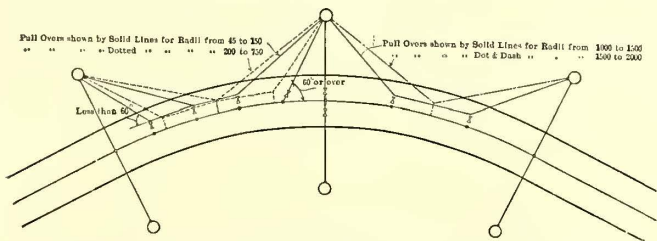
All cross-arms shall be held to pole by a through bolt driven from back of pole toward and through arm, having a washer at each end, with hole at back of pole properly counterbored to secure good seat for washer.

Cross-arms 3 1/4 in. wide by 4 1/4 in. deep shall be steadied by strap braces secured to pole by a lag screw, and to side of arm away from pole by carriage bolts on center line of arm with nuts next to the braces. Arms up to and including 48 in. in length shall have braces 24 in. long, fastened to arm 16 in. from center; arms over 48 in. long shall have braces 28 in. long, fastened to arms 19 in. from center.

Cross-arms of section heavier than 3 1/4 in. by 4 1/4 in. shall be steadied by an angle brace, fastened to bottom of arm by carriage bolt and to pole by a through bolt.

The lowest feeder, telephone or signal cross-arm shall have its center not less than 21 ft. above top of rail; other feeder, telephone or signal cross-arms shall be spaced at least 24 in. center to center. If the pole also carries a transmission line there shall be a clear distance of at least 11 ft. between the top feeder, telephone or signal arm and the lowest transmission arm.

Double arms for feeder shall be used at ends of curves, on intermediate poles of curves of radius less than 500 ft. and at such other points as may be specified. Double arms must be parallel and at the same height. Both arms shall be fastened to the pole by the same through bolt, and shall be firmly tied together by spacing bolts with nut and washer



Overhead Construction—Method of Dressing Curves

each side of each arm, located on the center line of arm, 8 in. from end.

SUPPORTING SYSTEM

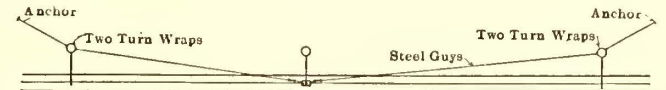
Bracket support on side poles shall be used for all single track where local conditions do not prevent, except for curves of radius less than 300 ft. Bracket support on central poles may be used on double track where practicable.

Span support shall be used on single track for curves of radius less than 300 ft. and where local conditions do not

permit use of brackets; on double track, including turnouts, not employing central bracket poles; and for more than two tracks.

Compound spans shall be used when necessary to support the overhead for a series of tracks too closely spaced to permit poles between. Bridge support will be used only in special cases.

Supporting structures shall be of such height that the



Overhead Construction—Method of Installing Strain Anchors

trolley wire in streets and on interurban lines shall be at a height of 18 ft. above the top of rail unless local conditions prevent; on trackage operating electric and steam road equipment and at crossings over steam roads the trolley wire shall be not less than 21 ft. above the top of rail.

Brackets must be of sufficient length to allow 8 in. between hanger or strain insulator and the end casting. When poles are on outside of curve the length of bracket must be sufficient to allow for effect of pole rake and rail elevation.

The eye-bolt shall be installed at level of trolley wire; the pole casting shall be a distance above center of eye-bolt equal to distance center to center between span eye and arm socket of end casting; and the over-support rod a distance in inches above pole casting of three times the length of arm in feet. On wood poles eye-bolts and over-support rod shall pass through pole and pole casting shall be attached by two lag screws. On steel poles eye for strand, socket for arm and pole attachment for over-support rod shall be carried by special fittings, clamping to pole.

Eye-bolt shall be installed pulled out to full length, the nut, on wood pole, seated against a washer; the arm shall be given an upward rake from the horizontal of 1 in. in 4 ft. of length; the intermediate casting shall be clamped on arm so that trolley wire comes midway between it and end casting; and the steel strand shall be close tied into eye-bolt and into end castings with 2 in. of slack to permit hanger installation. On steel pole strain insulators shall be cut into strand on either side of hanger, and between end and intermediate castings, to give double insulation.

Brackets on curves shall be installed as on tangents except that pull-over with attached strains shall be close tied in strand in approximately correct position, but ties at eye-bolt and end casting shall be temporary until final dressing of overhead.

Spans shall consist of seven-wire strand, and in case of steel poles, shall have strain insulator cut in not less than 5 ft. from pole; where pole carries high-tension circuits, a strain insulator shall be used of suitable strength and creeping surface. Where a foreign line crosses close to the span two strain insulators shall be used, one at either side of foreign line to insure that if latter falls it shall be on a dead section.

Spans on curves shall be close tied into eye-bolts at height above trolley wire equal to one-tenth distance from track center to pole. On wood poles eye-bolts shall be at least 12 in. below top of pole, and shall be installed at full length, seated against washers.

Spans on curves shall be installed as on tangents except that pull-over with attached strains shall be close tied in strand in approximately correct position and temporarily tied in eye-bolts until the final dressing of overhead.

In case of two or more tracks strand between pull-overs shall have temporary tie at one end until final dressing.

TROLLEY WIRE

Trolley wire shall be run out by mounting the reel on an arbor on which it can freely turn, and leading wire to an

anchor or to trolley already installed. Tension may be maintained by a brake or rim on side of reel, but under no circumstances shall braking be done against the copper. The wire should be pulled to correct sag and temporarily tied to brackets or spans by rope or other soft insulating ties. Particular care must be taken to prevent twisting, kinking or bruising the wire. Parallel faced clamps of approved type shall be used; chains, cam come-alongs or other short grip devices shall not be employed.

The sags shall be as follows, and in pulling up great care must be taken that the corresponding tensions are not exceeded:

Size of Trolley Temperature	0		00		000		0000	
	Sag In.	Tension Lb.	Sag In.	Tension Lb.	Sag In.	Tension Lb.	Sag In.	Tension Lb.
0 deg. Fahr.	2½	1,920	3	2,020	2¾	2,780	2¾	3,500
30 deg. Fahr.	3	1,600	3½	1,730	3¼	2,350	3¼	2,960
60 deg. Fahr.	3½	1,370	4¼	1,420	4¼	1,800	4¼	2,260
90 deg. Fahr.	4½	1,070	5½	1,100	5¼	1,450	5¼	1,830
120 deg. Fahr.	6	800	7¾	760	7¼	1,050	7¼	1,330

The table values are for spans of 100 ft.; for any other span the sag and tension are as the squares of the lengths. For example, with span of 50 ft., sag and tension for a given temperature are equal to 100 squared divided by 50 squared or one-fourth corresponding table values for that temperature.

After the trolley wire has been temporarily tied up with the proper sags, and the line has been anchored, the line ears and hangers shall be accurately located and attached, clinch ears being thoroughly closed down to give secure grip and smooth-running surface, and mechanical ears well seated in grooved wire, the clamp screws then being slightly upset to prevent backing out.

Splices shall be of a type to develop full strength of trolley wire, and shall be so installed as to offer the least possible obstruction to passage of trolley wheel. Grooved wire must be kept in perfect alignment, and if splice is of soldering type, it shall be thoroughly sweated on without annealing the wire.

In any case the free ends of the wire shall be bent sharply back at outlet, and cut off, forming a hook with end ½ in. long.

In bracket construction trolley wire guys shall be installed at the ends of curves and on long curves and tangents at equal intervals as nearly as possible, but not to exceed 1500 ft.

Trolley wire guys shall be seven-wire steel strand attached to strain plate supported at a bracket by double pull-over with proper insulation and led both ways to next adjacent poles. Each guy shall have a strain insulator cut in it 5 ft. from strain plate, and shall be secured to proper pole by a two-turn wrap at height of bracket arm. Where practicable the strain of these guys shall be taken by anchor guys in the line of the pull; if this is impracticable, high guys shall be used. Great care must be taken to insure equal pulls on the guys, and especially to insure that the strain plate is not twisted out of line; the ties should not be made up permanently until the final dressing of the overhead.

CURVES

Curves shall be made up with straight line clinch ears for round wire, or double clip mechanical ears for grooved wire, attached to suitably insulated pull-over bodies. Support shall be by span except where rest of line is in bracket, and radius is greater than 300 ft. Between supports curves shall be held to line by seven-wire steel strand, with single body for single track or for outside one of several tracks, and double body elsewhere, spaced as follows:

The pull-overs in each span shall have bodies and strains held radially to curve by a lacing of seven-wire steel strand at least 6 in. away from trolley wire, which lacing, however, may be omitted from any pull making an angle of 60 deg. or more with the ear to which it is attached. With odd number of pull-over bodies the middle one shall have pull-off strand to each pole. Intersections and complicated

special work, particularly in city streets, will usually require special and individual study and treatment.

Curves must be dressed with uniform deflections at pull-overs, and shall be offset to the inside of the curve 4 in. for each inch of rail super-elevation, plus an amount de-

Radius of Curve in Feet	Spacing of Pull-Overs in Feet	Number of Pulls Between Supports	Distance Apart of Poles in Feet
40	7	4	35
50	8	4	40
60	9	4	45
70	10	4	50
80	11	4	55
90	12	4	60
100	13	4	65
125	14	4	70
150	15	4	75
200-500	20	3	80
750	25	3	100
1,000	33½	2	100
1,500-2,000	50	1	100
Over 2,000	100	0	100

pendent upon the character of the rolling stock to be used, which amount shall be determined as follows:

For cars having trolley base directly over truck center the car factor is equal to  $R - \sqrt{R^2 - L^2}$ .

For cars having trolley base a distance  $C$  from truck center the car factor is equal to  $2R - (\sqrt{R^2 - L^2} + \sqrt{R^2 - C^2})$  if trolley base is in front of truck center, or  $\sqrt{R^2 - L^2} - \sqrt{R^2 - C^2}$  if trolley base is behind truck center.

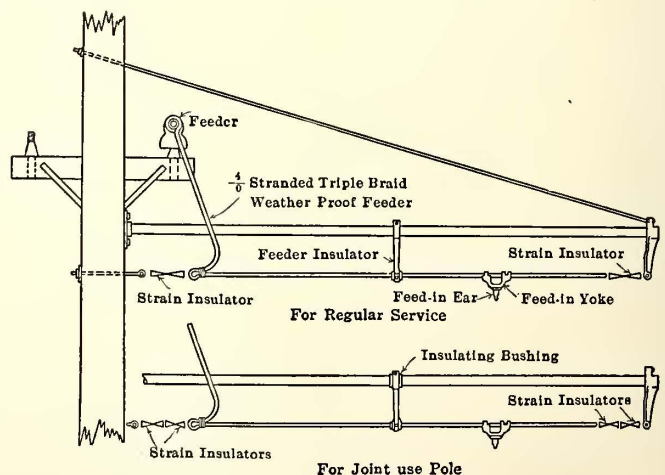
In these formulas  $R$  = radius of track center line,  $D$  = distance from point of contact of trolley wheel and wire to hinge of trolley base,  $H$  = height of trolley wire above the hinge of trolley base,  $L$  = horizontal distance from point of contact of trolley wheel and wire to hinge of trolley base =  $\sqrt{D^2 - H^2}$ , and  $C$  = horizontal distance from truck center to hinge of trolley base.

The total offset shall be uniformly tapered off from full value at inside easement point of track to no offset at outside easement point. If track is not eased, start with full offset at distance inside end of curve, as given by table, and run to no offset at point at equal distance outside end of curve.

Radius of Curve	Start Offset Easement
Up to 110 ft.	20 ft. from end of curve
100 to 500 ft.	40 ft. from end of curve
500 to 1000 ft.	60 ft. from end of curve
Over 1000 ft.	100 ft. from end of curve

FROGS AND CROSSINGS

Frogs shall be installed with both main line and branch trolley wires led straight through, the latter to end 6 ft.



Overhead Construction—Bracket Feed Taps

beyond frog in eye of strain insulator to other end of which is close tied a seven-wire steel strand, secured to pole at a level as nearly that of frog as will allow safe clearance over other wires. The frog itself shall be held on each side by a guy of seven-wire steel strand with strain insulator attached to frog and secured to proper poles at the point of span attachment.

Frogs shall be temporarily located on center line of main track and one-third distance from track switch points to track frog point back from track switch points, and if need be shall be shifted to suit local conditions and equipment. Until final location is made, trolley wire should be clamped just firmly enough to prevent slipping without bruising or kinking. Care must be taken that frog is not located too far back of track switch points, as such location, while often giving satisfactory running, will result in excessive wear of trolley wire.

Crossings wherever practicable shall be installed without cutting either of the line wires, which latter should be clamped just firmly enough to prevent slipping without bruising or kinking until the crossing has been satisfactorily located. Where wire must be cut at least 3 ft. of free end shall be left outside clamp until the final adjustment, after which the end should be cut off close to the clamp.

**FEEDER**

Feed taps shall be at points of support and shall consist of proper size triple-braid, weatherproof stranded connection from feeder, feed yoke well soldered on at proper point, and straight line ear soldered to the trolley wire and tap bolted to yoke. In general feed taps will be located every 1000 ft.

With bracket support the feeder connection shall run from feeder, to which it shall be well soldered, to strain attached to span eye-bolt in pole, thence, replacing the usual steel strand through insulated intermediate casting to strain attached to end casting of bracket. Bracket tube

ALLOWABLE SAGS IN FEEDERS FOR DIFFERENT TEMPERATURES

Temperature in Degrees, Fahr.	Sag for Copper in Inches	Sag for Aluminum in Inches
0	10	5
30	13½	10
60	17	16
90	20½	21½
120	23½	26

must be of sufficient length to allow at least 8 in. of connection cable between feed yoke and end strain, and intermediate casting should be so located that feed yoke is midway between it and end casting.

With span support the feeder connection shall run from feeder to strain attached to span eye-bolt in pole, thence, replacing the usual steel strand, to close tie in strain 5 ft. beyond trolley farthest from feeder. Span shall be completed by seven-wire steel strand close tied into strain and into pole eye-bolt and shall have sag equal to one-tenth distance from trolley wire to its pole.

Feeder reel shall be mounted on an arbor on which it can freely turn, and if practicable, run along the line on a car or wagon. Where local conditions necessitate pulling feeder on and over the cross-arms great care must be taken to prevent injury, especially to covered feeder, rollers or snatch blocks of ample size being used at each arm.

Feeders shall be strung, for spans of 100 ft., with sags not less than those of the following table:

The table values are for either bare or weatherproof feeder of any size from No. 0000 to 2,000,000 circular mils. For spans other than 100 ft. in length the sag should be in the same ratio to the table values as is the square of the span to 100 squared.

Feeder shall be installed in the top groove of the insulator on tangents and in the outer side groove on curves and at angles, and shall be tied in with No. 6 soft drawn wire of the same metal as feeder.

Top tie shall be made with two tie wires each 15 in. long. The first wire shall be looped around insulator in side groove, the ends crossed and twisted once under cable, then brought up, one each side, and wrapped around cable, crossing above and below until all is on. The other wire shall be used to make a similar tie on opposite side of insulator.

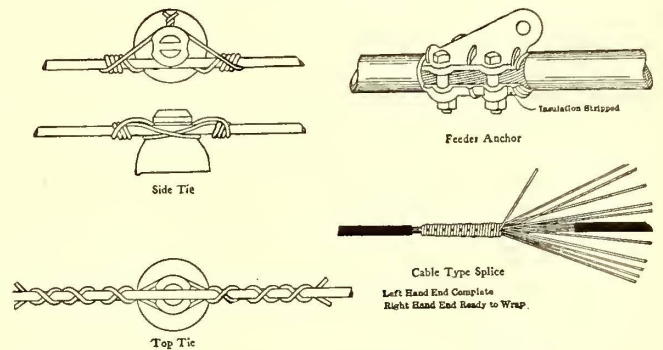
Side tie shall be made with one tie wire 15 in. long which shall be looped around inside groove at back and ends

carried under cable, then working from center with one end each side, over top, down back, under, up front and so on for four complete turns, then around back of insulator, where ends shall be twisted together securely. The cable side of the insulator is front.

On tangents feeder shall be carried by single arms having insulators on wood pins; on angles less than 10 deg. by single arms, and on angles greater than 10 deg. by double arms, in either case having porcelain insulators on metal pins.

Splices in solid feeder shall be made with an approved connector; in stranded feeder shall either be made with an approved connector, or shall be of the wrapped cable type, tapered uniformly to size of original feeder at ends. In insulated feeder either type shall be smoothly taped to the equivalent covering.

Wrapped cable type splice shall be made by stripping the ends to be spliced for 24 in., unlaying and brightening 18 in. of these bare ends, cutting out the core strand of each, and passing wires of one end between those of other end and laying parallel with main cable.



Overhead Construction—Insulator Ties, Feed Anchor and Cable Type Splice

The wires of one strand either side of middle of splice are then close served over main portion and rest of wires of that end; a second pair of strands is similarly served on, and so on, until the last pair of strands serve simply on the main portion. The splice shall then be sweated full of solder and smoothly taped to equivalent of original insulation if cable is insulated.

Lead-covered or specially insulated or covered cables shall be spliced under special instructions, and then only by men experienced in that particular class of work.

Bare feeder may be used on private right-of-way and wherever else practicable; weatherproof feeder shall be used where required and where frequent trees or other obstacles would cause grounds if bare cable were used.

Where long spans, long heavy grades, or other conditions cause unusually heavy strains, feeders shall be anchored by mechanical clamps of approved type, secured to eye-bolt in cross-arm through a suitable strain. Covered feeder shall be bared so clamp takes direct hold on the metal. If very heavy pull is to be anticipated take guy from cross-arm to next pole.

**PROTECTION**

Section insulators shall be installed at a span suspended from hanger. Section switch box shall be bolted to back of pole, using bolts of proper length, each with washer under head and nut, latter being inside box, which shall rest on cross-arm carrying feeder sectionalized. The feeder shall be dead-ended in strains attached to eye-bolt at proper point in feeder cross-arm and shall then enter box. If feeder drops from dead-end point it shall be carried lower than bushings in box and then up to prevent drip from entering.

Lightning arresters where required by local conditions shall be installed at feed taps, just below the feeder cross-arm, and shall be connected to the feed tap close to its

attachment to the feeder by solid insulated No. 4 copper wire.

The ground wire shall be of solid insulated No. 4 copper wire, stapled to back of pole, and either extended as a ground coil or well soldered into a pipe ground. In either case the lower portion shall be protected by a wood molding 8 ft. long, with groove  $\frac{1}{2}$  in. square in one side, well painted all sides with paint or other preservative and placed with lower end 1 ft. below the surface of the ground.

Lightning arrester grounds shall not be attached to the track rails. Where permanently moist earth is assured at reasonable depth the ground may consist of a  $\frac{1}{2}$ -in. pipe driven at least 3 ft. into the moist earth. Where there is doubt as to the condition of the soil, excavate. If permanently moist earth is reached, install pipe ground; if otherwise, install a flat coil containing 40 lineal feet of solid No. 4 bared copper wire bedded in not less than 7 cu. ft. of charcoal. Particular care must be taken to insure that the ground is effective; unless a good ground is secured the arrester cannot give protection.

Where soldering is necessary it shall be done with non-corrosive paste or with stearine. The use of acid or corrosive salts is strictly forbidden, and great care must be taken to prevent overheating and annealing.

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### CLOSE OF RAILWAY SIGNAL ASSOCIATION CONVENTION

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The business sessions of the Railway Signal Association's convention at Nashville, Tenn., were concluded on Thursday, Oct. 16. Revised specifications for rubber compound for insulated signal wire and for galvanized steel wire were accepted for submission to letter ballot. New specifications for enameled copper magnet wire, substantially those of the General Electric Company, were likewise accepted. In the debate on the committee report on storage battery and charging equipment, H. W. Buck, of the Electric Storage Battery Company, objected to mention of elements on jars in specifications for lead stationary batteries for signaling. This portion was withheld, but the specification otherwise was accepted.

Clarence C. Bailey, of the General Electric Company, pointed out the necessity of compensators on motor panels of battery-charging equipment. The committee on method of recording signal performance was instructed to continue its work, revision of the forms being considered advisable. The committee has a new form under consideration and promises a complete report at the next stated meeting in March, 1914. The association authorized an investigation of low-voltage switch-operating mechanism. The specifications of the Association of Railway Telegraph Superintendents as to low-tension wire crossings (applying to wires carrying not more than 550 volts) were accepted subject to letter ballot approval by the Railway Signal Association as a whole.

The next convention will be held at the Hotel Champlain, Bluff Point, N. Y., Sept. 22, 1914, and succeeding days. This change of date may avoid conflict with the convention week of the American Electric Railway Association. F. P. Patenall, signal engineer Baltimore & Ohio Railroad, Baltimore, was elected president, and C. C. Rosenberg, Bethlehem, Pa., was re-elected secretary. The total attendance was 410, and most of the delegates spent Friday in sight-seeing at the nearby points of interest.

#### COMMITTEE REPORTS

During the week, several subjects of direct interest to electric railways were considered at length. In the report of the committee on signaling practice it was stated that the effect of metal ties on track circuits was self-evident and that each rail had to be completely insulated from its ties to prevent a short-circuit. The effect of creosoted ties was not serious and, with a.c. track circuits, was

negligible. The effect of zinc-treated ties was problematic. The consensus of opinion as determined from replies to circulars sent out by the committee was that track circuits one mile in length were rendered inoperative by the extensive use of zinc-treated ties, but that track circuits 2000 ft. in length might be operated successfully even with 50 per cent or more of ties so treated. Ten per cent to 15 per cent of renewals a year would not materially affect circuits of the latter length. Where renewals were made of fifteen or twenty adjacent ties, the leakage was much greater than when the renewals were made singly at uniform distances. Where surface salts were present, more leakage occurred during wet weather than with untreated ties as these wet salts formed a better conductor than ordinary wet wood and in dry, hot weather these salts were drawn to the surface and constituted a more or less perfect conductor. However, after a period varying from three months to one year, these salts disappeared and subsequently no interference was noticeable.

In connection with the requisites for switch indicators, the committee, for the purpose of bringing out discussion, stipulated that indicators should be installed at trailing-point, main-track switches of passing sidings, at switches of trailing-point cross-overs between main tracks, and at switches at the side-track ends of all trailing-point cross-overs between side tracks and main tracks. Indicators were unnecessary at facing-point, main-track switches of passing sidings, at switches of facing-point cross-overs between side track and main track, at switches of facing-point cross-overs between main tracks, and at switches of tracks upon which trains could not clear the main line. The switch indicator should be used to indicate only the approach of trains and should indicate stop when a train reached a track circuit not less than a specified distance in the rear of the caution signal protecting the switch. It should remain at "stop" until the train passes the signal protecting the switch or a point opposite the clearing point of the switch if it is located beyond the signal protecting it.

The committee on electric railways and a.c. signaling submitted a number of specifications covering apparatus and material for a.c. systems and, in addition, submitted as information a historical section covering a number of steam and electric railway installations, including the electrified zones of the New York Central and Hudson River Railroad, the Oregon Electric Railway, the Aurora, Elgin & Chicago Railroad, the Brooklyn Rapid Transit System, the Northwestern Pacific Railroad, the Terre Haute, Indianapolis & Eastern Traction Company and the Washington, Baltimore & Annapolis Railway. All of these installations have been described in various issues of the *ELECTRIC RAILWAY JOURNAL*.

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The sixth annual convention of the Association of Railway Electrical Engineers will be held at the LaSalle Hotel, Chicago, Oct. 21 to 24. It is expected that this will be the largest meeting ever held by the organization, and that all the principal railroads of the United States and Canada will have representatives present. Among the papers read will be reports on terminal facilities for handling car-lighting equipment, on head-end equipment and on electric head-lamps; reports on methods of charging storage batteries, on standards, on dynamo suspension, on car-lighting reports, on lamp specifications, incandescent lamps, on wire and cable specifications, on wiring installation, on outside construction and yard lighting, on illumination and on shop practice. In connection with the convention a comprehensive exhibit of railway electrical apparatus will be displayed on the top floor of the hotel, which has been reserved for this purpose. D. J. Cartwright, of the Lehigh Valley Railroad, is president of the Association of Railway Electrical Engineers, and Joseph A. Andreucetti, general foreman Chicago & Northwestern Railroad, Chicago, is secretary-treasurer.

# Concluding Session of Engineering Association

At the Last Session of the American Electric Railway Engineering Association, Held at Atlantic City Yesterday, the Report of the Committee on Equipment Was Presented and Discussed—An Abstract of the Report and an Account of the Discussion Are Published

The final session of the Engineering Association was held at Engineers' Hall, Atlantic City, on Friday morning. It was called to order by President Schreiber at 10:15. The first subject on the program was the report of the committee on equipment. This report was presented by F. R. Phillips, chairman, and is published elsewhere in this issue of the *ELECTRIC RAILWAY JOURNAL*.

## REPORT OF COMMITTEE ON EQUIPMENT

President Schreiber, in opening the discussion, divided the report into two parts, one containing recommendations to be acted upon, the other containing data for reference. The recommendations of the committee on specifications for steel wheels, which had required the greatest effort on the part of the committee, was given first place and the manufacturers present were invited to criticize them. They declined to express any opinion at this time. In response to a question from Mr. Adams as to the tests referred to in the report Mr. Phillips stated that for two years one of the members of the committee has had in service about 2000 wheels, made under the committee's specifications. Next year it is expected that full data will be presented in the form of curves and tables.

## SOLID WROUGHT CARBON STEEL WHEELS

W. Thorn, engineer of car equipment, board of supervising engineers of Chicago, suggested the omission of the word "solid" in the title of the specifications with the idea that processes may be developed whereby effective spokes could be produced by blanking out the plates. Mr. Thorn expressed the belief that wheels built under the present specifications had excessive strength in the webs and plates and that blanking out the plate will not only reduce weight but may decrease noise.

J. P. Barnes, Syracuse & Suburban Railway, called attention to the desire of the American Society for Testing Materials for an expression of views of the association in the matter of the adoption of standard specifications for wrought carbon steel wheels. He stated that the desire of the committee is to formulate some kind of a test to which steel can be subjected, either as it comes from the heat or in the finished wheel, so that the purchaser can have some indication of the kind of steel he is getting. He was not so much concerned with the chemical content of the material as he was with the physical strength, safety and reliability of the wheel.

G. Aertsen, of the Midvale Steel Company, said that there was not much information available along the line suggested by Mr. Barnes. A sub-committee of the American Society for Testing Materials had had the matter under investigation and it hoped to develop something. Mr. Benedict represented the association on this committee. The matter was not one which could be settled by a few experiments. The American Society had adopted the standard specifications for these wheels but the specifications did not contain reference to any physical tests. It was expected that they eventually would do so.

In response to a question from Mr. Adams, Mr. Phillips stated that the committee had expressed itself clearly in the report as to its attitude in the matter of the American Society specifications. The association sub-committee did not feel that the time was ripe for the adoption of the specifications for hollow wrought carbon steel wheels for electric railway purposes by anyone. It believed that any statement of data or information for specifications of such wheels should come from electric railway engineers.

Mr. Phillips agreed with other speakers that physical requirements were the most important from the engineer's standpoint. What he wanted were tests of these, but up to this time no one had been able to develop a method of determining these physical characteristics. Among the plans proposed one was the casting of a test ingot from each heat upon which physical tests could be performed. Another was to dissect a wheel from each heat, securing from the tread portions test pieces for the same purpose. A third was to test the rim of the wheel for hardness to determine its uniformity and its physical characteristics. It was doubtful whether a hardness test was sufficient for the purpose. In regard to the omission of the word "solid" from the title, Mr. Barnes stated that this word was contained in the specifications now being considered by the American Society for Testing Materials and the Master Car Builders' Association. No change should be made in the title without conference of the three associations concerned.

After an explanation by Mr. Phillips that specifications for designs of tapes, gages and templets should be considered a part of the specifications of steel wheels, the recommendations of the committee regarding steel wheels were approved.

## BRAKE SHOES

The next subject taken up was that of brake shoes. F. W. Sargent, chief engineer American Brake Shoe & Foundry Company, emphasized the importance of the committee's recommendation that the spacing of brake heads should be reduced to 58 13/16 in. from the present spacing of 58 9/16 in. The latter causes the wheel flange to cut through the flange of the brake shoe, causing excessive crowding. This trouble, he said, came from the new design of wheel flange adopted by the association after the standard brake-shoe outline had been adopted. This brought the center line of the keyway 1/8 in. closer to the flange of the wheel than it should be. Mr. Sargent urged the adoption of a definite line from which to measure the spacing, the gage line being indefinite. He stated that in some cases a point on the back of the flange where the surface is practically vertical has been used. Regarding the length of brake shoe, Mr. Sargent pointed out that there should be ample length so that the end stop can be made sufficiently long to be durable. If it is cut down to 3/16-in. on each end it will give continual trouble from breaking off. If the brakehead guide is omitted, as proposed, there will not be enough metal to run over the end of the steel back and form a substantial end stop.

Ira R. Lesh, Railway Materials Company, Chicago, confirmed the statements made by Mr. Sargent, particularly in regard to over-all length. He said that with 12 3/8 in. between end stops, the steel back should have 3/4-in. anchorage. Insufficient anchorage will result in the continual breaking off of the end stops and the scrapping of many shoes which would otherwise be good. In selecting the point of measurement for spacing, the committee should be governed by the fact that the brake shoes should register exactly with the wheels.

In closing the discussion Mr. Phillips expressed appreciation of the suggestions made in the discussion regarding length of shoe and spacing and called attention to the desire of the committee that it be allowed to go over the whole subject thoroughly again in view of the recommendations that had been made. On motion of Mr. Adams

the recommendations of the committee regarding brake shoes were adopted with the understanding that the committee, in making up the drawings, should make the shoes of a length found most desirable in the light of the latest information obtainable.

#### SELF-PROPELLED CARS

In the discussion of the part of the report dealing with self-propelled cars, J. H. Tracy, of the Electric Storage Battery Company, stated that the data given for the Third Avenue Railway were correct for that type of service, which was very severe on account of the large number of stops and slow-downs resulting from the heavy density of street traffic. The large consumption of 5 amp-hours or 66 watt-hours per car mile was not excessive under these conditions, but a car of approximately the same weight and size having the same electrical equipment in operation in Billings, Mont., consumed only 2.83 amp-hours per car mile or 37 watt-hours per ton-mile. In the latter case a smaller battery could be used for the same daily mileage on one charge, with a resulting decrease in battery maintenance cost. On the other side of the balance sheet in the comparison of these two cases was the question of the accessibility of New York compared with Billings, Mont., and the fact that the Third Avenue Company operated 160 cars, which made supervision, inspection and repairs very much more expensive for the Billings Traction Company than for the Third Avenue Company. It was a fact that the cost of battery maintenance for the Brill-Exide car, operated by the Lewisburg, Milton & Watontown Passenger Railway, amounted to approximately 3 cents a car mile, the figure mentioned by Mr. Mullaney for his cars, but this was 1.86 mills a ton-mile, while for the Third Avenue Company the 3 cents a car mile amounted to 4.15 mills a ton-mile or  $2\frac{1}{4}$  times as much per ton-mile as for the Lewisburg car. This difference was due to difference in the services rendered.

John A. Thompson, in his report on the Edison-Beach cars used by the United Railways of Havana, had said, "No matter what the efficiency of the lead battery might be it is bound to be more expensive to operate than the Edison nickel-iron battery."\* This was based on an assumed cost of battery maintenance of 3 cents a car mile. It entirely overlooked the difference in first cost between the lead battery and the nickel-iron battery and also assumed an infinite life for the nickel-iron battery at zero cost for maintenance during this life. The Havana car was very similar in dimensions and speed to the Lewisburg car, the lengths being 38 ft. for Havana and 39 ft. for Lewisburg. The seating capacities were forty for Havana and forty for Lewisburg. The maximum speeds were 29 m.p.h for Havana and thirty for Lewisburg. The stops per mile were 2.1 for Havana and 1 to 1.5 for Lewisburg. The battery capacity, at 1.2 volts per cell for the nickel-iron battery and 1.965 volts per cell for the lead battery, was 61.7 kw-hr. for Havana and 69.2 kw-hr. for Lewisburg. The chief differences were in the number of stops per mile, which favored the Lewisburg car, and in the battery capacity, which was 12 per cent greater for the Lewisburg car. The Lewisburg car could take the boosting required at Havana with at least equal facility. The two cars, therefore, were generally comparable in the Havana service. The energy consumption of the Havana car was 0.79 kw-hr. per car mile; the battery efficiency, 44.4 per cent; motor-generator efficiency assumed, 80 per cent, which would give an input to a motor-generator of 2.225 kw-hr., which, at 4 cents per kw-hr., gave a power cost of 8.9 cents per car mile.

The weight of the Lewisburg car was 32,200 lb. empty. Assuming a load of the full seating capacity of forty passengers, at 140 lb. per passenger, gave a total weight of 18.9 tons. The battery had in actual service an ampere-hour efficiency of 90 per cent, a volt efficiency of 85.6 per cent and a watt-hour efficiency of 77 per cent. The

energy consumption given in the report was 40 watt-hours per ton mile. This, with the loaded car weight of 18.9 tons, battery efficiency of 77 per cent, and motor-generator efficiency of 80 per cent, would give an input to the motor-generator of 1.23 kw-hours, which at 4 cents per kw-hour gave a power cost of 4.92 cents per car mile, leaving 3.98 cents per car mile in favor of the Lewisburg car. Assuming the cost of battery maintenance for the Lewisburg car as 3 cents per car mile, which was very nearly correct, this left a clear saving of nearly 1 cent per mile if the Lewisburg car were substituted for the present Havana cars. To this must be added the proper amount for maintenance of the Edison battery and interest on the difference in first cost between the Edison-Beach car and the Brill-Exide car. If the nickel-iron battery had an infinite life and the cost of its maintenance was nil, there would still be a saving of nearly 1 cent per mile in favor of the Brill-Exide car.

Mr. Tracy assumed that if the Edison battery was replaced at the end of the guaranteed life of four years at 50 per cent off the advertised list price of \$20 per cell, and if the mileage of 150 miles per car a day was made for 300 days a year for four years, the renewal cost would amount to 1.77 cents per car mile. Neglecting the cost of replacing electrolyte and the interest on the additional investment, a saving of 2.75 cents per car mile was obtained by the substitution of the Brill Exide car for the Edison-Beach car. On the same basis of mileage, as above, this amounted to a saving of \$1237.50 a year per car.

N. W. Storer, Pittsburgh, congratulated the committee for the very complete data it had given on the operation of the different types of cars. He suggested that the subject be pursued at greater length during the coming year by getting the actual cost of the cars, if possible. Some roads with self-propelled cars were going into multiple-unit operation, but there was very serious doubt in his mind whether there was any advantage whatever in that practice, if the conditions permitted the use of trolleys. There was one thing the trolley car people could gain from a study of these self-propelled vehicles, and that was how to make a light equipment. Lightness was not inherent to the self-propelled car at all, and unless the cost was prohibitive, it should be applied to trolley cars in very many instances. If the frictionless bearings were good for self-propelled cars, they should be good for the others. It was simply a matter of cost.

C. G. Young, New York, believed the storage battery had a field, but emphasized the importance of studying all the conditions before a choice was made.

M. V. Ayres, New York, noted that the comparison which was so strongly in favor of the lead battery was based on a cost of 4 cents per kw-hr for power. At a different rate for power the results, comparatively, would be different, and at a very low cost for energy the nickel-iron battery would show less cost of operation than the lead battery.

W. Thorn, Chicago, thought that the committee should plot curves with one ordinate showing cost of operation and the other, stops per mile or some other variable, and thereby compare the two types of cars. The critical point would be where the curves cross, and below that point one of the cars would be more efficient, and above that point the other car would be more efficient.

F. R. Phillips, chairman of the committee, concluded the discussion on self-propelled cars. He thought that Mr. Thorn's suggestion regarding the plotting of curves to show the relative efficiencies of the storage battery and trolley car would be too great a task.

On motion of L. P. Creelius, the report of the committee on equipment was adopted with a vote of thanks.

#### REPORT OF COMMITTEE ON EDUCATION

In presenting the report of the committee on education William Roberts, Akron, Ohio, stated that consid-

\*See ELECTRIC RAILWAY JOURNAL, Oct. 4, 1913, p. 631.



erable progress had been made in this line during the year. He referred to the excellent co-operative work being done by the University of Cincinnati under the direction of Dean Herman Schneider. The Cincinnati plan involves the alternation of the students' work between school and shop. Mr. Roberts said that the desire of the committee is to assist in the simplification of education so that employees will be desirous of going on with it. Mr. Roberts expressed appreciation of the co-operation of Mr. Pryor and Prof. Norris and said that the committee plans to apply the methods of Dean Schneider during the coming year. Mr. Phillips commended the plan of co-operative work and stated that it is being used at the University of Pittsburgh with good effect. It is expected that a formal report of progress can be made next year.

Upon motion of Mr. Adams, the report of the committee on education was accepted with thanks.

#### REPORT OF THE COMMITTEE ON RESOLUTIONS

The next order of business was the report of the committee on resolutions, in which thanks were tendered to all the officers and committees, and regret was expressed at the resignation of Secretary-treasurer Donecker. The committee also expressed the gratitude of the association to the Manufacturers' Association for the exhibits. On motion the report of the committee was adopted.

The last order of business was the presentation of the report of the committee on nominations, which presented the following names:

President, J. H. Hanna, Washington.

First vice-president, L. P. Crecelius, Cleveland.

Second vice-president, John Lindall, Boston.

Third vice-president, B. F. Wood, Altoona.

Members of executive committee, F. R. Phillips, Pittsburgh; Norman Litchfield, New York; H. F. Merker, East St. Louis; J. P. Barnes, Syracuse.

Secretary-treasurer, E. B. Burritt.

These names were unanimously accepted, the secretary-treasurer casting the ballot. A telegram was received from J. H. Hanna, the new president, in which he thanked the association for the honor of election and expressed his regret that urgent business prevented him from remaining at the convention to acknowledge his election in person.

The meeting was then adjourned.

#### REPORT OF THE COMMITTEE ON EQUIPMENT\*

F. R. PHILLIPS, CHAIRMAN; E. W. HOLST, F. G. GRIMSHAW,  
J. M. BOSENBURY, W. R. MCRAE, L. M. CLARK, J. P.  
BARNES, R. N. HEMMING, D. E. BLAIR

The report on wires and cables for car equipment submitted in Appendix A is largely preliminary in its nature. It is written with a view to arousing interest in the matter, and the committee trusts that the members will discuss and criticize this section freely.

The matter of specifications for solid wrought carbon-steel wheels for electric railway service has been under investigation for several years and was reported upon by the 1912 committee on equipment. The specification reported in 1912 was adopted by the association at the convention as a guide to the members for use in such manner as desired, with a further recommendation that the subject be again studied with a view to a refinement of the specification.

There are at present four manufacturers of steel wheels, all of whom have a method or process of their own, each differing in many essential respects from the other. In the refinement of manufacturing processes extreme caution is necessary, since reliability must be maintained at any cost without the safety features being impaired. Progress must therefore be slow, especially since determinations cannot

profitably be made upon results of laboratory tests but must be based upon results in actual service.

The American Society for Testing Materials has drafted and will probably adopt a specification of this kind. This action, in the opinion of the committee, is inopportune and inconsistent, since the specification, which covers wheels for electric railway service only, would thus be declared a standard by an organization but partially composed of electric railway engineers, while this association, composed entirely of electric railway engineers, is not ready to adopt as standard any specification of this character, in view of the lack of satisfactory data in proof of its value.

Repeated efforts have been made by the committee to harmonize the various points of contention between the manufacturers and the sub-committee having in charge this specification. The manufacturers, on the one hand, insisted that the provisions of the specification proposed in 1912 were commercially impracticable, while the members of your sub-committee, on the other hand, demanded requirements in the specification which would insure uniformity of product. Individual investigations on the part of various members of the committee on equipment have led the sub-committee to believe that while the specification proposed in 1912 may not be possible of attainment at this particular time, it is in the right direction, and the committee is satisfied that improvement in the art of the manufacture of steel wheels will insure greatly improved product and that this specification will form the basis of this accomplishment.

Therefore it is recommended that this subject be continued for further investigation and that the incoming committee on equipment be instructed to collect and tabulate data covering the performance of wheels manufactured under the provisions of this specification, if any such are made.

Working specifications were submitted in an appendix to replace those adopted in 1912. These differed in minor details from the previous specifications, the more important changes in the paragraphs on chemical analysis being the omission of the dimensions of the test drill holes, the elimination of reference to segregated area and an increase in the mating limits from five points to six points of carbon content. In the new specification the expressions "machined contour" and "unmachined contour" replace the original expressions for machined wheels and rolled wheels and references to weight of wheel are omitted. The stamping on the wheel is considerably limited and the paragraph relating to patent litigation is omitted entirely.

The question as to the cause of and remedy for air hose failures is receiving the close attention at present of all users. The Master Car Builders' and Air Brake associations are also actively engaged in the investigation of this matter. The investigation of the subject this year has served to emphasize the necessity of very careful study, extended tests and research, all of which could not be satisfactorily accomplished in one year, and it is therefore recommended that the subject be assigned to next year's committee.

In the revision of brakeshoe standards some important omissions and errors were discovered in the present design. The committee believes it unwise to institute radical changes in standards, since to do so would perhaps entail much expense upon the member companies which have adopted them. Fortunately, however, the desired improvement in the standards may be attained with no interference with present practice, and the recommendations for changes in the standards act only as a refinement thereof and in many cases have already been put in practice by some of the member companies.

#### RECOMMENDATIONS OF THE COMMITTEE

The committee made the following recommendations:

1. That the subject of wires and cables for car equipment be continued.
2. That the specifications for solid wrought carbon-steel wheels for electric railway service be continued.

\*Abstract of report read before the American Electric Railway Engineering Association at Atlantic City, N. J., Oct. 13-17, 1913.

3. That the subject of air-brake hose specifications be continued.

4. That the standard brakeshoe drawings be revised so that all dimensions be indicated from a base line, which shall have a definite relation to the gage line of the wheel, such revision being made without changing the form of shoe, head or key except as outlined below:

(a) That certain errors and omissions noted in the report on revision of brakeshoe standards be corrected.

(b) That brakeshoe keys be made uniform in shape and dimension for treads of all widths and for flanged and unflanged brakeshoes.

(c) That the over-all length of brakeshoe be changed from  $13\frac{3}{4}$  in. to  $13\frac{5}{8}$  in. to conform to M. C. B. and C. E. R. A. standards.

(d) That an additional dimension which shows the distance from the back of shoe to the back of flange portion be incorporated in the standards.

(e) That face of shoe be tapered 1 in. in 25 in. to conform to standard wheel contours.

(f) That width of "face" of shoe be made  $\frac{1}{4}$  in. less than width of tread of wheel, the outer face of the shoe being sloped inward to suit.

(g) That standard designs show a dimension for depth of flangeway.

The action taken by the committee on standards was to recommend continuance of the matter of specifications for solid wrought carbon steel wheels with a view to determining whether a specification satisfactory to all parties interested can be developed. The changes in the present standard brakeshoe are recommended for adoption as outlined.

#### APPENDICES

Accompanying the report were five appendices as follows: Appendix A, covering the matter of wires and cables for car equipment; Appendix B, submitting a proposed revision of the present working specification for solid wrought carbon-steel wheel and designs for gages, tapes and templates for measuring wheels; Appendix C, covering the subject of self-propelled cars; Appendix D, submitting reasons for and drawings of proposed changes in the standard brakeshoes, and Appendix E, giving an analysis of existing differences between C. E. R. A. and A. E. R. E. A. standards with recommendations for harmonizing them. An abstract of Appendix A is published herewith.

#### WIRES AND CABLES FOR CAR EQUIPMENT

In view of the wide difference in methods and materials in use for car wiring, it was considered well to conduct an investigation of the best practice by engineers in general. The consensus of opinion bearing on certain phases is herewith presented:

It was agreed by the majority that in the case of all-steel or semi-steel cars having steel underframes, or where conditions were such as to make it imperative to use metal conduits, lead wires should be brought out of standard junction boxes and cleated to the car underframing with asbestos board or properly treated wooden cleats, these cleats holding the cables snugly and allowing a clear space between cables of at least 2 in.

In the case of double-truck cars this cleat is to be brought as close as possible to the king bolt. The leads are to be brought through the motor outlets, which are to be insulated with high-grade rubber bushings snugly fitting both the motor case and the cable.

The motor leads upon leaving the motor outlets are to be cleated to the motor frame in a manner similar to that described above in the case of the car-body lead wires and the cables to be so arranged between cleat on motor frame and motor outlet holes as to allow for a weather drip.

Brass connectors are to be firmly and permanently soldered to the ends of the car-body cables. A piece of rubber hose of suitable length and size is to be slipped on to the car cables before the connector is soldered on. The motor leads are to be joined to the connector by two set

screws in the connector. The rubber hose is then to be brought down over the connector and firmly taped at both ends, and to be treated with a coating of insulating paint. However, in addition to the above described connector there are several others on the market of equal merit.

It is necessary, when installing conduit in cars, to see that a proper fall is given to the conduit and that the lowest junction boxes have a small hole drilled in the bottom to permit the proper drainage of accumulated moisture. This method of treating motor leads is the best suited to the majority of installations and also suitable for cars wherein the car cables are run in wooden conduits or treated hose. It has been found very satisfactory in preventing mechanical injury to the cables to bring motor and rheostat lead wires from wood or canvas conduits through lead pipes of a suitable size properly fastened to the underframing of the car.

It seems to be the opinion of many that it is not necessary for car cables to be made up and insulated in sets prior to being drawn into conduits, if they are received in proper condition from the manufacturer. If the cables are up to specification, they should be installed as delivered by the manufacturer. Rough places or burrs in the conduits should be carefully guarded against in their manufacture, as these are the cause of a large number of cable failures. While it is not absolutely necessary to have extra insulation applied to cable sets, it is a great convenience in handling and saves time in erection to have cables firmly held together by some such method as either lap-taping the entire length of the cables or taping them at intervals, and also to apply to the made-up sets a coating of insulating air-drying paint prior to drawing the cables into the conduits.

It is not considered advisable, for ordinary uses, to install a fuse between the trolley and circuit-breaker. In the case of electric locomotives or heavy equipments, however, it may be good practice, or necessary, to install such a fuse to protect against excessive loads or abuse of equipment by the operator. Such a fuse should be of the magnetic blow-out type, using ribbon wire of predetermined current value, protected by a suitable metal box, which should be located in a convenient place, to permit of easy access.

Investigation shows that a large majority of roads use both inside-hung and outside-hung motors, and the committee would recommend that manufacturers of motors bore or drill the frames of motors for outlet leads on both sides, to accommodate either inside-hung or outside-hung motors.

There can be no question that 30 per cent pure Para rubber will give the best results for insulating car wiring. Its use may be advisable in special cases, as where cars are operated in subways and there is a liability to small short-circuits, which might cause smoke, fire or a possible panic. However, the wire referred to by manufacturers as containing 20 per cent pure Para rubber is giving general satisfaction, and the 30 per cent composition makes an insulation probably more expensive than is necessary. [Attached to the report was a proposed specification covering 20 per cent, by weight, of dry up-river fine Para rubber or A-No. 1 plantation sheet, which has not previously been used in a rubber compound. The committee recommended submitting the specifications to the manufacturers for criticism before adoption.—Eds.]

Relative to the matter of treating insulation to make it fire-proof or flame-proof, the committee is of the opinion that this should be done at the discretion of the consumer, bearing in mind that it is more essential to have the cables moisture-proof than to have them fire-proof or flame-proof. The committee believes, however, that cable insulation could be readily treated by either the manufacturer or consumer so as to make it practically a slow-burning insulation. This would be considered good practice for the purpose of delaying or preventing the flames from making rapid headway among the cables.

# Papers at Accountants' Final Session

At the Final Session of the American Electric Railway Accountants' Association at the Atlantic City Convention a Number of Papers Were Presented on Accounting Subjects, Including Overhead Charges, the Electric Railway Census, Interline Accounting Methods and Work of the Bureau of Fare Research

The concluding Accountants' session of the Atlantic City convention was held during the morning of Friday, Oct. 17. At this time in addition to the papers and committee reports scheduled on the convention program for presentation there was read Edwin Gruhl's address entitled "The Cost of Carrying a Passenger, and Proposed Work of the Bureau of Fare Research," which had been postponed from Wednesday's session. All of these papers are published in abstract herewith.

## THE COST OF CARRYING A PASSENGER, AND PROPOSED WORK OF THE BUREAU OF FARE RESEARCH\*

BY EDWIN GRUHL, ASSISTANT TO THE PRESIDENT, MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

Writing at the beginning of our electric traction industry, Edward E. Higgins, one of the pioneers of this association, gave the assurance in his book on "Street Railway Investments," that "the municipal transportation industry in the United States is intrinsically profitable." One of the noteworthy reasons assigned for this statement was the following commentary upon the American public:

"The average American is careless of small economies. He has not time to 'split the nickel'; he despises a penny and in some parts of the country will throw it away; he will willingly pay 5 cents to save three minutes in a half-mile ride, and he will doubtless be the same man fifty years hence."

Both of these predictions have not been realized. The citizens of many of our municipalities, whatever their extravagances along other lines, have not hesitated to attempt small economies in car fare and have demanded in addition a length of ride which is no longer measured by the half mile. This, with the rising cost of labor, material, injuries and damages and the increase in taxes and municipal burdens, has led to the general conclusion by many investors that the traction business is intrinsically unprofitable.

The problem of how far it is possible to carry a passenger under existing fares is one that has claimed the attention of a committee of the association for several years. Several methods have been proposed of calculating such a reasonable haul, and much light has been thrown upon the probable outcome of any impartial investigation of the cost of service. The conclusion reached that the traction industry is "selling goods below cost" has created widespread discussion and has already reflected itself in the decisions of some of our commissions.

The completion of the work as outlined by the committee of the American Association is too large a task to place upon a single committee, and accordingly the recommendation has been made and adopted at the present convention of the American Association that the work be assigned to a separate organization to be called the "Bureau of Fare Research." Such bureau is to serve under the direction of the committee on the cost of passenger transportation service. Ultimately this bureau will have in its employ the best talent which can be secured to develop and complete the work for the present committee.

While an innovation for the Electric Railway Association, the establishment of such a bureau is not an untried

experiment. The Bureau of Railway Economics at Washington has been in existence for several years and has prepared careful analyses of operating conditions for the railroads of the country. The rate research committee of the National Electric Light Association, while confining its efforts to the theories of rates and classifications of service, is performing a similar function for the electric lighting and power industry.

The success of the venture will depend largely upon the co-operation received from the separate companies and especially the accounting officers of these companies. The Accountants' Association is familiar with the form of financial and operating reports filed with governmental bodies. In many states such information has been supplied for years and forms a large part of the bulk of the published reports of various of our railroad and public service commissions. It is the purpose of the bureau to utilize such reports and to base its conclusions as to the cost of transportation service under varying conditions upon the facts with which the public is familiar and to which it has ready access. In assisting the interpretation of reports prepared under varying classifications, in furnishing supplementary information where necessary and in the preparation of suggestions, the members of the Accountants' Association can be of great service to the committee and the bureau.

The cost of carrying a passenger and the distance to which such a passenger can be profitably carried for a single fare involves a calculation of the operating expenses and investment charges applicable to the service performed. The operating expenses are usually capable of definite determination, but their allocation is not always determined with certainty. It is a common practice in apportioning costs between various services to ascertain costs varying with the car hour, with the car mile, with the miles of track operated and with the number of passengers carried. Frequently also, in analyses of this character, a separation is attempted between the costs varying with the passengers hauled and the costs varying with the passenger mile. Classifications of accounts do not so group the various items of expense as to enable such a statistical analysis without rearrangement, and the manner of this rearrangement has been the subject of much discussion. These methods of analyses will necessarily claim the attention of the bureau.

The total investment charges, in which there is included depreciation and return upon the investment, are not always determined with the same certainty as the operating costs and do not always appear from the books of accounts.

The work will accordingly devolve upon the bureau to keep closely in touch with the work of physical valuation, where it is attempted, and to attempt to analyze the factors making up such valuation. Return upon the investment, moreover, is not based merely upon physical property, but the various items of intangible value must be made a matter of special investigation before conclusions can be drawn as to the paying haul per passenger. So-called overhead charges, additive to appraisals of physical property, have already been a subject of frequent discussions before the Accountants' Association and are a matter of report by a separate committee this year.

The factors affecting reasonable return, where the value upon which such a return is to be calculated has been determined, are another problem, which, while not capable of definite solution, may be fixed at its lower limit by the discounted price of securities.

\*Abstract of paper read at meeting of American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 13-17, 1913.



agent representing the road making delivery in case it is a joint agency. One copy goes to the auditor of each line and the agent retains a copy for his file. In case there are two agents (not a joint agency) four copies will be necessary.

From the daily interchange report an entry is made on the ledger form on a sheet bearing the proper road name for cars belonging to that road which have been received by the home road or delivered by the home line. An entry is also made on this form for cars owned by the local road, showing delivery to or return by some foreign line. Additional entries are made on this form to show the movement of home cars on roads which do not make a physical connection with the home line, and for which a postal card notice is sent.

The postal card notices are used for the purpose of advising a road owning a car when any of its cars have been received or delivered by a road which does not make physical connection with such owning line.

There is not sufficient interchange between electric lines to require a special summary form. Each line should render a bill for use of its cars not later than the fifteenth of the following month.

#### ACCOUNTING DEPARTMENT CONFERENCES\*

BY FRANK B. LASHER, AUDITOR REPUBLIC RAILWAY & LIGHT COMPANY

The question of monthly or more frequent conferences between the auditor and the employees of his department is a matter that should receive favorable consideration, and steps should be taken whereby a representative from every department of the corporation should be present and discussions entered into upon such subjects as will advance knowledge and solidarity, thus automatically upbuilding the organization and creating a spirit of harmony. A complete record of the proceedings of each conference should be kept and a copy sent to the head of each department.

Conferences will prove to be an educational feature and a very valuable asset to the company adopting them, as they tend to uniformity of method and added interest in the company's affairs.

There are arising from time to time questions of importance which, after conference, are handled in a manner entirely different from the way they would have been handled if they had been left to the judgment of only one person.

It is very important that all employees of the accounting department familiarize themselves with the method of gathering the information forming the basis of entries and the statistics compiled for the executive officers.

The accounting department of to-day needs men of trained judgment to cope with the problems that are presenting themselves daily. They are frequently called upon by financial and other interests to compile figures and data relating to the physical condition of properties, to be used for different purposes, such as increase of capital, taxation and rate questions, etc., also to gage earning power and to forecast income returns, and in order to be fully conversant with all the details it is highly important that they be familiar with the methods pursued by every department in order that better and quicker results may be obtained.

This department is not looked upon at the present time as merely a bookkeeping department, but as a department of valuable research; and more—it has become one of the essentials of general management by detecting inefficiencies and pointing out opportunities for increased returns.

It is essential that the classification of accounts have careful thought and study, and in addition the accounting bulletins published by the Interstate Commerce Commission

giving decisions upon questions raised under the classifications should be read by every accountant.

A very important subject for conference, which would promote a great deal of discussion, is that of overhead charges. Accountants do not know how soon they will be called upon to show the cost and value in every detail of their properties. Are we ready? Are we prepared to show all the elements of overhead charges? Do our entries describe all charges to capital with sufficient detail fully to identify any particular unit or its component parts?

#### REPORT OF COMMITTEE ON OVERHEAD CHARGES\*

BY P. S. YOUNG, CHAIRMAN; EDWIN GRUHL AND A. L. LINN, JR.

The subject of overhead charges on traction appraisals has been discussed before the convention of 1911 and 1912. Its reference to a committee of the Accountants' Association late this year follows a demand which has been made from time to time that accountants furnish authoritative data on overhead charges for appraisers.

Your committee wishes to emphasize the large differences of opinion which exist, not only as to which items overhead charges comprise, but as to the amounts assignable to each individual item.

Your committee has, for this purpose, prepared some tabulations of important street railway appraisals, by courts, commissions, etc., and has endeavored to show, in so far as the information was accessible, the comparative amounts allowed for the various items under the head of overhead charges. The difficulties in the way of such a comparison are considerable because of the various methods of handling the subject under the different appraisals.

##### APPRAISAL OF CHICAGO SURFACE RAILWAYS, 1906

For legal expenses, interest during construction, brokerage and contingencies 10 per cent was added to the estimated inventory cost of reproduction.

For organization, engineering and incidentals 15 per cent was added to the estimated inventory cost of reproduction of track, electric power distribution system and buildings; 10 per cent to estimated inventory cost of reproduction of power plants, and 5 per cent to estimated inventory cost of reproduction of cars and car equipment.

The total overhead charges were \$4,259,190, or 21.7 per cent on the inventory cost in the Chicago City Railway appraisal.

##### APPRAISAL OF CHICAGO CONSOLIDATED TRACTION COMPANY, 1910

In this valuation 15 per cent was added as provided for by the 1907 ordinances for new capital investment. The other overhead charges remained the same as in the 1906 appraisal, with the exception of an allowance of 5 per cent for legal expense, interest during construction and contingencies, while in the 1906 appraisal there was an allowance of 10 per cent for the same items and brokerage.

The total overhead charges were \$1,971,434, or 38.4 per cent on the inventory cost.

##### CLEVELAND STREET RAILWAY APPRAISAL, 1909

Judge Tayler allowed as specific overhead charge applicable to track, 10 per cent; to pavement, 3 per cent; to cars, land, buildings, overhead construction, return circuit, power stations, storage batteries, miscellaneous rolling stock and equipment, 5 per cent, and, to the other items, nothing specific was applied to them, as, for instance, shop stores, auditors' stores and bookkeeping credits.

For financing, engineering, legal expenses, organization, administration, insurance, including accident insurance, superintendence, interest during construction, delays not covered by the specific allowances, consents, litigation with

\*Abstract of paper read before the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 13 to 17, 1913.

\*Abstract of report presented before the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 13 to 17, 1913.

property owners, incidentals and contingencies not applicable to specific items, 15 per cent was allowed.

The total overhead charges were \$3,178,305, or 22.18 per cent.

The above valuation was less depreciation. In the Chicago cases mentioned the depreciation was also determined and the overhead charges were depreciated to the same degree as the other depreciable property, so that the percentage allowance made for overhead charges remains the same.

#### APPRAISALS OF MASSACHUSETTS STREET RAILWAYS

This was a report to the joint board on the validation of assets and liabilities of the various street railways owned by the New York, New Haven & Hartford, by George F. Swain, engineer in charge, as follows:

Engineering, 5 per cent of physical cost of reproduction; contingencies, 5 per cent of physical cost of reproduction; legal and general expenses, 3 per cent of physical cost of reproduction; total of the above, 13 per cent of physical cost of reproduction; interest, 6 per cent of physical cost of reproduction plus the above, or about 7 per cent of physical cost of reproduction; commissions for marketing securities, 3 per cent of physical cost of reproduction; total, about 23 per cent of physical cost of reproduction.

#### APPRAISAL OF PUGET SOUND ELECTRIC RAILWAY BY WASHINGTON RAILROAD COMMISSION

The total overhead charges were \$499,517, equal to 15.7 per cent on the inventory cost. In this appraisal the reproduction cost less depreciation was also determined but the overhead charges were not depreciated. The overhead charges amounted to 19 per cent on the inventory reproduction cost less depreciation.

#### APPRAISAL OF CONEY ISLAND & BROOKLYN RAILROAD BY NEW YORK PUBLIC SERVICE COMMISSION, FIRST DISTRICT

For general contractor's profit 10 per cent was added to estimated inventory cost of reproduction, except those values relating to "miscellaneous stock, fixtures, etc.," and "real estate." In addition 15 per cent was added to cover "engineering, incidentals and organization." The total allowance was \$5,676,895, or 24.81 per cent on the inventory cost.

In this appraisal the reproduction cost less depreciation was also determined and the overhead charges were depreciated to the same degree as other depreciable property so that the percentage allowance for overhead charges remains the same.

#### APPRAISAL OF TRACTION PROPERTIES, RAILROAD COMMISSION OF WISCONSIN

In all instances the amount of overhead charges has been placed at 12 per cent of the detailed valuation of physical property. Commissioner Halford Erickson, in describing the present practice of the Railroad Commission of Wisconsin before the Western Society of Engineers, in May, 1913, said: "As to overhead expenses, that is a matter that is not quite understood. The Wisconsin commission in the case of smaller utilities allows 12 per cent. In the case of larger utilities, where there is a great deal of difficult city work to do, crossing rivers and work of that kind, which often involves considerable risk, we allow 15 per cent. That, however, is the apparent figure, which is visible in determining the unit price upon which to compute the cost of the various elements. We nearly always allow 10 per cent for contractors' profit. That is an element which entered into the unit prices or cost as a whole and is not given separately. However, if that were taken out of the unit prices where it appears and added to the 12 per cent, that figure would be considerably increased. It might not add 10 per cent to that figure but it probably would add 7 per cent to 9 per cent."

Your committee has endeavored to gather some data as to the percentage of overhead charges to the cost of construction of traction properties actually occurring in prac-

tice. Close analysis of these cases, however, discloses that the results are not comparable with the estimates cited above, because of omissions, differences in classification and variations in accounting practice.

#### DIFFICULTIES OF THE ACCOUNTANT

The difficulties confronting the accountant in furnishing authoritative information of service to the appraiser may be summarized as follows:

A. Basis of the appraisal. Many valuations proceed upon the assumption that the property appraised is constructed *de novo* at the time of the appraisal. Books of account, generally speaking, do not disclose so-called present-day values but costs. The construction period in practice is an interrupted process; the appraiser in this instance assumes a continuous period of construction. The overhead charges in either case will be essentially different. Where the valuation is made for the purpose of determining in the absence of record what the investment in the property has aggregated, book records of property built up by piecemeal construction where properly analyzed will supply the desired information. Under the assumption of reproduction in one process, only records of properties constructed as of whole or large extensions would supply the comparable data.

B. Difference in definition of overhead charges as usually understood by appraisers and accountants. In general, as will be noted from the examples cited, the appraiser's overhead charge takes the form of such a percentage addition to the specific or detailed valuations as is believed necessary to represent the complete value of the property. Considerable confusion evidently exists as to the items comprising this percentage, and the size will be gaged by the detail with which the appraisal has been made. The accountant usually defines overhead charges as containing those items of cost of property which cannot be definitely localized to specific construction account and represent rather undistributed charges.

Where the specific valuation of the appraiser consists merely of the pricing of an inventory, overhead charges must contain a larger class of the items of "road and equipment" than those usually recognized by accountants, since a very considerable amount of capital expenditures are specifically charged in accordance with the classification of accounts which the appraiser is certain to overlook.

The official classification of "expenditures for road and equipment of electric railways" is responsible for this restricted definition. Specific construction not only contains labor and material comprising the unit cost of appraiser, but as recently defined by the Interstate Commerce Commission:

"Cost of labor includes not only wages, salaries and fees paid employers, but also the personal expenses of each employer when borne by the company. Cost of material and supplies consumed in construction is the cost at the places where they enter into construction, including cost of transportation and inspection when specifically assignable. If such materials and supplies are passed through storehouses, their cost entered on the account may include a suitable proportion of store expense."

Moreover, such items as law expenses, injuries and damages, taxes, organization expenses, salaries and expenses of executive and general officers of a road under construction and of clerks in general offices engaged in construction accounts or work, rents and repair of general offices, furniture and office expense and other items of a special or incidental nature are only chargeable to the general or overhead charge accounts when they cannot be directly charged to the account for which incurred.

To obtain the sum total of these overhead charges directly classified under the various road and equipment accounts would necessitate a detailed re-analysis of the detailed charges.

C. Interest during construction. The appraiser is inter-

ested in the total money tied up before operation begins. The classification of accounts recognizes only money cost or interest on loans or notes borrowed for construction purposes, and not interest lost through the use of working capital. It should be pointed out, therefore, that in no instance will the account interest during construction, as appearing in the company's statements, represent the overhead charge sought by the appraiser.

D. Contract work. Construction undertaken by contract comprises items of overhead charges, such as superintendence and engineering, insurance, legal expenses, etc., which are not readily segregated from the sum total of the price paid. In regular practice, therefore, such charges become a part of specific construction.

E. Omissions in inventory. The item of contingencies, comprising omissions made by the appraiser, while a substantial part of the overhead charges as recognized in valuations, is not, of course, a part of the overhead charges appearing upon the books of account.

#### CLASSIFICATION OF OVERHEAD CHARGES

Your committee believes that because of the obvious danger of omission of numerous incidental items comprising the cost and value of property by appraisers a comprehensive classification is desirable by the elements comprising overhead charges.

Such a classification should comprise the items shown in the accompanying table.

#### I. Promotion.

A. Initial engineering expense.—Includes expenses incident to preliminary surveys and studies of location and tentative completion of maps, profiles, plans, specifications, estimates, etc.

B. Initial legal expense.—Includes expenses incident to franchises, consents, permits, easements, releases, options, etc.

C. Initial financial expense.—Includes expense incident to prospectuses, subscription underwriters' plans, etc.

#### II. Organization.

A. Incorporation expense.—Includes fees and expenses incident to incorporation, certificate of public necessity and convenience, etc.

B. Underwriting expense.—Includes cost of issues of securities, payments to trustees, discount and expenses incurred in marketing securities, etc.

#### III. Construction.

A. Engineering.—Includes supervision of work and completion of specifications, etc.

B. Administration.—Includes accounting and general office expense, inspectors, watchmen, timekeepers, paymasters, etc.

C. Stores expense.—Includes expenses incident to receipt, inspection, care and disbursement of material and supplies, adjustment of average and shortage, etc.

D. Utility expenses.—Includes stable, garage and transportation expense.

E. Labor expense.—Includes expenses incident to the employment, transportation, housing and maintenance of employees. Includes lay-off for sickness and weather on pay.

F. Contractors' expense.—Includes profit to contractors and sub-contractors for supervision and completion of specific construction work.

G. Equipment and tools.—Includes expenses of machinery, appliances and tools used in construction and shop expense incident thereto.

H. Preliminary construction.—Includes expense of experimental work and protective construction.

I. Injuries and damages during construction.—Includes costs of employers' liability and public liability.

J. Legal expenses during construction.—Includes legal expenses incident to contingencies of construction.

K. Taxes during construction.—Includes taxes on work in process of construction.

L. Insurance during construction.—Includes cost of fire, flood and emergency protection during construction.

M. Interest during construction.—Includes interest lost upon money expended prior to operation.

N. Unforeseen contingencies during construction.—Includes unexpected difficulties arising during course of construction occasioning a departure of estimated and actual costs.

#### IV. Appraisers' omissions (estimated additional percentage to detailed appraisal of physical properties).

A. Omissions in inventory.—Includes allowance for items omitted in detailed schedules.

B. Omissions in unit price.—Includes allowance for margin of safety to cover unusual variations in unit prices.

C. Piecemeal construction.—Includes allowance for increased cost of piecemeal over continuous construction.

D. Continuity factor.—Includes allowance upon specific items such as land and right-of-way for increased value due to compact development.

#### V. Intangible values.

A. Going concern value.—Includes the cost or value of adapting the physical plant to its business and the cost or value of providing an established business.

B. Working capital.—Includes working assets necessary to operating and construction.

C. Franchise value.—Includes cost or value of unexpired franchises, licenses, permits, etc.

D. Sundry.—Includes cost or value of rights, leases, options, contracts, agreements, etc.

Your committee suggests that, in view of the great importance of the question of fair valuation of traction prop-

erty, memorandum records be prepared by member companies covering overhead charges classified as above upon new construction work, and that where data are available past records be analyzed for similar information. Because of present provisions of the official classification of accounts, such detailed records cannot practically be made a permanent part of the accounting procedure.

We recommend that the compilation of such records be made a matter of further investigation by the association.

### REPORT OF THE COMMITTEE TO DEVELOP UNIFORM DEFINITIONS\*

M. C. BRUSH, CHAIRMAN; W. C. CALLAGHAN, A. BENHAM, L. C. BRADLEY, W. M. WEATHERWAX, T. C. CHERRY, FREDERIC NICHOLAS.

This committee was appointed in accordance with the belief of the executive committee that there was a distinct need for uniformity in the terms in use in the transportation departments. Under the instructions received from the executive committee it was understood to be the province of the committee, first, to compile a list of the terms in general use or which the committee believes should be in general use to describe simply and clearly certain of the fundamental practices and names having to do with the transportation department.

After the committee compiled a list of terms, it devoted the time which was given to the subject to the completion of the definitions which it submits with this report. A number of meetings have been held by the committee or by some of its members, but in view of the detailed nature of the work required to define the terms no record of these has been kept. At some of the conferences little progress was made because the discussion between the members indicated an absence of uniformity in the general use of terms which made further study of the subject necessary.

The committee found that it would not be possible, with the time that members could give to the work, to define all of the terms in use in the transportation department. In its consideration of the work it endeavored to avoid the study of terms which have been defined by other committees of the association or which are likely to be before other committees of the association or the allied associations in the future.

It will be understood from the statement of the committee that the members do not by any means consider that the work which properly belongs to such a committee is completed when this report is rendered. The work can be carried much further and in the judgment of the committee that should be done. The work before such a committee, if one is appointed to continue the study during the coming year, should proceed along the same general lines that this committee has followed. The members of the new committee could take up any terms which this committee has not attempted to include in the scope of this report, and could also make any revisions that were found necessary in the initial report on this subject.

There can be no room for serious argument against the advantage of uniformity in definitions of this character. Uniformity will promote a better understanding between trainmen and the officials with whom they are in touch in reference to the matters with which they deal. It will tend to do away with the looseness in use of terms which has existed in the past. Where uniformity prevails it will make simpler the task of the employee or official who is transferred from one company to another. That uniform terms may be recognized and adopted by the principal companies is the earnest desire of the members of the committee.

\*Abstract of report read before the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 13-17, 1913.

## TRANSPORTATION DEFINITIONS

Station master.—An official or employee of the transportation department in charge of a carhouse and of the trainmen and other transportation employees reporting there.

Reporting time.—Time fixed for trainmen to report at the carhouse in order to be ready to take their car out on schedule time.

Bulletin board.—Used for posting general or special orders issued by officials of the transportation department for the information of trainmen.

Defect report.—Form used by trainmen for report when cars or equipment need repairs.

Miss.—A failure of a trainman to report on time.

Safety stop.—A stop prescribed by rules or ordinance, as before crossing a railroad, drawbridge, etc.

Passenger stop.—A point designated by street intersection or sign as a regular place where the car stops on signal for passengers to board or alight.

Crossover.—Special track over which cars may pass from one track to a parallel track.

Designation sign.—Sign on car indicating route and terminal.

Route sign.—Sign on car indicating route to be followed by car.

Show-up time.—Time fixed for trainmen to report at carhouse.

Tripper.—A car which makes one or a limited number of trips during the rush period to meet emergency demands.

General and special orders.—Notices relating to matters of operation, discipline, etc., issued by officials of the transportation department for the information of trainmen.

Assembly room.—Room in the carhouse where trainmen assemble before going on duty and again after completion of the day's work to prepare themselves, settle up, make reports, or perform other duties that may be required in the preparation for or the completion of the day's work.

Regular trainman.—A motorman or conductor who has a regular run.

Extra trainman.—A motorman or conductor performing extra work or substituting for a regular trainman.

Trip sheet.—A record of fares and transfers collected and transfers issued on each half trip of a day's run. It is turned in with collections at the end of the day's work.

Directory.—A record posted at a carhouse containing numbers of runs and names of regular trainmen assigned thereto, subject to change only when runs are revised or regular men leave the service.

Extra working list.—A record posted at a carhouse containing numbers of runs and names of regular men off duty and names of extra trainmen assigned thereto, also reporting time of extra trainmen not assigned to runs. This record is subject to change daily.

Seniority list.—A list of names of trainmen, graded according to their length of service and indicating the order in which they may pick runs, also basis for wage scale.

Run.—A set of car trips designated by a number on the timetable and assigned to or selected by a crew as a day's work.

Run number.—A distinguishing number given to each set of car trips constituting a run.

Regular car.—Car used by trainmen with a regular run.

Extra car.—The car used as a tripper during rush hours or when some emergency need exists for service, and usually operated by extra trainmen.

Line.—Used with a distinguishing title, as Northwest line or State Street line, to indicate the route and terminal.

Running time.—The time allowed on the timetable for the operation of a car between given points.

Time point.—Place indicated on a timetable which a car should pass at a stated time.

Terminal.—End of a line or the place at which a half trip of a car is completed.

Terminal time.—Surplus or allowed time for trainmen to answer calls of nature and prepare car for next trip. Meal time is not included.

Fall-back time.—The same as terminal time except that an additional time is allowed for meals.

Relief.—A trainman who by pre-arrangement or in an emergency relieves a trainman from duty.

Relief point.—The designated point on the line at which a crew is relieved for lunch or upon completion of the day's work.

Turn-back.—A practice, due to pre-arrangement or emergency, by which a car is not operated to its regular terminal.

Headway.—Period of time between cars, allowed on the timetable or fixed by a designated transportation department employee, on a given line or lines operating over the same route.

Leader.—The preceding car on the same line.

Follower.—The following car on the same line.

Platform time.—Actual time spent by trainmen on car during performance of duty.

Allowed time.—Time on which wages of trainmen are based, composed of platform time, terminal time, fall-back and additional period for reporting, etc.

Accident report.—Form used for trainmen's report of accident or other unusual occurrence, affecting passengers or other persons.

## MEMORANDUM FROM THE COMMITTEE ON VARIABLE RATES OF FARE\*

M. R. BOYLAN, CHAIRMAN; C. H. ALLEN, W. B. BROCKWAY AND R. J. CLARK

This committee has had several meetings and, as reported to the 1912 convention, attempted to collect data from European operating companies as those most likely to throw light upon the subject in hand because of the prevalence of zone fares as against the flat-rate American standard. The committee found the companies on the other side most ready to co-operate in providing information, much of which, however, is furnished in foreign languages, necessitating considerable translation work. It has not been possible for the committee to get together and devote to the material in hand the time that would be required to study intelligently the plans effective in Europe and to develop from this conclusions that would be useful to our members or to the committee which had in hand for the American Association this question of rates and fares. In the judgment of your committee this work requires so much time and such close attention that it cannot to advantage be handled by a committee which can give only periodical attention at meetings of short duration.

The American Association, which suggested the formation of this committee to work in conjunction with what is now the committee on the cost of passenger transportation service, is now planning to institute what is tentatively described as the Bureau of Fare Research. It is expected that this plan will be approved by the 1913 convention and that it will come into existence immediately thereafter. The association will appoint to have charge of the work of this bureau some one who will give the study of fares in general his whole time, with such assistance as may be required properly to carry on the work. The committee of the American Association will therefore be relieved of performing work of an investigatory or analytical character, all details being turned into the bureau and the committee exercising jurisdiction and general supervision over the same.

Therefore, it is the thought of your committee that the

\*Presented before the American Electric Railway Accountants' Association, at Atlantic City, N. J., Oct. 13-17, 1913.





# Proceedings of Accountants' Association on Friday

The Meeting of the American Electric Railway Accountants' Association at the Atlantic City Convention Terminated on Oct. 17 with Discussions on a Number of Different Papers and the Election of Officers for the Ensuing Year—An Account of the Proceedings Is Published.

The concluding session of the Accountants' Association was called to order at 9:45 o'clock yesterday morning by M. W. Glover, the first vice-president.

M. R. Boylan, the secretary, read the report of the committee on co-operating with the United States Bureau of the Census, of which A. L. Linn, Jr., New York, was chairman. The report said that in accordance with the instructions of the executive committee, the committee appointed to co-operate with the Bureau of the Census in the preliminary work regarding the United States census of 1912 had several meetings. It communicated with W. M. Steuart, chief statistician for manufactures of the Census Bureau, and its members also discussed the work. The committee held several meetings with Mr. Steuart and discussed the form of the questions which were embodied in the blank reports sent to all of the electric railway companies in the country. The committee tried to render what service it could to the end that the forms of report might yield the most satisfactory results in accuracy and completeness of the census.

As the completed totals of the census report are invaluable to the electric railway industry and can be obtained in no other way than through this bureau of the government, the work assigned to the committee constituted an important part of the activities of the association during the year. The committee wished to express its appreciation of the co-operation which it received from Mr. Steuart and the Census Bureau.

Owing to the large amount of business to be transacted at the meeting the report of the committee on inter-line accounting was read by title. The report was accepted.

A paper on "Accounting Department Conferences," by F. B. Lasher, Republic Railway & Light Company, was read by the secretary on account of the inability of Mr. Lasher to be present.

George G. Whitney, Washington Railway & Electric Company, believed thoroughly in the value of conferences. They produced harmony and straightened out matters that could not be arranged satisfactorily in any other way. In the course of his discussion Mr. Whitney recommended the appointment of a committee to study the use of mechanical devices to promote efficiency in the accounting department.

A vote of thanks to Mr. Lasher was passed.

P. S. Young, Public Service Corporation of New Jersey, chairman of the committee on overhead charges, read the report of that committee. An abstract is published elsewhere in this issue.

Chairman Glover said it was important to remember that the accounting department was the only one that could get the necessary information on overhead charges and present it in the best way.

W. H. Forse, Jr., Union Traction Company of Indiana, said that probably some items from the report on overhead charges could be embodied in the standard classification of accounts, which was under revision.

C. N. Duffy, Milwaukee Electric Railway & Light Company, thought that the amount by which a company failed to earn a sufficient return on the investment was part of the going cost and should not be complicated with overhead charges.

Mr. Young said that the schedule of overhead charges was drawn up primarily to give an outline under which these charges could be separated and the total ascertained for any piece of construction. For the purpose of obtaining data regarding overhead charges accountants could make analyses under the headings recommended by the committee.

W. B. Brockway, Ford, Bacon & Davis, New York, said he wanted to emphasize the recommendation of the committee that accountants should prepare analyses of overhead charges in connection with construction accounts. It had been his duty to take part in appraisals and he had found it exceedingly difficult to get information on overhead charges. That was due to the destruction of old records in some cases and to the incompleteness of records when they were found in other cases. He doubted if many companies could go into old records and produce anything approximating the classification of the committee, but believed that such a system should be followed from this time forward. By the use of sub-accounts and otherwise all of the necessary information could be prepared with the present classification.

Mr. Young said that interest during construction, as defined by the committee, was meant to include both interest paid out and interest on money subscribed upon which no return was made to the investor. The overhead charges should appear in the records, but Mr. Young would not say they should be written up and shown in the general books; they should be carried in memorandum accounts of cost of construction.

Mr. Duffy said that interest during construction was an intangible capital expenditure. "Interest loss," as used in the report of the committee, he understood to mean that which the investor failed to get before operation of the property was started. Interest was composed of the charges on both bonds and stock.

On motion of Mr. Duffy the report was accepted and the committee continued.

Mr. Boylan read the report of the committee on best methods of collecting and accounting for variable rates of fare, of which he was chairman. An abstract of this report is published elsewhere.

On motion of Mr. Forse the committee was thanked for its work and was continued until the Bureau of Fare Research should be established by the American Association.

R. J. Clark, Metropolitan Street Railway of Kansas City, described some of his experiences on a recent trip to Europe.

A paper by Edwin Gruhl, Milwaukee Electric Railway & Light Company, on "The Cost of Carrying a Passenger, and Proposed Work of the Bureau of Fare Research," was read by Mr. Duffy. An abstract of the paper is published elsewhere.

A vote of thanks to Mr. Gruhl for the paper was passed.

W. H. Forse, Jr., Union Traction Company of Indiana, read a paper on "Sinking Funds." An abstract of this paper was published in yesterday's issue.

In opening the discussion Henry J. Davies, Cleveland Railway, said that the bonds of that company had no sinking fund provision. It was required by the mortgage to maintain the property in good condition. It was allowed

to issue bonds only to 50 per cent of the cost of the property securing them. This was due to the construction of the law and the franchise. The view of some of those who framed the ordinance was that it was desirable that the stock be held in Cleveland and the issue of stock rather than bonds to meet the cost of financing was favored.

C. L. S. Tingley, American Railways Company, said that a bond carrying a sinking fund netted a company more money than one without that feature.

E. D. Gault, Mahoning & Shenango Railway & Light Company, said that some mortgages provided that sinking fund payments should be made out of net earnings.

Mr. Brockway said it seemed clear to him that the sinking fund should not be shown in the income account. His examination of mortgages had shown that those which provided for payments out of net earnings or income were rare.

Mr. Duffy said that the sinking fund charge had nothing to do with the income account. If he built a house costing \$5,000 and borrowed that sum, agreeing to pay it back at the rate of \$500 a year for ten years, the lender was not interested in the question of where he got the money for the payments. When he made the first payment of \$500 it would not be correct to continue to carry the \$5,000 liability on his books and then to take on another liability of \$500.

Mr. Duffy read a letter on the subject from J. D. Mortimer, president Milwaukee Electric Railway & Light Company. Mr. Mortimer said that sinking funds were only a means of retiring capital obligations evidenced by bonds. Their intended purposes were various but their practical result was the same. Even where a mortgage provided that the sinking fund should be paid from net income, Mr. Mortimer was not of the opinion that it was incumbent upon the corporation or the mortgagor to show by its accounts that such sinking funds have been provided from income.

Sinking funds now had no place in mortgages on public utility properties, Mr. Mortimer thought. They found their way into the provisions of older mortgages on the assumption that the mortgage would soon be closed, permitting the issue of no further bonds, and that the property would depreciate in value. In view of the very rapid growth of all classes of public utility properties it had become evident to conservative bankers that the imposition of a sinking fund was burdensome to the mortgagor and that the maintenance of the physical property should be provided for by some other means. This had led to the development in many recent mortgages of the so-called improvement fund, which was mentioned in the paper read by A. M. Harris before the American Association.

The improvement fund partook of the properties of the sinking fund except that it might be used against the construction of additional property for which no additional bonds might be certified by the trustee of the mortgage. It was calculated in similar manner to the sinking fund and might or might not be a charge against income. It was directly designed to assist in the preservation of property and in this regard was much more specific than the old form of sinking fund.

The personal view of Mr. Mortimer, which was concurred in by many conservative bankers and other people familiar with the finances of public utilities, was to the effect that the preferable way of providing for the maintenance and depreciation of property was to make a specific allotment each year, measured either as percentage of value of physical property or as a percentage of gross earnings, which should be set aside for maintenance and depreciation. The balance remaining in this fund should be used either for making good depreciation or for the construction of new property against which no bonds should be issued. The improvement fund was a compromise between this latter method and the sinking fund method.

Mr. Forse said he felt strongly that the sinking fund was not a charge against income.

Mr. Gault presented the report of the committee on resolutions.

Mr. Boylan read a letter from W. M. Steuart, chief statistician of manufactures, United States Bureau of the Census, as follows:

"The committee appointed at the Chicago convention to confer with the Bureau of the Census in regard to the census of electric railways was of great assistance to us. Its recommendations resulted in simplifying the schedule used to collect the data, and at the same time it recommended the inclusion of some inquiries which I am satisfied have resulted in the collection of statistics that are of interest to all persons engaged in the industry.

"The canvass for this census was started during last April. It covers the operations of all roads for the year 1912. The field work is now approaching completion, and I am pleased to report that returns have been received from practically all railways. I regret very much, however, that such a large percentage of these reports were defective. We found it necessary to return at least 80 per cent of the schedules for some additional information. We have been very active in our correspondence to correct the reports, and I hope to begin the tabulation on Nov. 1. In that event the statistics should be ready for publication during the first part of 1914. This will be considerably in advance of the publication of the statistics for prior censuses, and I feel it is due largely to the recommendations of your committee, and to the greater interest on the part of the railway companies in work of this character.

"I am especially anxious to have the committee appointed at the last convention continued until the census report is printed and distributed. There are many phases of the census reports on railways which I think should be considered by the association, either through its committee or at its conventions. For instance, the reports heretofore published have grouped the statistics for the companies according to their size, the size being determined by the gross annual income from railway service. The statistics have also been grouped according to the kind of system, namely, whether elevated, surface, or subway; according to the character of the service, whether urban or inter-urban, and according to commercial lighting relations and the period of operation. It is possible that some of these groupings are not necessary, and it may be that the committee would recommend that they be abandoned and some other grouping substituted.

"The office expends a considerable sum for the collection and preparation of this report, and I am very anxious that it contain information which is of greatest interest to the people engaged in the industry. I shall, therefore, be greatly obliged if the association will have the committee extended, and arrangements made to have another meeting with me, for the purpose of discussing the class of statistics that shall be presented in the forthcoming report."

In accordance with the suggestion of Mr. Steuart the committee was continued.

Mr. Tingley presented the report of the committee on nominations, which was adopted, as follows: President, M. W. Glover, Mobile Light & Railroad Company; first vice-president, T. P. Kilfoyle, Cleveland Railway; second vice-president, A. H. Kayser, San Diego Electric Railway; third vice-president, C. S. Mitchell, Pittsburgh Railways; secretary and treasurer, M. R. Boylan, Public Service Railway, Newark, N. J.; executive committee, W. G. Nicholson, Omaha & Council Bluffs Street Railway; Walter Shroyer, Union Traction Company of Indiana; H. D. Vickers, Roanoke Railway & Electric Company; Herbert A. Gidney, Barre & Montpelier Traction Company.

Those of the newly elected officers who were present were called upon and responded briefly.

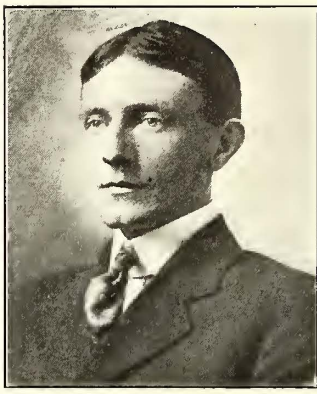
The association then adjourned.

## THE NEW PRESIDENTS

The elections which were held at the concluding sessions of the four affiliated organizations of the American Electric Railway Association resulted in the selection of four new presidents whose careers have been characterized by their activity in association affairs. However, for the benefit of those who are not familiar with the public



M. W. Glover



J. H. Hanna

lives of the new officers a series of biographical sketches of them are given herewith.

M. W. Glover, the new president of the Accountants' Association, has been during the past year the first vice-president of that body. He began his railroad career on Dec. 1, 1899, in the local freight office of the Southern Carolina Railway, which at that time was in the hands of a receiver. He was subsequently transferred to the auditor's office, where he handled freight, passenger and other accounts. The South Carolina & Georgia Railroad succeeded to the property of the Southern Carolina Railroad, and the receivership was terminated some time prior to July, 1895, when Mr. Glover was appointed traveling auditor of the new company.

In May, 1899, the South Carolina & Georgia Railroad was absorbed by the Southern Railway and Mr. Glover was retained as traveling auditor, continuing in that capacity until June, 1901, when he was advanced to the position of chief traveling auditor of the Southern Railway. In June, 1903, he resigned this position to become chief clerk to the auditor of the Atlanta & West Point Railroad and the Western Railway of Alabama, and he continued in that position until July 1, 1906, when he became auditor of the lines which compose the Ohio Electric Railway system.

Mr. Glover served as auditor of the Ohio Electric Railway until Oct. 31, 1909, and then was appointed assistant to the traffic manager of the Illinois Traction System. He remained in this capacity until Jan. 1, 1910, and then assumed his present position as secretary and auditor of the Mobile Light & Railroad Company. Mr. Glover has been president of the Central Electric Accounting Conference ever since the formation of that organization in 1907.

W. F. Weh, who has been president of the Claims Association, has a history of remarkable brevity notwithstanding the fact that, for more than twenty years he has been engaged in railroad work. He began his railroad career on the Pennsylvania system in the early nineties, when he was still in his "teens," remaining with that company until about 1893, when he entered the service of the Cleveland Electric Railway Company, which was afterward consolidated with other lines to form the present system, the Cleveland Railway Company. Mr. Weh during his entire service with this property has been in the claim department, and for the last fourteen years he has been at its head.

D. A. Hegarty, the new president of the Transportation

& Traffic Association, was born in Philadelphia and was educated at the University of Pennsylvania. His first railroad experience was in the engineering department of the Pennsylvania Railroad, by which he was engaged as assistant engineer on construction and maintenance work for six years. After leaving the Pennsylvania Railroad, Mr. Hegarty entered the electric railway field with the late A. Langstaff Johnson as engineer in charge of the Richmond (Va.) Electric Railway, the first commercially successful electric road in America. Continuing his connection with Mr. Johnson, Mr. Hegarty assisted in the construction of numerous railway, light and power companies in different parts of the country, among them the Hestonville, Mantua & Fairmount Passenger Railway, Philadelphia. Subsequently he became general manager and chief engineer of this company, in which capacity he continued until the property was taken over by the Union Traction Company. Mr. Hegarty next became chief engineer of the Norfolk (Va.) Railway, but shortly afterward resigned to accept the position of superintendent of the Railways Company General, a holding and operating company. Mr. Hegarty remained in this position until 1908, when he joined the operating forces of Ford, Bacon & Davis as general manager and treasurer of the Little Rock Railway & Electric Company. While there Mr. Hegarty was elected president of the Arkansas Association of Public Utility Operators. Three years later he resigned from the Little Rock Railway & Electric Company to become general manager of the railway and lighting departments of the New Orleans Railway & Light Company.

J. H. Hanna, who was elected president of the Engineering Association yesterday, had been called from Atlantic City to Washington by important business early in the week, but he was notified of his election by telephone, and a telegram of acceptance was received from him and read at yesterday's meeting.

Mr. Hanna was born in Henderson, Ky., in 1871, where he prepared, in the public schools, for Princeton University. At Princeton he entered the engineering courses, graduating in 1892 with the degree of civil engineer, and immediately took up railroad construction. For two years after leaving college he remained in steam railroad engineering work and then entered the service of the Washington & Georgetown Railroad Company, predecessor of



William F. Weh



D. A. Hegarty

the present Capital Traction Company of Washington, D. C. In the next year he was appointed assistant superintendent, and four years later he became superintendent and assistant engineer of the same company, being appointed to his present position of chief engineer in charge of all construction and maintenance about five years ago.

Mr. Hanna is generally prominent in technical association affairs, being a member of the American Society of Civil Engineers and of the American Institute of Electrical Engineers as well as the American Electric Railway Asso-

ciation. He also is a past-president of the Washington Society of Engineers. In 1896 he married Miss Jane Soper, of Henderson, Ky., and he is a member of a number of clubs in Washington, including the Cosmos Club and the Columbia Country Club.

On Oct. 16, the new executive committee of the Manufacturers' Association held a meeting, as described in the *ELECTRIC RAILWAY JOURNAL* for yesterday, and elected Cornell S. Hawley as president.

Mr. Hawley has long been a prominent figure in electric railway manufacturing circles. He originally planned to practise law, and after receiving the degree of LL.B. from the Georgetown University law school and LL.M. from Columbian University (now George Washington University), was admitted to the bar of the District of Columbia and also of the State of New York. The opportunities in a commercial career, however, proved more attractive, and some twelve

years ago he took the Eastern sales agency of the Consolidated Car Heating Company, with headquarters in New York. After a service there of four years he was appointed manager of sales of the same company, then its vice-president and general manager, and, in 1911, president and treasurer. His wide knowledge of the electric railway business, exemplified by these various advancements, attracted the



Cornell S. Hawley

attention of Eastern capitalists, and in 1912 he was offered and accepted the office of president of the Laconia Car Company, with headquarters in Boston. He is a member of the Engineers' Club of New York and of the Engineers' Club of Boston. Mr. Hawley has always taken an active interest in the work of the American Electric Railway Manufacturers' Association, and it has been the beneficiary of his ability and experience. For two years he was a member of the finance committee and he also served as chairman of that body. For the last five years he has been a member of the executive committee, and during this time he has served as vice-president in charge of finance and vice-president in charge of entertainment.

## BIENNIAL MEETING OF THE GERMAN STREET & INTERURBAN RAILWAY ASSOCIATION

The fourteenth meeting of the Deutscher Strassenbahn- und Kleinbahn-Verwaltungen (German Street & Interurban Railway Managements) was held at Cologne on Sept. 3, 4 and 5 under the direction of Dr. Wussow, general director Great Berlin Street Railway. After the delegates had been welcomed by officers of the city, the chairman announced that arrangements had been made for closer co-operation with other German societies.

### RAIL CORRUGATION

Messrs. Busse, Berlin, and Petersen, Dortmund, representing committee B, reported on their experiments in rail corrugation. New rails laid under different conditions appeared to show that corrugation was due to non-homogeneity of structure because of chemical and physical differences as well as to temperature variations during rolling. A chemist named Klockemeyer had recently observed that the running surface of rails was decarbonized during the rolling process. In general, their experiments had confirmed the earlier observations that corrugations are formed even in new rails and that high rigid rails are more likely

to become corrugated than low elastic rails. The Göteborg system had decreased corrugation by slitting the web to increase the elasticity of the rail. At the request of Messrs. Busse and Petersen, the association voted \$6,250 for the continuation of the work.

### MISCELLANEOUS MATTERS

Committee C reported favorably on the use of metallic lamps for cars. The law concerning the responsibility for electrolysis, etc., was discussed by Dr. Kappe, of Berlin, the legal representative of the association. He showed that electric railway stations actually cause less trouble than other plants and for that reason alone ought not to be subjected to special penalties.

Mr. Schörling, Hanover, presented a paper on motor cars in which he recommended greater wheelbases than are now customary, trucks in place of the Continental style of axle, metal sills, double springs, mechanical ventilators for vestibuled cars and the installation of automatic couplers. The discussion on cars disclosed a sentiment for the standardization of car signs.

A paper on energy distribution by Mr. Buschbaum placed emphasis upon the advantages of the three-wire system. The author also pointed out the desirability of installing feeders large enough for future needs, especially on routes where feeders must be installed under asphalt.

A report on trackless trolleys was made by Mr. Nier, Dresden, and Dr. Eissig, Chemnitz. Mr. Nier believed that the best field for trackless trolleys would be for suburban and cross-country service if cheap current was available and also for excursion business where higher fares were permissible. Dr. Eissig believed that the trackless trolley would have a still wider field. Mr. Otto, Berlin, said that the great technical improvements in buses had made them an important competitor of trackless trolleys and would probably limit the field of the latter more than ever.

Director Bussebaum, Carlsruhe, reported on the use of stone paving in asphalt streets. The installation of rails on concrete foundation always led to bad results not only because of noise but also through the cracking of the asphalt and consequent bad drainage. It was gradually being realized, especially by municipalities which operated street railways, that the only way to overcome drainage trouble was to place a zone of stone paving between and alongside the rails.

Director Arnold, Herten, presented a report on anti-friction bearings for railway motors and journal boxes. Roller bearings, he said, were considered better than ball bearings, but their high price prevented their general introduction.

Mr. Paap, Flensburg, presented a report on automatic couplers. In this he gave special attention to the development of the Janney coupler as used in the United States and the Scharfenberg coupler as used in Germany.

Director Stahl, Düsseldorf, discussed street railway tickets and accounting. In addition to automatic machines which issue a few types of completely printed tickets, other apparatus had been invented whereby the conductor could print any combination required by the passenger. A machine of the latter character, as invented by Traffic Inspector Krüger of the Cologne Tramways, also embodied mechanism for adding the total sales.

### ENTERTAINMENT

The afternoons of the convention were devoted to the inspection of the equipment of the Cologne Tramways and of several industrial establishments in and around Cologne. During the evenings the delegates were the guests of the municipality. The next meeting of the association will be held in 1915 at Düsseldorf.

It is reported that work on the Granada-Maracena tramway, Spain, will begin at once.

# News of Electric Railways

## Arbitration Proceedings Almost Completed in Detroit

An agreement was reached in the arbitration proceedings between the Detroit United Railway and its men on Oct. 8 to the effect that the remainder of the evidence should be submitted on this and the following day and that arguments should be presented to the board on Oct. 14, this closing the hearings before the board.

The afternoon and evening of Oct. 8 were spent in hearing testimony from the division superintendents of the company. They declared that the men had made no complaints to them of the hours required of them or of the wages they received. W. D. Mahon at one time demanded that the men be brought in, declaring that there is nothing for the board to consider if this is true. Chairman Naylor, however, declared that there must have been complaints or this arbitration hearing would not have been called.

Leo Reynolds, one of the division superintendents, stated that he had talked to a number of the 400 men under his supervision and that not one of them had made a complaint. Mr. Mahon requested the names of the men with whom Mr. Reynolds conversed, but General Manager Brooks refused to furnish them.

General Superintendent Harry Bullen, called to the stand, said that there is an unwritten law under which it is understood that the cardinal principle underlying the success of the company is harmony from the switchboy to the president. The company insists on co-operation among its employees in order that proper service may be furnished the 1,000,000 people depending upon its lines for transportation. Mr. Bullen said that he knew personally two-thirds of the men employed as motormen and conductors and that they come to him for personal and financial advice, but not with complaints.

The guide sheet to a schedule, furnished by the company and revised by Thomas Grant, formerly superintendent of one of the lines before the Detroit United Railway was formed, was criticised by Edward Ives, schedule maker for the company. He said it would be impossible to operate under the schedule as arranged by Mr. Grant. Some of the men would not have the number of hours demanded by the company's agreement with the union, the general average of the runs now being nine hours and twenty-eight minutes, while the agreement calls for at least eight hours. Some of the men would get but seven hours and twenty-one minutes under Mr. Grant's plan.

The afternoon of Oct. 9 opened with an argument between Mr. Brooks and Mr. Mahon as to the manner of presenting evidence. The trouble arose over evidence given by President Hutchins in another case. It was read by Mr. Mahon and Mr. Brooks charged that he did not read it all, but only such parts as would make his contentions in the present instance more plausible.

John Grant, former employee of one of the Detroit lines, was called in to be questioned by Mr. Brooks. He had previously testified that he had made schedules in Indianapolis, St. Louis and other places. Mr. Brooks wished to introduce a telegram from Indianapolis stating that Grant had never made schedules in that city. Mr. Mahon objected on the ground that signatures to telegrams could not be easily identified. Judge Phelan, one of the arbitrators, asked how the board could determine from what city the telegram came. The chairman finally ruled that the telegram should not be admitted. Mr. Brooks cross-examined Mr. Grant on his testimony to the effect that the property could be replaced for between \$12,000,000 and \$13,000,000. He said he arrived at that conclusion through his knowledge of the railroad business and from appraisals made in the past. As showing the peculiar position assumed by Judge Phelan, he made a motion when Mr. Grant left the stand that a vote of thanks should be given to him. Chairman Naylor finally relieved the embarrassment caused by this motion by suggesting that the board confine itself to the serious matters before it.

On Oct. 9 Mayor Marx signed the Council proceeding authorizing the construction of the Junction Avenue line. A body of citizens had filed a protest with him against the

construction of a road through certain stretches of street, but he found that he could not give consideration to all these matters, as they would cause much delay in building the line.

Attorney George W. Moore and Allan Frazer and Corporation Counsel Lawson have suggested a number of changes in the municipal ownership sections of the proposed new city charter. The most important, perhaps, is the separation of the street railway portion from that relating to other public utilities. It is believed that this will simplify the sections and possibly result in avoiding complications later on.

## Subway Developments in New York

The Public Service Commission for the First District of New York has advertised for bids for the construction of Section No. 3 of the Seventh Avenue subway in Manhattan. Bids will be opened on Nov. 10 at 12.15 o'clock. The Seventh Avenue subway is to be operated by the Interborough Rapid Transit Company, and Section No. 3 covers that portion of the route in Varick Street and Seventh Avenue Extension between Beach Street and Commerce Street. The cost of this work will be defrayed by money contributed by the Interborough Rapid Transit Company.

The commission has executed the contract awarded a short time ago to the Snare & Triest Company for the construction of Section No. 1 of the elevated railroad in Queens. This contract embraces the junction station at the Queensboro Bridge Plaza, where the Astoria and Corona lines separate. The contract price for this section is \$880,000.

The commission has ordered a public hearing for Oct. 24 on the contract for the Livonia Avenue extension of the Eastern Parkway subway, and for Oct. 31 on the form of contract for the first section of the Eastern Parkway line. The Eastern Parkway route is to be operated by the Interborough Rapid Transit Company.

According to the reports of the engineers of the commission, there is now under contract \$83,000,000 worth of work on the new subway lines of the dual system of rapid transit and an average daily force of 7000 men employed thereon. Of the \$83,000,000 worth of work, about \$38,000,000 is on lines to be operated by the Interborough Rapid Transit Company and \$45,000,000 on the lines to be operated by the New York Municipal Railway Corporation. Of the latter, however, the Fourth Avenue subway in Brooklyn and the Centre Street Loop subway in Manhattan, costing together about \$28,000,000, are practically completed. It is estimated that the construction work on the city-owned lines will cost about \$200,000,000. There is, therefore, more than one-third (to be exact about two-fifths) of the value of this work already under contract. Of the remainder, to cost \$117,000,000, it is expected that more than one-half will be under contract before the end of the year, so that by that time, nine months after the signing of the dual system operating contracts, actual construction work will be in progress on three-quarters of the city-owned lines.

## Toronto Purchase Reports Presented

The reports of the experts appointed to appraise the property of the Toronto Railway and the Toronto Electric Light Company, all letters between Sir William MacKenzie and Mayor Hocken, and all other papers connected with the proposed purchase of the property of the Toronto Railway and the Toronto Electric Light Company were brought before the meeting of the City Council held on Oct. 13. The negotiations may be summed up briefly as follows:

Mayor Hocken, as the result of several conferences with Sir William MacKenzie, wrote on July 21 to Sir William MacKenzie offering, subject to the approval of the ratepayers of Toronto, to purchase the property of the Toronto Railway, the Toronto Electric Light Company and the parts of the Toronto & York Radial Railway within the city limits, the purchase price to be \$30,000,000, of which \$8,000,000 is for the Toronto Electric Light Company's property and

franchise. Eight million and ninety thousand dollars is to be paid in cash, and the venders take the balance of \$21,910,000 in city debentures, maturing in thirty years and bearing 4½ per cent interest. A portion of the bonds in question is to be deposited with trustees for the redemption of various bond issues of the vender companies totaling \$6,300,000.

Bion J. Arnold and J. W. Moyes valued the assets of the Toronto Railway and R. A. Ross, Montreal, the Toronto electric light plant. The reports of these experts show that the Toronto Railway has land, buildings, cars, tracks and other physical assets valued at \$9,894,482, and "intangible" assets worth \$10,713,553, consisting chiefly of a franchise to operate exclusively surface railways on the streets of Toronto. This franchise has eight years to run.

The experts indorse the proposal to buy the Toronto Railway. Mr. Arnold, in reply to a direct question by the Mayor, says:

"Taking a most unfavorable view of it from the city's standpoint, the city is not paying an excessive amount over and above the real value of the property in order to possess itself of a clear right-of-way, both legal and physical."

The assets of the Toronto Electric Light Company are reported to be worth \$6,132,754, and those of the radial railways, including \$193,649 for an exclusive franchise on a part of Yonge Street, are placed at \$411,447. The total of physical assets for all property to be acquired is \$16,245,034. This leaves a balance of about \$13,750,000 as the price to be paid for extinguishing the rights of the various companies to do business on the streets of Toronto.

The Council will receive soon a report by John MacKay on the financial outlook under public operation, having especial reference to the operating costs of the street railway under civic management. Mr. Couzens, the manager of the city's hydroelectric service, will report on the value of the Toronto Electric Light Company's plant when amalgamated with the hydroelectric system. If the Council decides to submit the municipal ownership proposal to the people, a formal agreement will then be drafted on which the vote will be taken.

#### Long Island Railroad Wreck Hearing

A hearing was held before the Public Service Commission of the First District of New York on Sept. 26 in regard to the wreck that cost the lives of three trainmen and a passenger and injured fifty persons on the Whitestone branch of the Long Island Railroad on Sept. 22. The testimony of H. W. Thornton, general superintendent of the company, before the commission, corresponded in its details to the statements made by James McGee, chief train dispatcher of the Long Island Railroad, in an investigation held on Oct. 2 in Jamaica before the coroner. Near the close of the hearing Superintendent Austin was recalled. He stated that since the accident the block signal system had been extended over the Whitestone Landing branch and various improvements had been made for the single track.

A second hearing was held before the commission on Oct. 2, at which time Mr. Freeman, of the engineering department of the commission, described an examination he had made on Sept. 20 of the new tower system installed by the Long Island Railroad after the accident. According to him there is a twenty-four-lever tower with twenty levers installed, three telephones and three sets of telegraphic instruments controlling the Whitestone section. A detailed examination in regard to the train movement past the J. C. tower showed that in an average non-rush hour fourteen trains pass through that block, necessitating, however, not more than five telephonic or telegraphic communications between the operators as a result of the new system.

C. W. Wilder, electrical engineer for the commission, testified that this block signal system introduced by the railroad did not have the merits of an automatic electrical block signal system. According to him the practicability of the new system depends entirely upon the actual transmission of information from one operator to the other and also on the correctness of that information. This, said Mr. Wilder, leaves the human element to be reckoned with, and if there is any slip on the part of either man, a collision is liable to result.

C. L. Addison, assistant to the president of the Long

Island Railroad, stated that he was opposed to the installation of an automatic block signal single-track system on the Whitestone branch. Such a system is in use on the Oyster Bay branch of the Long Island Railroad, but he would not advise its use on the Whitestone branch. One particular objection stated by him was that an automatic single-track system might in case of trouble cause serious and prolonged delay to traffic and that to be of any value it would have to be helped out by flagging the train through. In answer to questions from Commissioner Maltbie, Mr. Addison stated that the Long Island Railroad was desirous of adopting any device that would insure the greatest degree of safety to the public, but years of study had convinced him that a manually operated system was more feasible and that the reason various lines in the country depended upon automatic systems for single-track branches was that they could not stand the expense of manning the other kind.

#### The Dublin Labor Situation

The general labor trouble in Dublin, which had its beginning in the strike of the employees of the tramway system, has again prompted the *London Times* to deal with the labor situation editorially. According to the *Times* there was no sign of any improvement in the condition of affairs in Dublin on Sept. 24. It said that the fact that both the National Transport Workers' Federation and the parliamentary committee of the Trade Union Congress had decided to send assistance to the strikers in Dublin meant that the strike and the consequent misery may be indefinitely prolonged. Referring particularly to the disorder which has marked the strike, the paper said in part:

"Under the guidance of Mr. Larkin, violence has been freely resorted to by the Irish strikers during the present crisis. The riots of the last two days of August, with their 700 casualties, and the renewal of the disturbances on Sept. 21 are a sign not only of the inability of the labor leaders to control the men whom they are supposed to represent but also of the present aggravation of the inherent feverishness of the Irish nature, which might quite easily result in a war of classes. It is this danger that constitutes the seriousness of these processions of strikers, 6000 strong, and these battles with stones, jam pots and porter bottles on the one side and batons and revolvers on the other. The empty streets, the idle quays, the rise in the price of food and coal, the congestion of the pawnshops, the starvation due to the fact that 13,000 men are now unemployed, are suggestive of the horrors of actual warfare. The Irishman is lacking in the reserve fund of stolidity and common sense which, in the case of the rest of the United Kingdom, is the chief safeguard against similar outbreaks, and for that reason their occurrence in his country is of particular danger, and their prevention of particular importance, to the stability and security of the whole British nation."

**Traction Company Rewards Non-Strikers.**—In making up a new time schedule which has just gone into effect on the line of the Indianapolis, Columbus & Southern Traction Company between Indianapolis and Louisville a reassignment of runs has been made. The men who remained loyal to the company during the recent strike received their choice of the runs, the oldest men in service receiving first choice.

**Steinway Tube Transferred to Transit Company.**—The formal transfer by August Belmont and others of the Steinway tunnel in New York City to the Interborough Rapid Transit Company was recorded on Oct. 16. The transfer was made in behalf of the creditors, stockholders and members of the New York & Long Island Railroad "to cancel and discharge \$9,734,692 and interest, amounting in all to \$10,603,692." Under the dual subway contracts the Steinway tunnel falls to the city at an agreed price of \$3,000,000.

**New Subway Ordinance Introduced in Pittsburgh.**—Chairman Wilkins of the public service and surveys committee of the City Council of Pittsburgh has introduced the new subway ordinance drawn for the Pittsburgh Subway Company. The bill, prepared after conference between Assistant City Solicitors Robinson and Bown, Mayor Magee and A. O. Fording of the subway company and Councilmen,

is agreed upon in its main details. The bill has been ordered printed and referred to committee.

**Massachusetts Commission Votes Down More Detailed Corporate Reports.**—The Public Service Commission of Massachusetts on Oct. 8, by a vote of four to one, declared against the adoption of an order compelling railroads, street railways and other public service corporations and associations to submit to the commission a sworn statement showing all expenses incurred for publicity, outside legal assistance and work connected with legislation and general expenses from Oct. 1, 1912, to Oct. 1, 1913. This order was proposed so as to obtain from public service corporations other than the New York, New Haven & Hartford Railroad facts regarding expenditure of money during the last year.

**Seattle Council Favors Extension of Municipal Ownership.**—The deal which has been pending between the city of Seattle and the receivers of the Seattle, Renton & Southern Railway, Seattle, Wash., whereby the city of Seattle will take over that portion of the railway within the city limits, has been approved by the City Council and the matter is now before the Mayor. The price fixed is \$1,200,000, of which \$850,000 is to be paid in 5½ per cent bonds. This action was taken with the understanding that the city may buy that portion of the line outside of the corporate limits for \$200,000 if legislation can be secured or a court decision rendered that will assure the city's legal right to operate and own a line outside its boundaries.

**Electrification Campaign in London, Ont.**—On Oct. 10 a meeting was held in London, Ont., in support of the plan to electrify the London & Port Stanley Railway, an issue which is to be voted on on Oct. 22. The speakers included Adam Beck, the originator of the electrification movement; J. McClary, Mayor Graham and others. Mr. McClary stated that so great was his faith in the plan of Mr. Beck that if it was approved by the people his stove manufacturing works would take into consideration the placing of steamships on the lake to ply in conjunction with the city's electrified line. Mr. Beck went over the whole question, linking in with it the Niagara power scheme. He told the citizens present that electrification will tend to reduce the tax burden of the public. The loan of \$700,000 necessary to carry out the plan will be a charge against the railway and will not affect the city's borrowing powers.

**New Heating Device for Seattle Cars.**—The Puget Sound Traction, Light & Power Company, Seattle, Wash., recently installed heating devices in twenty-five of its cars, according to the promise made to the franchise committee of the City Council ten months ago. The company will put ten new cars in operation within six weeks, each equipped with the new heating device, making a total of thirty-five cars in all which will be operated in that city during the winter with the heating systems. The company has selected twenty-five open-end cars and ten of the inclosed type for the experiment. At the time the question arose in regard to the heating of cars on the long lines, including Alki Avenue, Fauntleroy Avenue, Green Lake, Phinney Avenue and other lines, the Health and Sanitation Department questioned the advisability of the move on the ground that heated cars are not so good as unheated cars from the standpoint of public health.

**Value of Interurban Roads to the Business of a City.**—While speaking at the Municipal Exhibit in Cincinnati on the evening of Oct. 10, Mayor Shank of Indianapolis took occasion to refer to interurban railways and their value to the business interests of the cities which they enter and those in which they terminate. He said that the trade position of Indianapolis was caused solely by the sixteen interurban lines that enter the city. "We have already passed Louisville and Columbus and now we are after Cincinnati," said Mayor Shank, "and unless you get the interurbans into your business section you will find that the trade will go to some other city." Mayor Shank praised the efforts made by Mayor Hunt to secure a rapid transit entrance for the interurban roads and said they can do nothing but add to the wealth of the city. "From 15,000 to 20,000 people are brought into Indianapolis daily over the electric roads," he said, "and there is no reason why a like number should not come to Cincinnati to trade if they have hourly service, as we have."

## Financial and Corporate

### Stock and Money Markets

Oct. 16, 1913.

Trading on the New York Stock Exchange to-day was fairly active at the opening and fractional gains were shown all through the active list. The sales totaled 314,608 shares. New Haven advanced on the news of the favorable decision of the Massachusetts Public Service Commission in regard to the issue of \$67,000,000 of convertible debentures. Rates in the money market to-day were: Call, 3½ per cent; sixty days, 4¼ @ 5 per cent; ninety days and four months, 5¼ per cent; five and six months, 5 per cent.

In the Philadelphia market prices ruled fractionally stronger without any increase in trading. Union Traction opened at 45¼ bid and Philadelphia Rapid Transit at 20 bid. Prices ended weak, with Union Traction at 45¼.

The Chicago market was broad to-day, but the volume of transactions was small. Public Service bonds were in good demand.

The Boston market opened firm and active, but in the afternoon the market became dull.

The sales of stock on the Baltimore exchange to-day totaled only 166 shares. The sales of bonds totaled \$43,000, par value.

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

	Oct. 8	Oct. 15
American Brake Shoe & Foundry (common).....	90¼	88½
American Brake Shoe & Foundry (preferred).....	131	130½
American Cities Company (common).....	36	36
American Cities Company (preferred).....	65	64
American Light & Traction Company (common).....	353	337
American Light & Traction Company (preferred)....	105	103½
American Railways Company.....	39	39
Aurora, Elgin & Chicago Railroad (common).....	41	41½
Aurora, Elgin & Chicago Railroad (preferred).....	82½	83
Boston Elevated Railway.....	86	83¾
Boston Suburban Electric Companies (common).....	*7	7
Boston Suburban Electric Companies (preferred)....	*56½	59
Boston & Worcester Electric Companies (common)....	*10	a10
Boston & Worcester Electric Companies (preferred)...	*43	42½
Brooklyn Rapid Transit Company.....	87	86½
Capital Traction Company, Washington.....	115	115
Chicago City Railway.....	160	160
Chicago Elevated Railways (common).....	25	25
Chicago Elevated Railways (preferred).....	75	75
Chicago Railways, ptcptg., ctf. 1.....	95½	93
Chicago Railways, ptcptg., ctf. 2.....	28½	28¼
Chicago Railways, ptcptg., ctf. 3.....	7¼	a7¾
Chicago Railways, ptcptg., ctf. 4.....	2¼	2¼
Cincinnati Street Railway.....	108	112
Cleveland Railway.....	103½	103¾
Cleveland, Southwestern & Columbus Ry. (common)...	*5½	5½
Cleveland, Southwestern & Columbus Ry. (preferred)...	*28¼	30
Columbus Railway & Light Company.....	18	18
Columbus Railway (common).....	a69½	69½
Columbus Railway (preferred).....	88	88
Denver & Northwestern Railway.....	*104	111
Detroit United Railway.....	69	69
General Electric Company.....	143	139½
Georgia Railway & Electric Company (common).....	*117	120
Georgia Railway & Electric Company (preferred).....	*87	86
Interborough Metropolitan Company (common).....	15¼	13½
Interborough Metropolitan Company (preferred).....	61¾	57¼
International Traction Company (common).....	*30	40
International Traction Company (preferred).....	*95	95
Kansas City Railway & Light Company (common).....	*22	*22
Kansas City Railway & Light Company (preferred)....	*30	30
Lake Shore Electric Railway (common).....	*5	7
Lake Shore Electric Railway (1st preferred).....	*89	92
Lake Shore Electric Railway (2d preferred).....	*24	25
Manhattan Railway.....	128	130
Massachusetts Electric Companies (common).....	13	13
Massachusetts Electric Companies (preferred).....	68	67
Milwaukee Electric Railway & Light Co. (preferred)...	*95	100
Norfolk Railway & Light Company.....	*27½	25½
North American Company.....	71	71½
Northern Ohio Light & Traction Company (common)...	63	63
Northern Ohio Light & Traction Company (preferred)...	98	97
Philadelphia Company, Pittsburgh (common).....	41	39
Philadelphia Company, Pittsburgh (preferred).....	40	40
Philadelphia Rapid Transit Company.....	225½	197½
Portland Railway, Light & Power Company.....	*55	56
Public Service Corporation.....	111	110
Third Avenue Railway, New York.....	40¼	38
Toledo Traction, Light & Power Company (common)...	a30	30
Toledo Traction, Light & Power Company (preferred)...	80	80
Twin City Rapid Transit Co., Minneapolis (common)...	104½	104½
Union Traction Company of Indiana (common).....	*5	13
Union Traction Company of Indiana (1st preferred)...	*80	83
Union Traction Company of Indiana (2d preferred)...	*20	25
United Rys. & Electric Company (Baltimore).....	25¾	25¾
United Rys. Inv. Company (common).....	18	17½
United Rys. Inv. Company (preferred).....	35	34
Virginia Railway & Power Company (common).....	a56	53½
Virginia Railway & Power Company (preferred).....	95	93½
Washington Ry. & Electric Company (common).....	93	95
Washington Ry. & Electric Company (preferred).....	90¼	90¾
West End Street Railway, Boston (common).....	*71	70
West End Street Railway, Boston (preferred).....	*89	89
Westinghouse Elec. & Mfg. Company.....	67	66
Westinghouse Elec. & Mfg. Company (1st preferred)...	107	107

\*Last sale. a Asked.



## ANNUAL REPORTS

## American Railways

The statement of income, profit and loss of the American Railways, Philadelphia, Pa., for the fiscal year ended June 30, 1913, is as follows:

Income from sub-companies.....	\$984,015
Miscellaneous income .....	9,427
Gross income .....	\$993,442
Deductions from income:	
General expenses .....	\$8,066
Legal expenses .....	206
Depreciation of office furniture and of engineering instruments .....	1,320
Taxes .....	15,000
Interest on funded debt.....	442,452
Interest on preferred stock receipts.....	1,462
Total deductions from income.....	\$468,506
Net income .....	\$524,936
Dividends paid and accrued on preferred capital stock..	\$89,059
Dividends paid on common capital stock.....	402,789
Total dividends paid.....	491,848
Surplus .....	\$33,088
Surplus, June 30, 1912.....	\$625,198
Less adjustments during the year.....	9,850
	615,348
Surplus, June 30, 1913.....	\$648,436

The balance sheet includes, besides the usual asset and liability headings, a detailed statement of the holdings of the American Railways in the various subsidiaries, giving the total issue, the portion owned by the holding company and the value at which it is carried on this company's books. Further schedules show bonds owned by the American Railways and the insurance and contingencies fund investments, as well as the stocks and bonds owned by the subsidiaries.

J. J. Sullivan, president, says in part:

"The total number of passengers carried was 100,343,051. The gross receipts of the subsidiary companies were \$5,164,007, showing a gain of \$269,700, or 5.55 per cent. This does not include the gross receipts of the Johnstown Passenger Railway, or the receipts of the Kanawha Valley Traction Company, Charleston, W. Va., for which the company receives a rental. The increase in receipts for lighting and power was 15.18 per cent.

"During March there was an overflow of the rivers in Ohio whereby the company lost about \$50,000 in gross receipts.

"The company paid for accidents during the year in all companies \$123,127. There is a credit in the accident insurance fund of \$42,176, and fewer claims were presented than last year.

"During the year \$1,311,785 of new capital was expended for sundry improvements to the subsidiary companies. The company paid all operating expenses, fixed charges, interest and taxes, including the United States government tax, amounting to \$9,300, and charged off for depreciation and obsolescence of the underlying companies about \$290,000, which included the original cost of two storage batteries, an abandoned carhouse, etc. There was charged off, in addition to the above depreciation, 7.02 per cent of the gross receipts for maintenance of track and roadway and maintenance of equipment. The company made payments to the sinking fund of \$26,769. It paid in dividends \$491,848, an increase of \$99,559, leaving a balance of \$33,087 to be added to profit and loss, which, after certain adjustments, representing chiefly the expense in connection with the issuance of the preferred stock, makes that item now stand \$648,436.

"All of the company's important franchises in Lynchburg, Va., Springfield, Ohio, and Ashland, Ky., have been extended for the full term allowed by law."

The report also takes up in detail the progress for the year of each one of the principal subsidiaries.

Mr. Sullivan continues in part:

"During the year the gross earnings of the Altoona & Logan Valley Electric Railway increased \$27,593, or 4.94 per cent. The company repaired 322 ft. of track and rebuilt 14,235 ft. Besides the poles and wires required for the extensions made during the year, thirty-three new steel poles were erected in the Altoona fire district, and 2,400 ft. of underground cable was installed, and 4 miles of return

feeder, 1/2 mile of 500,000-circ. mil. feeder and 1 mile of 400,000-circ. mil. feeder were installed in Tyrone and on the Fostoria cut-off. Ten cars were rebuilt to prepayment type, two work cars were rebuilt and twelve cars were equipped with steel wheels. Two new flat cars were built and placed in service. Eighty-one cars were equipped with new lightning arresters and twenty-eight cars repainted.

"The gross receipts of the Bridgeton & Millville Traction Company increased \$8,199, about 6.25 per cent, during the year. Twelve hundred feet of track in Millville was rebuilt, many poles were renewed and regular maintenance was well taken care of. Five single-track cars were bought for city use and new electrical equipment was ordered.

"During the year the gross receipts of the Lynchburg Traction & Light Company increased \$21,220, nearly 5 per cent. Two miles of new track was built on Rivermont Avenue and 2870 ft. of new track was built on Eleventh Street, Grace Street, Buchanan Street and McKinley Avenue. A new 40-ft. work car with four Westinghouse motors and carrying an adjustable derrick at each end was added to the equipment. The franchise was extended for the full period of thirty years.

"The gross receipts of the Ohio Valley Electric Railway increased \$28,550, or 7.31 per cent. In a fire in the carhouse the company lost nine car bodies. Eight new steel cars were bought and mounted on the trucks of the burned cars. Ten additional new steel cars were bought with trucks and multiple-unit controlled motors to facilitate two-car train operation.

"During the year the property of the People's Railway was visited by a severe flood, which had Dayton as its center. For eighteen days from March 25 no cars were run and for some weeks afterward, until the streets were entirely clear of debris caused by the flood, operations were hampered. Steam railroad flat cars were run through the streets over the tracks of the People's Railway and loaded with loose material, preventing the operation of cars on schedule time. The city being under martial law, nothing could be done to improve the conditions existing. Since May 1 the business has improved. We subscribed \$20,000 to a fund of \$2,250,000 to be used for flood prevention. The total operating revenue was \$405,591, showing a loss of \$16,422 in gross receipts. A large amount of money has been expended on this property for power house, machinery, carhouse, cars and new track and 6650 ft. of additional feeder, also a new electric trolley wagon.

"The gross receipts of the Roanoke Railway & Electric Company increased to \$549,290, more than 8 per cent, although a large number of men struck on May 1. The company employed local men and the strike has entirely failed. The company bought and put in service six new steel cars of standard type with double trucks and complete electrical equipment. One car was changed from two-motor to four-motor equipment. New signs were placed on all cars. The company is rebuilding all closed cars to the pay-within type.

"During the year the gross receipts of the Scranton Railway were \$1,362,461, an increase of \$59,095 over the previous years. In November, 1912, the company began operating over the new Mulberry Street viaduct, which cost more than \$100,000. The company had a double track and the exclusive use of one side of the bridge. The structure was built to avoid two steam railroad grade crossings. During the year 105,203 ft. of track was rebuilt and all newly paved. All the new work except that on the County Road has been of steel tie and concrete construction, which should give it a much longer life. One work car and two flat cars were built in the shops and five new double-truck steel cars have been ordered. A contract for power was made with the Scranton Electric Company.

"The gross revenue of the Springfield (Ohio) Railway increased \$25,527, or 7.5 per cent over the previous year. A new twenty-five-year franchise has been obtained. Considerable track was rebuilt and 5020 ft. of street paving was put down. The company ordered ten new double-truck steel cars, with trucks and motors complete, which, with the present number of cars, should furnish an adequate supply for some time to come. The company has bought a tract of 4 acres on high ground on which to build a new carhouse to take proper care of the equipment."

**Cape Breton Electric Company, Ltd.**

The condensed results of operations of the Cape Breton Electric Company, Sydney, N. S., Canada, including leased property, for the twelve months ended Dec. 31, 1912, as compared with the previous year, are shown by the following statement:

	1912	1911
Earnings:		
Railway department .....	\$216,132	\$211,370
Light and power department.....	115,117	98,442
Ferry department .....	28,927	27,742
Total earnings .....	\$360,176	\$337,554
Operating expenses and taxes:		
Operating expenses .....	\$188,405	\$175,631
Taxes .....	6,475	6,132
Total operating expenses and taxes.....	\$194,880	\$181,763
Net earnings .....	\$165,296	\$155,791
Interest charges .....	53,825	54,150
Balance .....	\$111,471	\$101,641
Sinking and improvement funds.....	14,280	13,680
Balance .....	\$97,191	\$87,961
Dividends paid .....	70,290	59,040
Balance .....	\$26,901	\$28,921
Direct credits to reserves and surplus.....		114,037
Prior surplus .....	288,132	156,174
Balance .....	\$315,033	\$299,132
Replacement reserve .....	8,000	11,000
Current surplus .....	\$307,033	\$288,132

The Stone & Webster Management Corporation makes the following statement regarding the company:

"The gross earnings of the street railway and ferry departments for 1912 show only a moderate increase over those of the preceding year. In the lighting and power department a special effort to extend the service resulted in an increase in earnings amounting to approximately 17 per cent. Operating expenses for the year 1912 were normal, with the exception of maintenance and removal of snow and ice, both of which were somewhat higher than in any average year.

"During the past year the much-needed subway at McQuarrie's Crossing has been built, allowing continuous operation of cars on the most important city line which the company operates. A new carhouse has been built at Glace Bay for the housing of four cars. Many short extensions to lighting lines have been made for the accommodation of new customers and a high-tension transmission line has been built to the Colonial Mines, to which a large amount of current is now sold each month for operating the mines and for operating two briquetting plants in connection therewith.

"Liberal expenditures for maintenance were made during the year. A special examination of the company's power plant is now in progress and it is expected that certain changes and improvements in the plant will be made during the coming year which will have the effect of leading to increased economy."

**Boston & Maine Railroad**

The annual report of the Boston & Maine Railroad, Boston, Mass., for the fiscal year ended June 30, 1913, shows an increase of \$2,523,143 in operating revenue, an increase of \$3,014,129 in operating expenses and a decrease of \$1,240,550 in the net corporate income.

The Boston & Maine Railroad owns 18.1 miles of branch lines of electric street railways and 1.14 miles of side tracks; it leases 32.11 miles of branch lines and 2.11 miles of side tracks, making a total of 53.46 miles of electric railway operated. The electric railway equipment of the company is shown by the following inventory as of June 30:

Description	1913			1912 Total
	Owned	Leased	Total	
Passenger cars .....	21	37	58	58
Snow plows on wheels.....	1	3	4	4
Other cars .....	2	3	5	5
Total .....	24	43	67	67

The two electric railways owned and leased by the company are the Portsmouth (N. H.) Electric Railway and the Concord & Manchester Electric Railway, which branch lines have a total mileage of 50.21, exclusive of side tracks. The result of operations of these companies for the fiscal

year ended June 30, 1913, as compared with the previous year, is shown by the following statement:

GROSS REVENUES:			
	1913	1912	
Passenger .....	\$254,220	\$243,890	
Mail .....	275	284	
Station and car privileges.....	1,568	1,456	
Car service .....	372	374	
Total .....	\$256,434	\$246,004	
OPERATING EXPENSES:			
Maintenance of Way and Structures:			
Superintendence .....	\$1,066	\$942	
Maintenance of way .....	34,219	33,339	
Maintenance of electric lines.....	5,162	3,587	
Maintenance of buildings and structures.....	2,467	3,348	
Total .....	\$42,914	\$41,216	
Maintenance of Equipment:			
Superintendence .....	\$305	\$240	
Maintenance of power equipment.....	765	13,822	
Maintenance of cars.....	11,082	13,126	
Maintenance of electric equipment of cars.....	9,576	10,529	
Miscellaneous equipment expenses.....	89	.....	
Total .....	\$21,817	\$37,717	
Transportation and General Expenses:			
Superintendence and general expenses.....	\$8,075	\$7,776	
Power plant employe's .....	7,129	7,376	
Substation employe's .....	1,979	2,099	
Fuel for power.....	9,191	8,833	
Other power supplies and expenses.....	754	2,414	
Power purchased .....	8,877	8,924	
Conductors .....	27,521	25,715	
Motormen .....	27,279	25,876	
Cleaning and lubricating equipment.....	3,076	3,405	
Injuries and damages.....	6,149	2,875	
Stationery and printing.....	373	445	
Insurance .....	1,760	1,773	
Law expenses .....	478	35	
* Advertising .....	3,892	4,985	
Miscellaneous .....	4,759	5,562	
Total .....	\$111,292	\$108,093	
Total operating expenses .....	\$176,023	\$187,026	
Net revenue .....	\$80,411	\$58,978	

\* Includes net expense of operating Contoocook River Park.

The number of passengers carried on the Portsmouth Electric Railway and the Concord & Manchester Electric Railway during the year ended June 30, 1913, was 5,087,417, as compared with 4,877,820 during the previous year; the number of car miles advanced from 1,105,089 to 1,117,538.

The annual report of the Boston & Maine Railroad also contains a comparative income, profit and loss statement for the Conway (Mass.) Electric Street Railway, which is controlled by the railroad company, but operated separately. This statement shows a deficit for the year ended June 30, 1913, of \$2,601, compared with a deficit of \$4,672 the preceding year, as follows:

REVENUE:			
	1913	1912	
Freight revenue .....	\$5,259	\$5,087	
Passenger revenue .....	2,824	2,847	
Other transportation revenue.....	2,117	2,828	
Other revenue—power sold, etc.....	1,430	1,429	
Total operating revenue.....	\$11,630	\$12,191	
OPERATING EXPENSES:			
Maintenance of way and structures.....	\$743	\$2,263	
Maintenance of equipment.....	720	1,215	
Transportation expenses .....	4,638	5,579	
General expenses .....	1,317	1,032	
Total operating expenses.....	\$7,418	\$10,089	
Net operating revenue.....	\$4,212	\$2,102	
Taxes accrued .....	403	433	
Operating income .....	\$3,809	\$1,669	
Interest accrued .....	6,410	6,341	
Deficit .....	\$2,601	\$4,672	

**Laurel Light & Railway Company**

The Laurel Light & Railway Company, Laurel, Miss., reports net earnings for the year ended Aug. 31, 1913, as compared with the previous year, as follows:

	1913	1912
Gross earnings.....	\$75,860	\$39,347
Operating expense.....	39,028	19,870
Net earnings.....	\$36,832	\$19,477

The Laurel Light & Railway Company was organized in 1911 to take over the property of the Laurel Electric Power & Light Company and to build a railway in Laurel and an interurban railway between Laurel and Ellisville, which are both county seats of Jones County, Mississippi.

The company has \$500,000 of capital stock, of which \$75,000 is 6 per cent non-cumulative preferred and \$425,000 is

common. The authorized bond issue is \$500,000, of which \$380,000 is outstanding.

The property of the old light company was taken over on Jan. 1, 1912, and the installation of a new 625-kw Allis-Chalmers turbo-generator was begun. The installation of this new unit was completed in September, 1912. At the same time the construction of the street railway in Laurel was begun. On Nov. 23, 1912, 3½ miles of street railway was placed in operation, and on Aug. 1 operation was begun to a park on the interurban line about 2 miles south of the city. The interurban road, consisting of 8½ miles to and through Ellisville to an agricultural college in the southern end of Ellisville was completed Sept. 1 and is now in operation. The company has taken over the municipal lighting plant in Ellisville and began operation of that piece of property on Sept. 1.

The statement of earnings given above does not include any light or power business in Ellisville or earnings from the completed interurban line. July, 1913, was the first full month of operation of the entire 5 miles of street railway in Laurel, while the August earnings contain figures for 2 miles of interurban track. In each instance the greater population served is indicated by the increased business.

The statement of transportation earnings of the company by months from November, 1912, to August, 1913, inclusive, follows:

	Gross Earnings	Operating Expenses	Net Earnings
1912			
November .....	\$669	\$669	.....
December .....	2,000	1,287	\$713
1913			
January .....	1,788	1,744	43
February .....	1,645	1,450	194
March .....	2,039	1,819	220
April .....	1,984	1,921	64
May .....	2,181	1,501	681
June .....	2,896	1,764	1,132
July .....	3,379	2,179	1,199
August .....	4,644	2,806	1,838
Total .....	\$23,225	\$17,141	\$6,084

**Sheffield Corporation Tramways Report**

The annual report by A. R. Fearnley, general manager of the Sheffield Corporation Tramways, has been made public. The total increase in the number of passengers is 5,871,391, while the traffic receipts exceed last year's total by £20,770. The policy of the committee in reducing the fares to 1d. all the way on the city routes, the report states, has proved successful. The average fare paid per passenger again shows a slight decrease, 0.893d., compared with 0.896d., and the average journeys per head of population per annum show an increase of eight journeys per head, the total being 206. Under these two items interesting comparisons are made with other tramways. Of the fifteen towns quoted there are only two, namely Hull and Glasgow, where the average fare paid per passenger is lower than in Sheffield. Glasgow is the only city which shows a larger total with reference to the average journeys per head of population.

**Electric Railway Valuations in Washington**

The following table gives the valuations placed upon electric interurban railroads and city railways by the Board of Equalization of the State of Washington, as compared with the values fixed in 1912:

	1913	1912
Pacific Northwest Traction Co.....	\$2,387,795	\$1,473,109
Puget Sound Electric Railway, Light & Power Co. ....	4,000,000	4,240,000
Spokane & Inland Empire R. R.....	10,000,000	12,500,000
Washington-Oregon Corp.....	458,310	*275,000
Washington Water Power Co.....	4,000,000	4,000,000
Walla Walla Valley Railway.....	395,867	395,867
Willapa Harbor Railway.....	395,867	395,867
Yakima Valley Transportation Co.....	362,207	362,207
Total .....	\$21,680,379	\$23,246,483

\*Vancouver street railway valued separately in 1912.

**Cleveland (Ohio) Railway.**—President Stanley of the Cleveland Railway intends to demand that the City Council authorize the charging off of \$800,000 for the obsolescent power equipment of the company before the end of the ordinance year, March 1, 1914. Indications are that this action, requested by the arbitrators, will cut the interest fund so low as to cause an increase in the rate of fare. Mr. Stanley is quoted as follows: "I shall not be impatient about the

arbitrators ordering it charged off immediately, but it must be done before the close of the ordinance year. Meanwhile, we are carrying the interest burden, but the charge is on the car riders ultimately."

**Columbia Railway, Gas & Electric Company, Columbia, S. C.**—Redmond & Company, New York and Boston, are placing at a price to net 6½ per cent three-year convertible 6 per cent secured gold notes, dated Oct. 1, 1912, and due Oct. 1, 1915, of the Columbia Railway, Gas & Electric Company. These notes are convertible at the option of the holder at any interest date on ten days' notice into an equal par value of the first mortgage bonds deposited as security and \$120 in cash per note, making the net cost of the bonds 88, on a 5¾ per cent basis. These notes are also subject to redemption at the company's option on any interest date at 101 and interest on thirty days' notice. If called, the privilege of conversion may be exercised.

**Hull (Que.) Electric Company.**—At a recent annual meeting of shareholders of the Hull Electric Company W. R. Baker, secretary of the Canadian Pacific Railway, was elected president, and E. W. Beatty, general counsel of the Canadian Pacific Railway, vice-president, for the current year.

**Indianapolis (Ind.) Street Railway**—At a meeting of the board of directors of the Indianapolis Street Railway on Oct. 9, which was for the purpose of electing officers and filling vacancies in the board of directors, Joseph A. McGowan, secretary and treasurer of the Terre Haute, Indianapolis & Eastern Traction Company, was elected a director of the company. Dr. Henry Jameson was elected president, succeeding the late Admiral George Brown. Other officers elected were: Harry S. New, first vice-president; Harold B. Hibben, second vice-president; Joseph A. McGowan, secretary and treasurer; W. F. Milholland, assistant secretary and treasurer. The following now constitute the board of directors of the Indianapolis Street Railway: Henry Jameson, Harold B. Hibben, Harry S. New, Ferdinand Winter and Joseph A. McGowan, Indianapolis, Ind.; Marshall S. Morgan, Philadelphia, Pa., and C. M. Murdock, Lafayette, Ind.

**Montreal (Que.) Tramways.**—The New York Stock Exchange has listed \$13,335,000 of first and refunding mortgage thirty-year 5 per cent collateral trust notes, Series A, of the Montreal Tramways. These notes fall due in 1941.

**New York, New Haven & Hartford Railroad, New Haven, Conn.**—The Massachusetts Public Service Commission on Oct. 14 approved the \$67,552,000 bond issue proposed by the New York, New Haven & Hartford Railroad. Immediately upon receipt of the news a meeting of the directors adopted resolutions approving the issue. Notice was sent to stockholders on Oct. 15 that 65 per cent of the subscriptions must be paid on Nov. 15, 1913, and the remainder on Jan. 15, 1914. The bonds run for twenty years, interest at 6 per cent.

**Northern Ohio Traction & Light Company, Akron, Ohio.**—Hayden, Miller & Company of Cleveland have announced that all of the \$1,500,000 of the collateral trust 6 per cent bonds of the Northern Ohio Traction & Light Company recently offered by them have been sold.

**Portland Railway, Light & Power Company, Portland, Ore.**—The Portland Railway, Light & Power Company will be required to pay a rental of 4 cents per lineal foot of track each year for its proposed cross-town car line on the East Side, according to the valuation recently fixed by the city commission. The valuation of 4 cents per foot is the highest ever imposed upon the company for a franchise. Heretofore the highest rental has been \$200 a mile.

**United Railways, St. Louis, Mo.**—The Mississippi Valley Trust Company, the Mercantile Trust Company and Francis Brothers & Company, St. Louis, having sold the greater part of the issue, are offering at 98 and interest, yielding 5¼ per cent, the unsold portion of the \$1,000,000 of Compton Heights, Union Depot & Mercantile Terminal Railroad first mortgage extended 5's, due July, 1923, but callable after July 1, 1914, at 102½ and interest on any interest date at sixty days' notice. The principal and interest are guaranteed by indorsement on each bond by the United Railways.

**Washington-Oregon Corporation, Vancouver, Wash.**—The Washington-Oregon Corporation has filed a \$1,000,000 mortgage covering the Centralia-Chehalis line and its water and power plants. It is understood that the proceeds of

\$400,000 of the bonds will be used to retire outstanding bonds, and the remainder for extension of the company's interurban lines.

**Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont.**—At the adjourned annual meeting of the Windsor, Essex & Lake Shore Rapid Railway held on Oct. 10, the following officers were elected: W. C. Crawford, Tilbury, Ont., president; Albert Eastman, first vice-president, resident and general manager; John Piggott, Sr., Chatham, second vice-president; W. R. Philmore, Chatham, secretary. J. W. McCall, Toronto, was re-elected treasurer. A new office, that of assistant secretary-treasurer, will be filled by J. L. Baird, Kingsville, Ont. The directors elected are: Hon. E. G. Stevenson, Detroit; W. C. Crawford, John Piggott, Sr., Walter T. Piggott, W. R. Philmore, J. W. McCall, Albert Eastman.

**Dividends Declared**

Brooklyn (N. Y.) City Railroad, quarterly, 2 per cent.  
 Columbus (Ohio) Railway, quarterly, 1¼ per cent, preferred.  
 Havana Electric Railway, Light & Power Company, 3 per cent, preferred; 2½ per cent, common.  
 Jacksonville (Fla.) Traction Company, quarterly, 1½ per cent, preferred; quarterly, 1¼ per cent, common.  
 Milwaukee Electric Railway & Light Company, quarterly, 1½ per cent, preferred.  
 Public Service Investment Company, Boston, Mass., quarterly, \$1.50, preferred.  
 Puget Sound Traction, Light & Power Company, Seattle, Wash., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

**ELECTRIC RAILWAY MONTHLY EARNINGS**

**BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, ME.**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo. August '13	\$74,248	*\$30,832	\$43,416	\$17,354	\$26,062
1 " " '12	70,418	*28,769	41,649	16,558	25,091
12 " " '13	747,311	*339,598	407,713	206,398	201,315
12 " " '12	674,614	*304,888	369,726	185,219	105,000

**CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo. August '13	\$99,752	*\$57,787	\$41,965	\$25,381	\$16,584
1 " " '12	94,925	*56,264	38,661	22,566	16,095
12 " " '13	1,167,414	*695,613	471,801	286,549	185,252
12 " " '12	1,016,891	*605,249	411,642	256,107	155,535

**CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo. August '13	\$251,278	*\$122,063	\$129,215	\$58,654	\$70,561
1 " " '12	232,369	*106,443	125,926	53,012	72,914
12 " " '13	2,251,109	*1,243,144	1,007,965	686,218	321,747
12 " " '12	2,086,489	*1,221,588	864,801	620,506	244,295

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

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo. August '13	\$236,699	*\$147,446	\$89,253	\$48,860	\$40,393
1 " " '12	208,339	*116,525	91,814	48,125	43,689
12 " " '13	2,626,253	*1,486,834	1,139,419	586,545	552,874
12 " " '12	2,353,499	*1,307,044	1,146,455	568,589	477,866

**GRAND RAPIDS (MICH.) RAILWAY**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo. August '13	\$119,738	*\$79,691	\$40,047	\$15,173	\$24,874
1 " " '12	111,605	*64,084	47,521	14,793	32,728
12 " " '13	1,278,452	*759,100	519,352	178,334	341,018
12 " " '12	1,218,260	*681,568	536,792	176,074	360,718

**LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, MAINE**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo. August '13	\$81,046	*\$40,396	\$40,650	\$15,529	\$25,121
1 " " '12	71,808	*36,150	35,658	14,448	21,210
12 " " '13	666,798	*410,694	256,014	176,318	79,696
12 " " '12	610,155	*384,535	225,620	173,435	52,185

**PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo. August '13	\$556,152	*\$280,110	\$276,042	\$172,166	\$103,876
1 " " '12	543,189	*276,453	266,736	148,022	118,714
12 " " '13	6,683,992	*3,316,515	3,367,477	1,906,293	1,461,184
12 " " '12	6,533,288	*3,238,767	3,294,521	1,678,552	1,615,969

**PORTLAND (MAINE) RAILROAD**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo. August '13	\$130,854	*\$62,282	\$68,572	\$16,380	\$52,192
1 " " '12	118,155	*60,592	57,563	10,294	47,269
12 " " '13	1,028,828	*712,828	315,779	132,369	183,410
12 " " '12	970,278	*687,040	283,238	110,405	172,833

**ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY, ST. JOSEPH, MO.**

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1 mo. August '13	\$105,091	*\$61,949	\$43,142	\$20,199	\$22,943
1 " " '12	102,859	*58,262	44,597	19,710	24,887
12 " " '13	1,226,213	*692,131	535,082	239,685	294,397
12 " " '12	1,151,979	*680,261	471,718	234,812	236,906

\*Includes taxes.

**Traffic and Transportation**

**Decision in Los Angeles Fare Case**

In the complaint before the Railroad Commission of California in which discrimination was alleged in the passenger rates of the Los Angeles (Cal.) Railway Corporation between Los Angeles and Vermont Heights the commission held that the one-way fare of 10 cents is reasonable, but that the price of the thirty-ride family commutation ticket should be reduced from \$2.70 to \$1.50.

In this case the complainant attacked the passenger fares of the Los Angeles Railway Corporation between the city of Los Angeles and Vermont Heights as excessive, unreasonable and discriminatory and asked that a fare of 5 cents with transfer privileges be established between Vermont Heights and the city of Los Angeles. The rates of the defendant were as follows: One-way fare between Vermont Heights and the city of Los Angeles 10 cents, made up of 5 cents between any point in Los Angeles and Manchester Avenue and 5 cents from Manchester Avenue to Vermont Heights.

The following adult commutation rates were in effect: ten-ride party ticket, 90 cents; thirty-ride family commutation ticket, \$2.70; fifty-two-ride individual monthly commutation ticket, \$3.75.

The lines of the company serving Vermont Heights are on either side of what is known as the "Shoestring Strip" and do not operate west of Manchester Avenue within the corporate limits of Los Angeles. The complainant based his claim for a fare of 5 cents between Los Angeles and Vermont Heights on the fact that the defendant operates certain of its lines outside of Los Angeles at a fare of 5 cents and that the distances beyond the boundary line of Los Angeles are not at all regular in shape, consequently a line in one direction might reach a considerable distance beyond the city limits and at the same time the terminus thereof be a shorter distance from the center of population in Los Angeles than would a line operating in the other direction wholly within the city. For example, the line to Huntington Park: the distance from the city limits to the end of the Huntington Park line is greater than the distance from Manchester Avenue to Vermont Heights; at the same time, because of the irregular boundary lines of Los Angeles, Huntington Park is much nearer the center of population of Los Angeles.

In his opinion E. O. Edgerton of the commission said in part:

"It must be apparent to anyone who will study the transportation map of the city of Los Angeles that in no case does the defendant maintain a 5-cent fare with transfer privileges to any point which is the same distance from the business center of Los Angeles as Vermont Heights. Because a city annexes adjoining territory, making its boundary lines extremely irregular, it does not follow that a street railway system should be required always to extend its 5-cent fare zone to conform to the new boundary lines.

"Complainant has not sustained his claim for a fare of 5 cents with transfer privileges between Vermont Heights and Los Angeles. Discrimination undoubtedly exists in favor of other sections served by the defendant in the matter of commutation rates, and for the same reasons as were pointed out in our decision in Case No. 337, City of Inglewood vs. Los Angeles Railway Corporation et al., we must hold that passengers from Vermont Heights are entitled to the same commutation rates as are in effect between Eagle Rock and Los Angeles. Drawing a circle from either the assumed center of population of Sixth and Main Streets or Twelfth and Main Streets, Los Angeles, it will be found that the distances are approximately the same to Eagle Rock, Annandale, Inglewood and Vermont Heights. We know of no just reason why the defendant should grant lower commutation rates to Eagle Rock and one-way fares from Annandale without transfer privileges, which are equivalent to the commutation rates between Eagle Rock and Los Angeles, on any lower basis than are in effect between Vermont Heights and Los Angeles.

"I therefore find as a fact that a just and reasonable

commutation fare for the transportation of adult passengers between Vermont Heights and Los Angeles is \$1.50 for a thirty-ride family commutation ticket without transfer privileges."

#### Insurance and Pensions in Philadelphia

The statement of the Co-operative Beneficial Association for August, 1913, shows how effectually this association, which is composed of employes of the Philadelphia (Pa.) Rapid Transit Company, is affording protection against want during illness by the payment of \$1 per day for one hundred days following the first week's illness and the payment at death of \$150 designed to cover funeral expenses.

Since the association was organized in November, 1912, it has paid a total of twenty-nine death benefits and 775 sick benefits. Out of approximately 10,000 employes of the company who are eligible, 7700 are now members of the association. The scope of the association has recently been enlarged by opening the membership to include female as well as male employes, between the ages of eighteen and forty-five years, and the period of service necessary to qualify as a member has been reduced from six to three months.

The number of members of the association who are taking advantage of the 8 per cent saving by the use of cash coupon books under the co-operative buying plan is rapidly increasing. The benefits offered by the Co-operative Beneficial Association are in addition to the general pension and insurance plan of the company, which provides a pension of \$20 a month for employes who have reached the age of sixty-five years, who have completed twenty-five years of continuous service and are unable to further perform their duties, and a death benefit of \$500 payable to the dependents of the deceased employee. Since the pension and death benefit plan was established in January, 1910, the company has paid 315 death benefits, amounting to \$156,880, and has granted pensions to eighty-one employes amounting to \$35,901, a total of \$192,782. At the suggestion of the co-operative committee the regulations governing the administration of the insurance plan maintained for the benefit of employes of the company have been amended to provide that the death benefit of \$500 will be paid only to actual dependents.

As many death benefits under the insurance plan are paid to motormen and conductors and consequently are charged to the 22 per cent fund set aside for the payment of the wages of trainmen, the administration of insurance and pensions has, with the approval of the co-operative committee, been placed directly under the same board of trustees that administers the Co-operative Beneficial Association. These funds will, however, be kept entirely separate and will be in no way associated with the accounts of that association.

#### Car Capacity Order Stands in Washington

The Public Utilities Commission of the District of Columbia has declined to grant a request by the Capital Traction Company and the Washington Railway & Electric Company that the commission revoke its former order prohibiting the carrying of passengers on front platforms, with the exception of those that are equipped with a dividing rail which isolates the motorman, and on the running boards of open cars, as contained in provisions of Sections 3 and 7 of regulations for the operation and equipment of cars in the District, issued by the commission on June 9, 1912. The matter was considered at a public hearing on Aug. 11, at which the Capital Traction Company was represented by Attorney R. Ross Perry, and the Washington Railway & Electric Company by J. J. Darlington. It was contended that the orders would work a hardship upon the public and that it is impossible for a street railway to prevent overcrowding. In announcing its decision the commission states that it is of the opinion that "the provisions of the said Sections 3 and 10 are necessary for the public safety and convenience, and that the said sections do not impose unreasonable requirements upon the utilities concerned."

The provisions which the commission directs shall be enforced follow:

"Every street railway or corporation shall cause its cars to stop to take on and to let off passengers at street crossings or other regular stopping places: Provided that a car which is loaded to its capacity, having due regard to Section 10 of the regulations for the operation and equipment of street railway cars in the District of Columbia relating to the occupation of platforms and running boards, shall display a sign 'Car full' and shall not stop to take on passengers; provided further that disabled and special cars need not stop for passengers; provided further that, after a blockade on a car line, if two or more cars going in the same direction are within a space of two blocks, and the forward car is behind its schedule or is loaded, such forward car need not stop to take on passengers, but may leave signaling passengers for the next car following.

"Motormen shall pay attention to the operation of the car next ahead and take care that no passenger is passed by more than one car, except in those cases exempted above; provided further that all cars which are permitted by orders of the commission to be operated as express cars shall be required to stop only at railway crossings, fire and safety stops; provided further, that street cars shall stop for passengers at such street crossings as may be indicated by the public utilities commission.

"No street railway shall permit passengers to occupy the front platforms of open cars or of closed cars or the running boards of open cars, provided that on cars equipped with a dividing rail completely isolating the motorman that portion of the platform not so reserved for the motorman may be occupied by passengers, but only to such an extent as not to prevent the rapid and easy ingress and egress of passengers. Each street railway company shall keep the rear platforms of cars sufficiently clear to allow the rapid and easy ingress and egress of passengers. In the case of center entrance cars, the 'well' shall be construed as the rear platform for the purposes of this section."

**Appeal to Commission to Require Reduction in Fare in Seattle.**—The City Council of Seattle, Wash., has adopted two resolutions which have for their purpose a request to be made by the Council asking the State Public Service Commission to require the Puget Sound Traction, Light & Power Company to sell tickets for 4 cents each good on its cars.

**Warning Signs Posted on Indianapolis Line.**—The Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., has posted notices on all of its lines citing the laws in regard to the molesting of the cars or property of common carriers and to the placing of obstructions in front of cars. An offer of \$100 reward is made for evidence leading to the arrest and conviction of persons violating any of the statutes mentioned.

**Interurban Line Seeking Freight Traffic Privilege.**—The Chicago, Ottawa & Peoria Railway is making an attempt to secure the privilege of handling freight traffic through Ottawa. Petitions are being circulated among the property owners of the city, and in the event that a majority of the property owners on the streets on which the interurban line is located favor the project, the matter will come before the commissioners for approval. Thereafter it will have to be submitted to the referendum vote of the people for final authorization of the privilege.

**Trolley Line Gains a Point in Akron.**—On Oct. 9 the Public Utilities Commission of Ohio rendered a decision to the effect that the Northern Ohio Traction & Light Company may operate single-truck cars without air brakes on lines where there are no steep grades. This means that the company may operate six cars on the Grant and Exchange Street lines, four on the Bowery line and twenty on other lines except the North Hill line. The order is effective for six months only and during the hours of heavy traffic morning and evening.

**Service Complaint in State of Washington.**—An application to the Public Service Commission at Olympia for an order to compel the Puget Sound Electric Railway to give what

the petitioners designate as a satisfactory interurban service in King County was recently made by Charles H. Ennis, a Seattle attorney representing a number of property owners living in King County. It is charged that the service furnished by the company is inadequate and that during the last three years the company has discontinued running trains at such hours as to provide for the accommodation of the traveling public and that the company has not provided the proper number of cars for the transportation of the passengers between Renton Junction and Seattle.

**Report on Traffic in Jersey City.**—E. P. Goodrich and George B. Ford, experts engaged by the City Planning Commission of Jersey City, N. J., report that in general the system of the Public Service Railway of that city is good, but that some present routes could be changed, others extended and some cars re-routed through the congested portions of the city with benefit to the service. The problem in Jersey City is involved with that of a number of neighboring and outlying places, and the entire situation should be considered, they say, in making recommendations for changes from existing conditions. They recommend that a single investigator be empowered to make such a study of the entire problem, including the requirements of each of the separate municipalities.

**Public Service Railway Contests Bridge Charges.**—Upon application of Frank Bergen, counsel for the Public Service Railway, Newark, N. J., Chief Justice Gummere on Oct. 11 granted a writ of certiorari to review the action of the Public Utility Commission fixing compensation for the use of the Clay Street bridge in trolley service. Mr. Bergen questioned the right of the commission to compel the company to pay for the use of the bridge. He declared that it was operated by Hudson and Essex counties as a matter of public convenience, and that there was a question whether any business enterprise should be discriminated against in paying for the use of it.

**New Haven Railroad Committees Elect Chairmen.**—The various committee of directors of the New York, New Haven & Hartford Railroad appointed to investigate the different phases of the company's business and make a report with recommendations to the full board have selected chairmen as follows: Connecticut electric railway committee, Charles F. Brooker; Rock Island electric railway committee, no selection; steamship committee, A. Heaton Robertson; relations with Boston & Albany, no selection; Massachusetts electric railway committee, Lawrence Minnot; Boston & Maine committee, William Skinner. At a recent meeting of the executive committee of the New York, New Haven & Hartford Railroad Theodore N. Vail and Alexander Cochrane resigned as members of the committee. The matter will be placed before the full board of directors for further action.

**Stock Offered to Traction Employees.**—In order to foster co-operation and give the employees an interest in making the road safe and efficient, the Scioto Valley Traction Company, Columbus, Ohio, has offered to sell 1000 shares of its stock to its employees. In making this offer President Frank A. Davis and Treasurer E. R. Sharp make the following explanation in a letter sent to employees: "We have purchased from the state banking department the common stock of the Scioto Valley Traction Company, formerly held by the Columbus Savings & Trust Company, at a price of \$12.50 per share. We now offer to the employees of the company 1000 shares of this stock at \$12.50 per share, its cost price to us, to be paid for either in cash or in monthly instalments extending over a period of one year. We will enter into a contract with the employees purchasing this stock to buy it back from them at any time within two years at \$12.50 per share if such employee should, within that time, express a desire to have us purchase the same. This offer is made that the employees may be financially interested in the company for which they are rendering service, with the belief that both the employees and the company will be benefited thereby. Subscriptions will be received for not more than twenty or less than five shares to an employee, and will be accepted and filed in the order in which they are received at the manager's office. Unless the entire amount is subscribed at an earlier date, this offer will remain open until Oct. 15, 1913."

## Personal Mention

**Dr. Henry Jameson** has been elected president of the Indianapolis (Ind.) Street Railway to succeed the late Admiral George Brown.

**Mr. I. L. Godfrey** has been appointed comptroller of the International Transit Company and the Trans-St. Mary's Traction Company, subsidiary companies of the Lake Superior Corporation, Sault Ste. Marie, Ont.

**Mr. J. M. Delaney**, who has been chief train dispatcher of the Buffalo, Lockport & Rochester Railway, Rochester, N. Y., has been appointed general superintendent of the company to succeed Mr. John H. Cain, resigned.

**Mr. E. B. Barber** has been appointed assistant comptroller of the International Transit Company and the Trans-St. Mary's Traction Company, subsidiary companies of the Lake Superior Corporation, Sault Ste. Marie, Ont.

**Mr. Walter L. Buckland**, for the last five years general agent of the Electric Express Company, operated by the New England Investment & Securities Company, with headquarters at Springfield, Mass., has resigned to devote his entire time to private business interests.

**Mr. Edward F. Boyle** has been appointed special examiner by the Public Service Commission for the First District of New York. Mr. Boyle is a lawyer and accountant and until recently had been chief of the executive staff in the office of the president of the Board of Aldermen. Prior to that time he had held various positions in the office of the commissioner of accounts for New York City.

**Mr. G. L. Langton**, who has been appointed auditor of the Kentucky Traction & Terminal Company, Lexington, Ky., was born in Kittery, Me., in 1883. He has been connected with Hodenpyl, Walbridge & Company and Hodenpyl, Hardy & Company, New York, N. Y., since 1906 as statistical clerk, bookkeeper, accountant, assistant traveling auditor, New York office manager and assistant general auditor.

**Mr. H. C. Prather** has been appointed general manager of the Buffalo, Lockport & Rochester Railway, Buffalo, N. Y., to succeed Mr. William E. Havens, Rochester, who held the title of acting general manager. Mr. Prather has been master mechanic of the company for some time. Mr. Prather has been connected with electric railway work for more than thirteen years. His first work was with the Union Traction Company of Indiana on overhead lines. He served subsequently with the United Railways, St. Louis, the Brooklyn (N. Y.) Rapid Transit Company, the Public Service Railway, Newark, N. J., and the Roanoke Railway & Electric Company. He was also connected with I. R. Nelson & Company, Newark, for which company he equipped seventeen cars of the Buffalo, Lockport & Rochester Railway with electric apparatus.

### OBITUARY

**T. Frame Thomson**, a British electrical engineer and financier and largely interested in South American enterprises, died suddenly at his home near London on Oct. 2. Among his other offices Mr. Thomson was deputy chairman of the Anglo-Argentine Tramways Company of Buenos Aires, and chairman of the Cordova Light, Power & Traction Company, Ltd., of Cordova, Spain. Three years ago Mr. Thomson endowed a series of lectures on the relations between engineering and commerce to be delivered before the British Institution of Civil Engineers. Editorial reference in regard to these lectures appeared on page 366 of the issue of this paper for Sept. 6, 1913.

**Ralph D. Gillett**, prominent in the development of electric railways in the western portion of Massachusetts, died suddenly at his home in Westfield on Oct. 14 at the age of forty-seven years. Mr. Gillett was widely known in the field of electric railway construction and was one of the promoters of the Berkshire Street Railway, Western Massachusetts Street Railway and other enterprises in the region between Springfield and Pittsfield. Besides being president of the recently completed Hampden Railroad, in Massachusetts, he was at the head of the Western Massachusetts Construction Company, which is building a high-speed electric railway for the Berkshire Street Railway between Lee and Huntington.

# Construction News

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

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

## RECENT INCORPORATIONS

**\*Owingsville & Olympian Railroad, Owingsville, Ky.**—Application for a charter has been made by this company in Kentucky to build an electric railway between Olympian Springs and Owingsville. Capital stock, \$25,000. Incorporators: W. S. Gudgell, H. C. Gudgell and A. T. Brown.

**\*Gallipolis & Northern Traction Company, Gallipolis, Ohio.**—Chartered in Ohio to build an electric railway in Gallipolis. Capital stock, \$50,000. T. W. Jackson, incorporator.

**\*North Canadian Valley Railway, Oklahoma City, Okla.**—Chartered in Oklahoma to build an electric railway from Oklahoma City to Shawnee, 40 miles. Capital stock, \$100,000. Incorporators: J. Kenneth Wright, W. A. Lybrand, F. B. Owen, Norman H. Wright and Henry G. Snyder, all of Oklahoma City.

**\*London, Grand Bend & Stratford Railway, London, Ont.**—Application for a charter has been made by this company to the Ontario Legislature to build an electric railway from London, northwesterly through London, Lobo, East Williams, West Williams, McGillivray, Stephens, Parkhill and Grand Bend, thence easterly to Exeter and Stratford, and then westerly to London, and branch lines. Offices have been opened at Parkhill. Incorporators: A. E. Beer and C. T. McAllister.

**\*Niobrara Water Power Railway, Pierre, S. D.**—Application for a charter has been made by this company in South Dakota to develop power from the Niobrara River and construct an electric railway in the county of Yankton, S. D., and the counties of Holt, Knox, Cedar, Dixon, Dakota, Thirston, Burt, Cuming, Stanton, Antelope, Pierce, Madison, Colfax, Dodge, Washington and Douglas in Nebraska. The company proposes to build a bridge across the Missouri River at Yankton and to enter Sioux City over the combination bridge. Capital stock, \$16,500,000. Incorporators: Charles W. Baker, Omaha; Herman P. Buhmn, Leigh, Neb.; O. S. Christian, Madison, Neb.; Peter A. Mangold, Bennington, Neb., and Glen W. Martens, Pierre, S. D.

**\*Nueces Valley, Rio Grande & Gulf Railroad, Belleville, Tex.**—Chartered in Texas to build a 25-mile electric or steam railway from Kitty along the Nueces River through Simmons and Live Oak to a point near the center of McMullen County. Capital stock, \$25,000. Headquarters, Belleville. Incorporators: W. A. Matthaei, H. F. Granau, Sr., C. R. Johnson, J. R. Brooks, H. F. Granau, Jr., H. T. von Rosenberg and R. E. Zeiske, Belleville; Leonard Tillotson, Sealy, Tex.; J. H. Shary, Omaha, Neb., and J. W. Atkinson, Tilden, Tex.

## FRANCHISES

**Tulare, Cal.**—The Big Four Electric Railway has received a franchise over certain streets in Tulare. This 45-mile line will connect Tulare, Visalia, Lindsay and Porterville. [E. R. J., Sept. 27, '13.]

**Peoria, Ill.**—The Peoria, Canton & Galesburg Railway has received a franchise from the Council in Peoria. This 52-mile line will connect Peoria, Canton and Galesburg. [E. R. J., Oct. 4, '13.]

**Watertown, Ill.**—The Moline, East Moline & Watertown Railway, Moline, will again ask the Board of Trustees for a franchise in Watertown. This company plans to extend its line to Port Byron in the near future.

**Waukegan, Ill.**—At a special meeting the voters of Waukegan have accepted the thirty-year franchise granted the Chicago & Milwaukee Electric Railway in Waukegan.

**Cedar Rapids, Ia.**—The United Light & Railways Company has received a twenty-five-year franchise from the Council in Cedar Rapids. The company has also received a forty-year franchise from the Council in Chattanooga, Tenn.

**Topeka, Kan.**—The Topeka Railway has received a twenty-year franchise from the County Commissioners over the Eighth Street line from the city limits of Topeka on the west to Gage Park.

**Middlesboro, Ky.**—W. Godfrey Hunter, Middlesboro, will ask the Council for a franchise in Middlesboro. This is part of a plan to build an electric railway to connect Middlesboro with other coal centers of that section. [E. R. J., Sept. 20, 1913.]

**Springfield, Mass.**—The Springfield Street Railway has asked the Council for a franchise to double-track its line from Woodlawn turnout to the Westfield line in Springfield.

**St. Louis, Mo.**—The United Railways has asked for a franchise along Florissant Avenue from Calvary Avenue to Robin Avenue in St. Louis.

**Orange, N. J.**—The Public Service Railway, Newark, has asked the Common Council for a franchise to extend its line in Central Avenue, Orange, from the East Orange line to the West Orange line.

**Orange, N. J.**—The Orange Mountain Traction Company has asked the Common Council for a franchise on Central Avenue in Orange.

**York, Pa.**—The directors of the York Railways have accepted the franchise recently granted by the Council authorizing the Jackson Street extension in York.

**Providence, R. I.**—The Rhode Island Company has asked the Council for a franchise to double-track a certain portion of Maryland Avenue and New York Avenue and for an extension of its tracks on Manton Avenue in Providence.

**Sutherland, Sask.**—The Saskatoon Municipal Railway has received a twenty-year franchise from the Council to extend its lines in Sutherland.

**Jackson, Tenn.**—The Jackson Railway & Light Company has received a fifty-year franchise from the Council in Jackson, in return for which the company will extend its line into West Jackson.

**Everett, Wash.**—The Seattle, Snohomish & Everett Railway, Seattle, has received a two-year extension of time on its franchise from the Council in which to begin the construction of its line in Seattle. This line will connect Seattle, Everett, Bothell and Snohomish and connect in Seattle with the Ravena line of the Puget Sound Traction, Light & Power Company.

## TRACK AND ROADWAY

**Birmingham (Ala.) Rapid Transit Company.**—Contracts will be awarded by this company in about thirty days to build its 19-mile line over certain streets in Birmingham. Plans and specifications have been approved by the city engineer and accepted officially by the city officials. This line will eventually be extended through Jefferson County. George B. Kelley, Birmingham, president. [E. R. J., Oct. 11, '13.]

**Pine Bluff & Sulphur Springs Interurban Railway, Pine Bluff, Ark.**—Surveys have been completed by this company and right-of-way obtained for 3 miles of its line from Pine Bluff to Sulphur Springs. Contracts have been let for grading and for ties. A. G. Russell, Pine Bluff, president. [E. R. J., Aug. 30, '13.]

**British Columbia Electric Railway, Vancouver, B. C.**—Negotiations are reported to be in progress by this company with the Great Northern Railway for the purchase of the abandoned right-of-way of the Cloverdale-Blaine line between Hazelmere and the International Boundary at Blaine, Wash. The proposed electric line will connect with the line projected by the Stone & Webster Corporation to Bellingham, and an extension may be built to the mouth of the Campbell River.

**Northern Electric Railway, Chico, Cal.**—Tracks are being laid by this company on its extension between Cement and Vacaville.

**Fresno (Cal.) Traction Company.**—Work will be begun at once by this company on its new line from the city limits of Fresno to the San Joaquin River, near the Riverside Country Club. Grading has been completed by this company on its 8½-mile extension between Muscatel and the new town-site of Biola.

**Fresno, Hanford & Summit Lake Railroad, Fresno, Cal.**—Plans are being considered by this company for an extension from Fresno to Selma.

**Pacific Electric Railway, Los Angeles, Cal.**—Grading has been begun by this company for its extension from the city limits of Santa Ana to Orange.

**San Rafael & San Anselmo Valley Railway, San Rafael, Cal.**—This company has asked permission of the Railroad Commission to issue \$100,000 in stock and \$100,000 in bonds, the proceeds of the sale of which the company plans to use to build its 6-mile line between San Rafael, San Anselmo and along the county roads in Fairfax. The company will use storage battery cars. Plans are being made by this company to take over the franchises granted in September to S. J. Norton by the Councils of San Anselmo and San Rafael and by the supervisors of Marin County. E. S. Raker, president, and C. S. Whitaker, secretary. [E. R. J., Oct. 4, '13.]

**Connecticut Railway & Lighting Company, New Haven, Conn.**—Plans are being considered by this company to extend its lines in Norwalk, Bridgeport, New Haven and in the adjacent territory of New Haven. It also plans an extension from Cherry Street and North Street in Milford, thence northerly through Orange to connect with the tracks of the company on Derby Avenue.

**Okeechobee Interurban Railway, Arcadia, Fla.**—This company has been organized to build an interurban railway from Arcadia southeast, crossing Joshua Creek and Kissimmee River to the eastern coast of Florida. Also a branch southeast via Bigler, Hall City, Palmdale and Mayport to mouth of Fisheating Creek. An extension is also planned to Fort Myers via La Belle and a separate line via Lake Childs to Sebring. Capital stock, \$1,000,000. E. Prouty, Arcadia, manager. [E. R. J., Sept. 6, '13.]

**Jacksonville (Fla.) Traction Company.**—Construction will be begun at once by this company on the Main Street extension from Seventeenth Street in Jacksonville to Long Branch, a distance of 1 mile.

**Rome Railway & Light Company, Rome, Ga.**—This company has placed in operation its 2-mile extension to East Rome.

**Kankakee & Urbana Traction Company, Urbana, Ill.**—During the next few weeks this company plans to extend its line northward from Rantoul to Ludlow.

**New Albany & French Lick Valley Traction Company, New Albany, Ind.**—Following the announcement by the Indiana Public Service Commission that this company, recently incorporated at New Albany, would be permitted to issue \$300,000 of common stock, officers of the company have begun the work of securing right-of-way and disposing of the stock. It is proposed that as soon as the initial issue of stock is sold the company will be permitted to market an additional \$200,000, after which a bond issue will be authorized. C. S. Hernley, Newcastle, secretary. [E. R. J., Sept. 20, '13.]

**Waterloo, Cedar Falls & Northern Railroad, Waterloo, Ia.**—This company has awarded a contract to R. A. Elzy, Marshalltown, Ia., for grading a 5½-mile extension from Urbana to Center Point. The contract for the bridging and culverts has been awarded to the Gould Construction Company, Davenport.

**Independence, Neodesha & Topeka Traction Company, Independence, Kan.**—Grading has been begun by this company between Neodesha and Independence. T. Blarksley, Neodesha, president. [E. R. J., Oct. 4, '13.]

**North Beach Railway, Baltimore, Md.**—This company has applied to the Public Service Commission for authority to issue \$15,000 of common stock. Work has been begun by this company on its 3-mile line between Chesapeake Beach and North Beach. John C. Shaw is interested. [E. R. J., June 28, '13.]

**Boston & Northern Street Railway, Boston, Mass.**—This company is asked to double-track its line from Hall's Corner to Broadway in Revere.

**Meridian Light & Railway Company, Meridian, Miss.**—This company has placed in operation its new Eighth Street line in Meridian to Oakland Heights, a distance of 2 miles.

**Metropolitan Street Railway, Kansas City, Mo.**—An extension of this company's lines into the Blue Valley is under consideration.

**United Traction Company, Albany, N. Y.**—Plans are being considered by this company for an extension over New Scotland Avenue in Albany.

**Blue Ridge & Interurban Railway, Hendersonville, N. C.**—At a meeting of the Chamber of Commerce in Anderson it was decided to secure all of the right-of-way and raise a bonus of \$10,000 to be presented to this company if it would consent to build a 2-mile extension from Cherry's crossing to Clemson College, in Anderson.

**Stark Electric Railroad, Alliance, Ohio.**—Arrangements are being made by this company to build its line between Alliance and Akron, via Malboa, Nevada, Baltimore and Lake.

**Cleveland (Ohio) Railway.**—Work has been begun by this company on its new Denison-Harvard line.

**Bartlesville (Okla.) Interurban Railway.**—This company is asked to consider plans to extend its lines in Bartlesville south on Keeler Avenue to Tenth Street, east on Tenth Street to Wyandotte Avenue and Fourth Street.

**Henryetta (Okla.) Interurban Railway.**—Financial backing has been secured and final surveys will be begun at once by this company for its 100-mile line to connect Henryetta with various coal mines and oil fields within a radius of 10 miles. Two preliminary surveys have been made to Dewar and the permanent one will be extended to Coalton. This section of the line will be built first. The company then plans to build east and west extensions with Shawnee and Muskogee as the proposed ultimate terminals. C. H. Kellogg, Henryetta, is interested. [E. R. J., Sept. 6, '13.]

**Tulsa (Okla.) Street Railway.**—Improvements which will include some additional trackage are contemplated by this company for its lines in Tulsa.

**Hamilton (Ont.) Railway.**—This company has received the approval of the Ontario Railway & Municipal Board for its extension into the Kerr Milling Company's premises at Dundas.

**Toronto Suburban Railway, Toronto Junction, Ont.**—This company has been asked by the Municipal Board to build its Annette Street line in Toronto at once.

**Pacific Power & Light Company, Astoria, Ore.**—Construction will be begun at once by this company on an extension from the business section of Walla Walla to the Fair Grounds.

**Portland Railway, Light & Power Company, Portland, Ore.**—This company is asked to consider plans to build an extension between Rose City Park and the Montavilla line out to the city limits of Portland.

**Butler (Pa.) Passenger Railway.**—Work will be begun at once by this company on its 1½-mile extension of the Main Street line to the Boulevard in Butler.

**\*Pittsburgh, Pa.**—A company of Pittsburgh promoters are considering plans to build an electric railway between Pittsburgh and Erie. No names are yet given of those interested in the project.

**Montreal (Que.) Tramways.**—A large amount of work is being done by this company on improvements of its lines in Montreal. Among the improvements are the laying of new intersections on many of its lines.

**Montreal & Southern Counties Railway, Montreal, Que.**—Reports state that much of the work on the roadbed for the extension to St. Cesaire, Que., has been completed by this company, and that it is contemplated to extend the recently completed electrification of the Central Vermont Railway from Richelieu to Marieville, Que., a distance of 4 miles.

**Spartanburg Railway, Gas & Electric Company, Spartanburg, S. C.**—A 25-mile extension from Spartanburg to Cross Anchor is being planned by this company.

**Dallas, Corsicana & Palestine Railway, Dallas, Tex.**—Plans are being considered by this company to build its 150-mile line from Dallas to Palestine and Corsicana. No definite plans have yet been made as to the awarding of contracts for the construction of the line. C. Roe Hall, Palestine, secretary. [E. R. J., Dec. 14, '12.]



**Dallas Southwestern Traction Company, Dallas, Tex.**—Right-of-way has been secured and contracts will be awarded by this company about Jan. 1 for its 80-mile line between Dallas, Glen Rose, Grand Prairie, Mansfield, Alvarado and Cleburne. The following officers have been elected: E. P. Turner, president; C. A. Dunn, vice-president; B. B. Cain, treasurer; George Williams, secretary; E. M. Gleason, general manager; H. John T. Witt, 606 Practorian Building, Dallas, chief engineer. [E. R. J. Oct. 4, '13.]

**Southern Traction Company, Dallas, Tex.**—This company has placed in operation its 98-mile line from Dallas to Waco. A branch to Corsicana, 35 miles, is now being built. Power is supplied by the Fort Worth Light & Power Company.

**Northern Texas Traction Company, Fort Worth, Tex.**—In compliance with a petition filed several weeks ago this company has agreed to extend its Summit Avenue line in Fort Worth 1 mile beyond the present terminus as soon as financial arrangements are made by the petitioners.

**Blue Ridge Interurban Railway, Greenville, Tex.**—An extension from Blue Ridge to Bonham is being contemplated by this company.

**Houston (Tex.) Electric Company.**—Announcement has been made by this company that it will spend \$70,000 on improvements of its lines in Houston Heights. The improvements will include heavier rails.

**Charleston-Dunbar Traction Company, Charleston, W. Va.**—This company has placed in operation its 4½-mile line from Charleston to Dunbar.

**Monongahela Valley Traction Company, Fairmont, W. Va.**—This company has placed in operation its 25-mile line between Clarksburg and Weston.

**Morgantown (W. Va.) Interurban Railway.**—It is reported that bonds have been voted by the citizens at Morgantown and vicinity to aid this company to build its 10-mile line between Morgantown, Star City and Point Marion. S. D. Brady, chief engineer. [E. R. J., June 7, '13.]

**Wheeling (W. Va.) Traction Company.**—Work has been begun by this company laying new rails on its lines in Glendale.

**Minneapolis, Merrill & Marinette Railway, Merrill, Wis.**—Surveys have been completed by this company from Merrill to Athens. This line will connect Minneapolis and Merrill, via Abbotsford and Athens. F. W. Kubasta, Marinette, secretary. [E. R. J., June 7, '13.]

#### SHOPS AND BUILDINGS

**British Columbia Electric Railway, Vancouver, B. C.**—Plans are being made by this company for the construction of extensions to its Mount Pleasant carhouses on the block between Main and Quebec Streets and Thirteenth and Fourteenth Avenues in Vancouver. The structure will extend 132 ft. on Main Street and Quebec Street and 300 ft. along Fourteenth Avenue. It will be of reinforced concrete construction. On Main Street the height of the building will be 40 ft. and on Quebec Street about 20 ft.

**San Diego (Cal.) Electric Railway.**—This company has awarded a contract to John Campbell, San Diego, to build its new carhouse on Adams Avenue in San Diego. The cost is estimated to be about \$92,000.

**Springfield (Ill.) Consolidated Railway.**—Work has been begun by this company on its new carhouse at Sixth Street and Ash Street in Springfield. The building will be erected by the Clinton Bridge Works and is to be of steel construction, with concrete foundation. The cost is estimated to be about \$5,800.

**Kankakee & Urbana Traction Company, Urbana, Ill.**—Plans have been completed by this company for a new carhouse on North Market Street in Champaign. It will contain three tracks and a pit.

**Kentucky Traction & Terminal Company, Lexington, Ky.**—This company plans to build soon a new passenger station on Main Street between Limestone Street and Upper Street in Lexington.

**Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md.**—This company will soon build a new freight station in Baltimore. The structure will be 30 ft. x 150 ft.

**Bay State Street Railway, Boston, Mass.**—Plans are being made by this company to establish a waiting room at Main Street and Centre Street in Brockton.

**Cleveland (Ohio) Railway.**—Plans are being made by this company to begin work soon on its new repair shops at Washington Boulevard and Harvard Avenue in Cleveland. The shops will replace the present repair plant at Lakeview.

**Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.**—A passenger station and terminal freight houses will be built by this company at Niagara-on-the-Lake as soon as the company's new St. Catharines-Niagara line is completed. The company is considering plans to purchase the property now occupied by the Armstrong-Addison, LeFaugh and Greene buildings at Niagara-on-the-Lake.

**Toronto (Ont.) Railway.**—This company has plans to build an addition to its carhouses on Connaught Avenue in Toronto in the near future. The cost is estimated to be about \$9,000.

**Greenville, Spartanburg & Anderson Railway, Greenville, S. C.**—Plans are being made by this company to build new passenger stations in Duncan and in Taylor, S. C. A. C. Lee, Greenville, chief engineer.

**Dallas (Tex.) Electric Corporation.**—Preliminary arrangement have been completed by this company to build soon new repair shops in Dallas. The structure is estimated to cost about \$120,000.

**Eastern Texas Traction Company, Dallas, Tex.**—This company plans to build a new office building on the corner of King Street, Lee Street and Washington Street in Dallas in the near future. The company has recently opened offices in the Teague Building on West Lee Street in Dallas.

**Tyler Traction Company, Clarksburg, W. Va.**—This company has awarded a contract to Dayton & Francis to build a new carhouse in Sistersville. The structure will be of brick, stone and cement construction.

#### POWER HOUSES AND SUBSTATIONS

**Oakland, Antioch & Eastern Railway, Oakland, Cal.**—This company will install in its power plant in Oakland one 750-kw synchronous motor generator set consisting of two 650-volt, d.c. generators connected in series, and 11,000-volt, three-phase, 60-cycle, 514 r.p.m. motor with direct-connected exciter. This apparatus has been ordered from the Westinghouse Electric & Manufacturing Company.

**United Railways & Electric Company, Baltimore, Md.**—An order has been placed by this company with the Westinghouse Electric & Manufacturing Company for one 2000-kw, 600-volt, six-phase, 25-cycle, commutating pole rotary converter, three 750-kw, 13,200-volt, air blast transformers and switchboard for the control of same for its power plant in Baltimore.

**Pittsburgh (Pa.) Railways.**—This company has placed an order with the Westinghouse Electric & Manufacturing Company for three 500-kw, 600-volt, six-phase, 60-cycle rotary converters with three 550-kva, 22,000-volt, three-phase O. I. S. C. transformers, and one fourteen-panel switchboard for the control of same for its power plant in Pittsburgh.

**Greenville, Spartanburg & Anderson Railway, Spartanburg, S. C.**—An order has been placed by this company for one complete portable substation consisting of the following: One steel car equipped with Burke switches, lightning arresters and choke coils; one 500-kva, O. I. S. C., three-phase, 60-cycle, 44,000/2400-volt transformers, and one 500-kw motor-generator set consisting of two 250-kw, 750-volt, 900-r.p.m., direct-current generators, and one 750-hp, three-phase, 60-cycle, 2400-volt, single-phase motor and one 6½-kw direct-connected exciter. This apparatus has been ordered from the Westinghouse Electric & Manufacturing Company.

**Puget Sound Traction, Light & Power Company, Bellingham, Wash.**—It is reported that this company plans to build a new power house on the Baker River and Skagit River sites in Bellingham.

# Manufactures and Supplies

## ROLLING STOCK

**Dominion Power & Transmission Company, Ltd., Hamilton, Ont.**, has received one freight car from the Preston Car & Coach Company.

**Nipissing Central Railway, North Cobalt, Ont.**, which is operated by the Temiskaming & Northern Ontario Railway Company, Toronto, Ont., is considering the purchase of additional cars.

**Cape Breton Electric Company, Sydney, N. S.**, has ordered the three double-truck, double-end closed cars which it is having built to be equipped with Baldwin trucks, four 40-hp Canadian Westinghouse motors for each car, and Canadian Westinghouse air brakes.

**Edmonton (Alta.) Radial Railway** has received ten steel underframe, double-truck, single-end pay-as-you-enter cars from the Preston Car & Coach Company, making twenty-eight delivered out of an order of thirty-five. The remainder will not be built until 1914.

**Guelph (Ont.) Radial Railway** has received one double-end, double-truck, pay-as-you-enter city car from the Preston Car & Coach Company. It is mounted on standard truck with rolled steel wheels, Westinghouse 101-B2 quadruple motor equipment, Westinghouse SM-1 air brake, and the body is finished in natural cherry inside and out. Crouse-Hinds imperial arc headlight, Providence fenders and Root scrapers are used.

**London (Ont.) Street Railway**, noted in the *ELECTRIC RAILWAY JOURNAL* of Oct. 11, 1913, as having ordered six single-truck, single-end, pay-as-you-enter city cars from the Preston Car & Coach Company, has specified that these cars are to be mounted on Brill 21-E trucks, with 8-ft. base. The doors on the rear platform will be operated in conjunction with the folding steps by a system of leverage under the control of the conductor. The front vestibule door is to be operated in a like manner. The bodies are to be finished inside and outside in natural cherry. There will be ten cross seats, two longitudinal and three stationary seats in each car, giving a total seating capacity of thirty-two passengers. There will be no bulkheads. The roof will be turtleback.

**New York State Railways, Rochester, N. Y.**, noted in the *ELECTRIC RAILWAY JOURNAL* of April 19, 1913, as having ordered twenty-five pay-as-you-enter cars from the G. C. Kuhlman Car Company, has issued the following specifications concerning these cars:

Seating capacity.....	46	Cables .....	West.
Weight (car body only),		Curtain fixtures.....	Cur. Sup. Co.
	17,500 lb.	Curtain material....	Pantasote
Bolster centers, length,		Designation signs....	Hunter
	22 ft. 3 in.	Fare boxes.....	New Haven
Length of body...30 ft. 11 in.		Fenders .....	Eclipse
Length over vestibule,		Gears and pinions....	West.
	43 ft. 6 in.	Heaters .....	Cooper
Width over sills...8 ft. 3 in.		Headlight .....	Dayton
Width over all...8 ft. 5¼ in.		Journal boxes....	Symington
Height, rail to sills...31¼ in.		Motors..two West. No. 307,	
Height, sill to trolley base,		outside-hung.	
	8 ft. 8 in.	Paint .....	Devoe
Body....steel sides to win-		Registers .....	International
dow rail; posts and fram-		Sash fixtures.....	Kuhlman
ing wood		Seats .....	Brill rattan
Interior trim.....cherry		Springs .....	Brill
Headlining .....	Galco	Step treads.....	Feralum
Roof.....plain arch		Trolley catchers....	Wilson
Underframe .....	steel	Trolley base.....	Nuttall
Air brakes.....	West.	Trucks.....	Brill 39-E
Axles .....	Brill	Varnish..Beckwith & Chan-	
Conduits and junction		dler, Valentine.	
boxes .....	West.	Wheels .....	National

## TRADE NOTES

**Newman Clock Company, Ltd., London, England**, has opened a branch office at 55 Station Street, Birmingham, England.

**National Insulator Company, Pittsburgh, Pa.**, has sold through its sales agent, C. H. Davis, at Atlantic City, a two-

carload order of insulators to the Georgia Railway & Power Company.

**Allis-Chalmers Manufacturing Company, Milwaukee, Wis.**, has placed A. J. Cooper, recently of the engineering department of the Milwaukee main office, in charge of the air-brake and equipment sales of its New England section.

**Taylor-Wharton Iron & Steel Company, Philadelphia, Pa.**, has elected A. E. Borie chairman of the board of directors. Mr. Borie was formerly vice-president of the company. J. W. Jones and W. L. Wright were chosen vice-presidents.

**Thomas A. Edison, Inc., Orange, N. J.**, announces the election of E. Hudson to the office of fourth vice-president of the company. Mr. Hudson will continue as heretofore in charge of the sales of the primary and battery department and will make his headquarters in Orange, N. J.

## ADVERTISING LITERATURE

**Sprague Electric Works of General Electric Company, New York, N. Y.**, have issued a folder listing their flexible-steel armored conductors and Greenfield flexible-steel conductor.

**Hydrex Felt & Engineering Company, New York, N. Y.**, has issued a catalog explaining its membrane method of waterproofing concrete and insulating it from the effects of electrolysis, especially if below grade, by means of its felt and compound.

**Siemens & Halske and the Siemens-Schuckert Works, Berlin, Germany**, began in July to publish a house monthly entitled "Mitteilungen" (reports). The August issue, which has just come to hand, describes their automatic track switches for potentials up to 800 volts and also contains the first instalment of an article on automatic railway signaling.

**National Tube Company, Pittsburgh, Pa.**, has issued a folder describing its spring plug cock, which is made in different metals for varying service. It has an inverted plug with a spring at the bottom, which constantly presses the plug firmly against the seat. While the plug usually turns easily, should it stick occasionally, it may be loosened by a blow on the top, after which it is immediately re-seated by the spring. The cap at the bottom is screwed securely into the body and cannot be tampered with by the workman.

## NEW PUBLICATION

**Steam, Its Generation and Use.** Published for distribution by the Babcock & Wilcox Company, New York. Cloth, 335 pages.

The thirty-fifth edition of this volume, which is without doubt the best known publication on steam boilers in existence, has been completely rewritten and expanded in many respects. It begins with a brief history of the utilization of steam, and this is followed by chapters on the early forms of water-tube boilers, the evolution of the present type and a description of its constructional details, circulation and other features of desirability. A new chapter on the measurement of heat has been added, including discussions of thermometric scales, specific heats, melting points and expansion of different substances and pyrometers, and new chapters on boiler-feed water have been inserted with discussions on the action of chemicals and the amounts of soda ash and lime required per grain per gallon for the elimination of scale-forming impurities. The usual tables on the properties of steam appear in the chapters on this subject, one of these supplying the much-needed demand, caused by the general use of the turbine, for figures on the properties of steam at high vacuums, and another showing the properties of superheated steam. The original chapters on properties of air, combustion analysis of flue gas and chimney losses have been completely rewritten, and the chapters on steam fuels have been expanded to cover the subject in the most thorough manner, including an unusually complete table of analyses of steam coals of the United States. To the chapter on efficiency and capacity of steam boilers has been added a chart showing the approximate relation between these two factors in steam production together with a new list of boiler tests. New chapters on boiler operation, boiler settings and boiler room piping have also been included in the volume.