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Of this issue of the ELECTRIC RAILWAY JOURNAL 9500 copies are printed.

### The Convention Daily

The ELECTRIC RAILWAY JOURNAL takes pleasure in announcing that it will issue four dailies at the next convention of the American Street & Interurban Railway Association. They will be published on Tuesday, Wednesday, Thursday and Friday of the convention week and will contain all the news of the convention and other features which have proved so successful in the dailies issued in previous years by the ELECTRIC RAILWAY REVIEW. The plan of

publishing a "Convention Number" prior to the convention, followed by the STREET RAILWAY JOURNAL for many years, will also be continued this year, so that the consolidation of the STREET RAILWAY JOURNAL and the ELECTRIC RAILWAY REVIEW will result in the continuance of the convention features of both papers.

### The Motor Bus Craze

For the past two or three years, the London electric transportation enterprises, particularly the underground railway companies, have suffered severely from motor-bus competition. Present indications point to the practical cessation of danger from this competition on account of the high rate of depreciation on motor-buses, the existence of which will be appreciated by owners of automobiles. Although the prospectuses of many of the motor-bus companies nominally provided for considerable depreciation in their accounts, the results indicate that the allowance was not sufficient and it is now said that most if not all of the companies are losing money. Although the laws in England regulating franchises are very liberal to bus companies, and quite the opposite to railways of all kinds, this advantage does not seem to have overcome the physical handicaps. Motor-buses have their places, and in New York, where a 10-cent fare is charged and the cars run over asphalt pavements, there may be a profit, but as a direct competitor to a good car service on rails there is nothing in auto-buses.

### Branch Line Rates in Massachusetts

In the investigation of the Massachusetts Board of Railroad Commissioners into the fares of the Natick & Cochituate Street Railway, the question has arisen of the right of a company to make an unprofitable branch line charge a higher rate of fare than a more profitable main line. The petitioners in the suit against the company asserted that 2,000,000 passengers on the main line through Wellesley and Natick were paying an extra cent each per annum to support the service on the unprofitable Needham branch, and argued that a higher rate of fare would be justified on the branch on the principle of the greatest good to the greatest number. In opposing this view representatives of the company declared that it was not feasible to determine the capitalization of a branch line with reasonable accuracy, because of the existence of a large amount of fixed property of the company which is in general use over the entire system. It is impossible to determine with accuracy the exact operating expenses on a branch line. The riding public prefers a uniform rate in street railway service, and if the branch lines of an established system should have to bear their own burdens the extension of systems and decentralization of population, which are essential to public welfare, would be seriously retarded.



### The New York Situation

The announcement last week that the operation of the Fulton Street line in New York would be abandoned and the report that two other subsidiary companies would be segregated from the Metropolitan system, give an intimation of a possible solution of the New York City problem. If the operating conditions were different, other remedies might be possible, but under existing conditions of transfers and motive power none other seems available. As the receiver of one of the lines has sagely remarked: "There is no profit in carrying people for nothing." The Fulton Street line was a horse-car line and presumably the other lines which will first be separated from the main stem will also be divisions using animal power, because such roads, under the conditions existing in New York, cannot be made profitable.

In reviewing the obstacles to an improvement of the New York situation two points stand out with especial prominence. One involves motive power, the other the issue of transfers. New York was the last of the large cities to maintain a large number of independent companies, as it was also the last to retain horse-power on many of its important lines. The origin of the two questions which are now before the company for solution date from the time when these companies were brought together to form the Metropolitan system. This was 16 years ago, when the large holding companies in other cities were being formed and when the possibilities of improved motive power in street railway operation were becoming apparent. If animal power was retained few economies could be made. But if more powerful means for car propulsion were available it was believed that the history of the transportation system in New York should be the same as that indicated to be possible elsewhere, with the added advantage of the greater field which only a metropolitan city could afford. The story of the attempts to secure a satisfactory power is well known. Other cities introduced the trolley, but it was forbidden in New York; not by law, but through local sentiment, which prevented the local authorities from giving the necessary permission. Broadway, and later Columbus and Lexington Avenues, were cabled at great expense, only to have their apparatus scrapped after a few years' use. A refuge was finally found for the lines of greatest traffic in the underground conduit system, which proved enormously expensive in both construction and operation. Many attempts were made to secure an independent motive power for the cross-town lines, but without success. Even on the conduit lines the speed expected was not obtained, on account of the congestion on the streets. On many lines the cars run but slightly, if at all, faster than the horse cars, yet a difference of 1 m. p. h. in speed in New York corresponds to half a million dollars annually in operating expenses.

The second and perhaps the most serious of all the obstacles with which the company has had to contend lay in the transfer requirements of the State law, the actual extent of which have become apparent only through rulings of the courts during the last 10 years. Cases upon cases coming under this enactment have been carried by the company to the highest tribunals, only to meet defeat, since each decision up to within the last few months, has ex-

tended the length of ride allowed on the transfer. This has cut down the average fare paid per passenger until it is barely over 3 cents, while there has been an actual decrease in the gross receipts during the past five years. The future of the company is still to be determined, but this much is certain, no satisfactory system of urban transportation in New York can be established until conditions of operation have greatly changed from those at present in effect.

### Water Powers

At the conference of governors in the White House last month, especial attention was directed to the rapid decrease in the supply of fuel. It is estimated that even at only the present rate of consumption the amount of anthracite coal in this country will be exhausted during the life time of some of those now living, while the quantity of bituminous coal will last for only a few hundred years at best. Statistics also indicate that of the 30,000,000 hp annually generated in this country for manufacturing, railroad and other power services, 9,000,000 hp is utilized electrically. Electrical development is thus directly responsible for a large and increasing part of the present consumption of coal, but it also supplies an agent by which this drain upon an exhaustible supply of energy may be reduced. This phase of the subject was discussed at the conference of governors by H. S. Putnam, whose paper has recently been published in pamphlet form, with the other papers at the meeting, by the Inland Waterways Commission, which had charge of the arrangements at the conference.

The proportion of water power to the total commercial power development of the country has shown noteworthy fluctuations. In 1870 48.3 per cent of all the power used in the country was obtained hydraulically, but this ratio had fallen in 1905 to 11.2 per cent. Conditions have now changed and indicate a renewed interest in hydraulic development. The preservation of the available water powers of the nation is dependent in no slight degree upon the maintenance of the forests, which tend to equalize the flow of water in the streams throughout the year, but with proper safeguards it is estimated that the total amount can be increased over that now available. In citing instances of individual places or districts, Mr. Putnam estimates the power of Niagara to be 7,000,000 hp; the upper Mississippi River and its tributaries at 2,000,000 hp, the southern Appalachian regions at 3,000,000 hp, while the State of Washington has 3,000,000 hp and northern California 5,000,000 hp available. Altogether the water power in the United States exceeds 30,000,000 hp, and under certain assumptions as to storage reservoirs this amount could be increased to 150,000,000 hp or possibly more. Even at the smaller figure, the power would represent the consumption, based on the economy of the average steam engine plant, of 650,000,000 tons of coal, or 50 per cent in excess of the total coal production of the country in 1906.

The conference of governors will prove a benefit to the country if it results in calling greater attention to this important asset in the nation's wealth. Water powers have been looked upon askance to some extent in the past by power users on account of fluctuation in the amount of current flow. In denuding the land of its forests, the country has been prodigal of the timber, the soil which was



protected by the roots and has now been washed into the rivers and harbors to form obstacles to navigation, and the water power itself.

The other papers at the conference of governors called attention to an alarming condition of affairs. Mr. Putnam's paper is of a constructive type and points the direction to the importance of preserving and increasing an important source of national wealth.

### The Question of Direct-Current Feeders

A chance for the exercise of engineering ability that is frequently neglected is in the proportioning of the direct-current feeder system and the maintenance of a proper relation of the losses therein to the load from year to year. On many roads the cost of power at the station busbars is known to the thousandth of a cent each day, and every effort is made to keep this cost to an absolute minimum by the introduction of every efficiency-building factor. On the same road the efficiency of the direct-current distribution system will not only be surprisingly small, but the subject is apparently absolutely neglected except when the operating superintendent complains of the low voltage, yet no attempt is made to ascertain the possibilities in earning power of some money spent in copper.

It is sometimes difficult to realize why the apathy on the subject which is so clear should exist. It may be due to the apparent difficulty in getting a comparative view of the situation. Recording wattmeters on station load panels are quite common, and the coal bill is a reminder in an insistent way of the amount of fuel consumed. Figures on coal per kilowatt-hour and labor per kilowatt-hour for various sizes and classes of stations are available with a fair amount of ease so that the comparison of one's cost of power per kilowatt-hour with that of another is not a difficult matter. Every possible economical method consequently is practised in the endeavor to produce a greater power output per dollar expended in the power station.

As meters are commonly installed and records usually kept, however, it is not so easy to determine how much of the output is dissipated in feeder losses. From station wattmeter readings and car-mile records we can get at the power consumption per car-mile, but as this value is so dependent on weight of equipment, schedule requirements and conditions of grade and alignment of tracks, it is difficult to secure any light on copper losses by comparison with the same figure from other roads. If all of the cars were equipped with car wattmeters, these losses could be quite easily determined as an aggregate or for individual feeders by proper reading of the instruments. A complete equipment of car wattmeters would operate to great advantage in giving this sort of information, as well as being a check on the performance of individual car equipments and motormen, but few roads are so equipped.

The difficulty of the determination of these losses does not entirely explain the frequent indifference to them, however, as they may be measured much more easily than by the method outlined above. A combination of wattmeter at the station and portable recording voltmeter at the delivery end of the feeder, for instance, will give the information at a minimum of expense and in sufficient detail. The subject is so important that it should receive much more

attention than it evidently does. Frequently large sums are expended to better the station economy 2 or 3 per cent, while the same amount would reduce copper losses to a much greater aggregate saving. How many managers know, or have an engineer who knows, the amount of power which is being dissipated as losses in the distribution system, and what investment would be necessary to reduce these losses to an economic figure? Why are more and larger cars constantly added with no thought of additional copper losses? In considering the purchase of more or larger equipment it is necessary to consider power station capacity; why not consider feeder capacity? Why is there absolute aversion to the expenditure of a dollar for copper which may save 10 or 15 cents a year in losses? Why not spend something to save some more in feeder losses as well as in other parts of the system? Copper has one advantage—its depreciation item is smaller than that of perhaps any other part of the equipment.

While the subject is in mind, it may be well to ascertain whether or not the copper already in service is being employed to the best advantage. In passing under a trolley section insulator at night, a considerable change in the brilliancy of the lights in the car is frequently noticed. This is usually a good indication of a defect in the copper layout. The original distribution may have been designed correctly, but natural changes in conditions of schedule or other factors may not have been accompanied by corresponding proper changes in feeder taps, section insulators, etc., so that an unequal distribution of the load on feeders, and consequent inefficiency, has resulted.

### State Commissions on the Accounting System

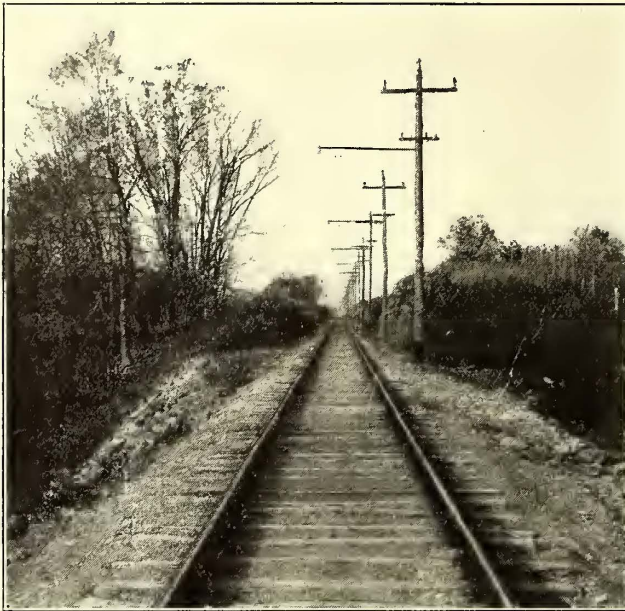
A tendency to postpone the introduction of the new classification of accounts for electric railways until 1909 is indicated in the replies of two State commissions to inquiries of the *ELECTRIC RAILWAY JOURNAL*, published in another part of this issue. The great majority of the electric roads are, of course, intrastate and substantial uniformity will not be secured unless the State commissions follow the action of the Interstate Commerce Commission. While it appears that some of the States have accepted or will adopt the interstate classification, commissions of other States will hold hearings on the subject before taking action. Massachusetts and Virginia will postpone promulgation of any change from the present prescribed classification. The commissions of Michigan and Kansas will hold hearings before any decision is reached. As action taken by State commissions independent of the interstate commission will determine the procedure of all railways not engaged in interstate commerce, it is important for them to be fully represented at any meetings which they are asked to attend in order to present the point of view of the railways. Various meetings of this character will be held in the future, and the officials of electric railways should be represented at them. In attending such meetings, executive and accounting officials should be prepared to present the facts about operation or accounting methods which will assist the representatives of the public to remember that fairness requires that the standpoint of the corporations and holders of their securities shall receive as much consideration as the standpoint of the traveling public.



# THE YOUNGSTOWN & OHIO RIVER RAILROAD

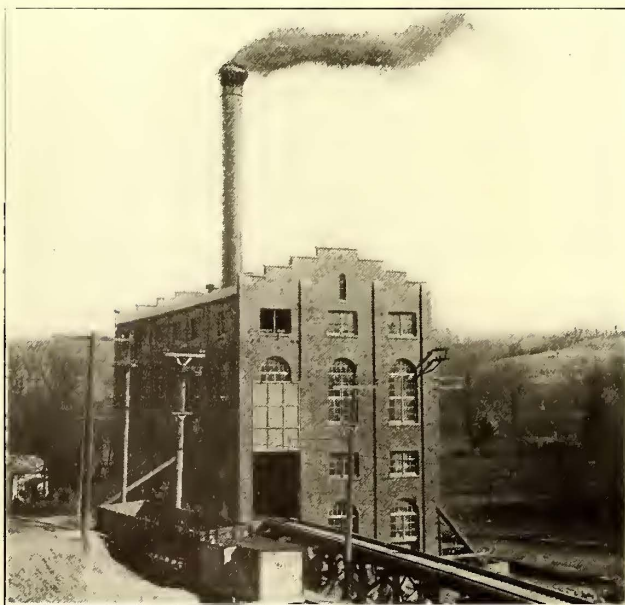
BY C. W. RICKER

The Youngstown & Ohio River Railroad will extend, when completed, from Salem to East Liverpool, Ohio, a distance of 35 miles. Its location and connections are



Youngstown & Ohio River Railroad—Track and Roadway

shown on the accompanying map. It is notable that this line completes electric railway communication between Cleveland and the Ohio River, across the eastern part of Ohio. The tracks of the Northern Ohio Traction Company, the Stark Electric Railway and the Youngstown & Ohio River Railroad are so connected that cars can be run through from



Youngstown & Ohio River Railroad—Power Station

Lake Erie to the Ohio River. Connection is made with the Youngstown & Southern at Leetonia and arrangements have been made with that road for through service between Youngstown and East Liverpool and between Youngstown and Salem. At Youngstown connection is

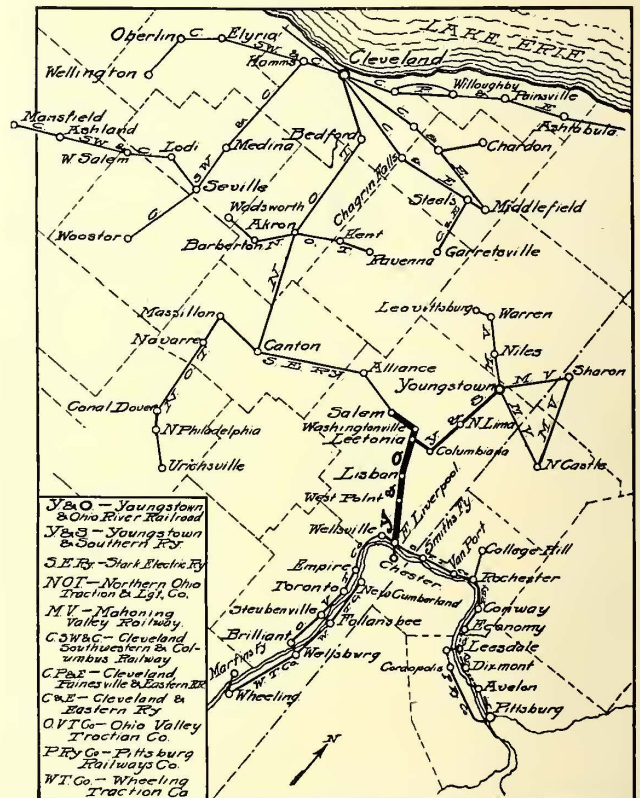
made with the Mahoning Valley Railway which reaches Warren, Sharon and New Castle.

At East Liverpool, the Youngstown & Ohio River Railroad connects with the Ohio Valley Traction Company, the lines of which, together with those of the Wheeling Traction Company and the Pittsburg Railways Company, extend along the Ohio River from Wheeling, W. Va., to Pittsburg.

The Youngstown & Ohio River Railroad is now giving regular hourly service between Salem and Lisbon connecting with the Youngstown & Southern at Leetonia and the Stark Electric at Salem, the latter of which in turn connects with the Cleveland service of the Northern Ohio Railway at Canton.

### TRACK AND ROADWAY

Work is now in progress upon the roadbed and track of the Youngstown & Ohio River Railroad and it is expected that the line will be completed to East Liverpool this sea-



Youngstown & Ohio River Railroad—Route and Connections Between Cleveland and the Ohio River

son. At present the permanent way, though in use, is far from finished. The country through which the line is being built is very rough and the problem of location was unusually hard. Some idea of the difficulties encountered may be gathered from the following facts: The line must pass over four summits, two about 500 ft. and two about 400 ft. higher than the southern end. Between these summits the valleys reach down to within 200 ft. of the lowest level. About 47 per cent of the line will be on curves and over 12,000 ft. will be on trestles, some of these being more than 75 ft. high. The constructional difficulties of this route also may serve to account for the rather heavy power equipment which has been provided.

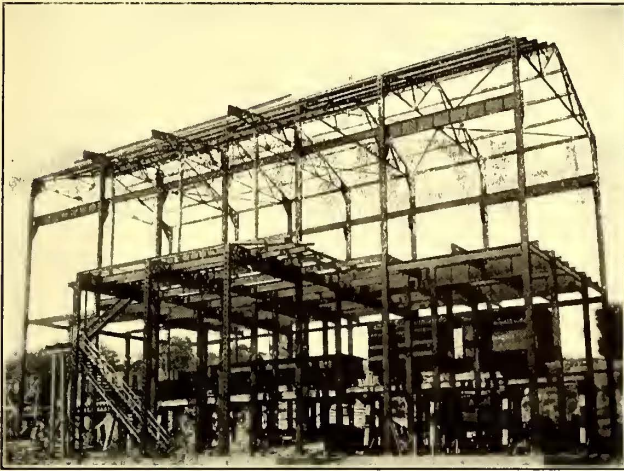
### PRESENT TRANSPORTATION FACILITIES.

Only the trouble and expense of building such a line can explain the paucity of means of transportation in this region. Columbiana County, within which the new line is

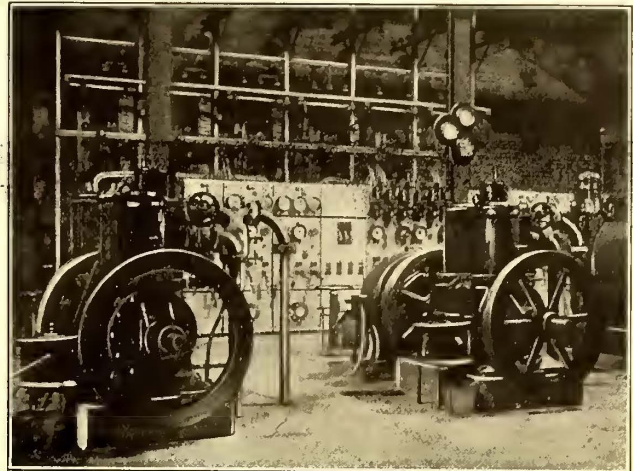


located, had, in 1900, about 70,000 inhabitants, of which 41,000 lived directly along the line of this railway and there has been a large increase in population since the census of 1900. The industries are coal mining and manufactures of

business at the county seat. Travel between any other two of the cities in the county was almost equally difficult and expensive. Communication with the towns in neighboring counties was not much better until the partial opera-



Youngstown & Ohio River Railroad—Power Station Framework

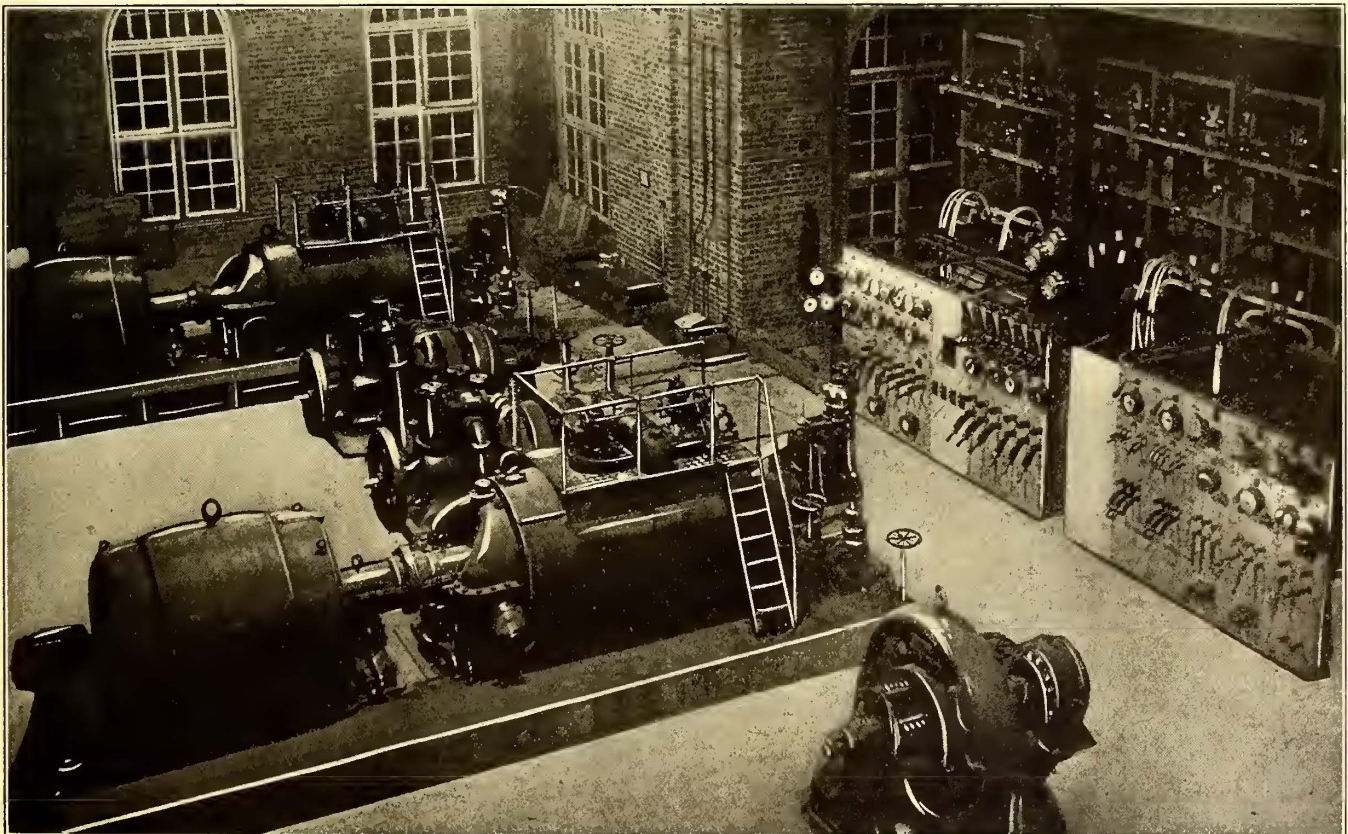


Youngstown & Ohio River Railroad—Exciter Units

iron and porcelain. The county seat is Lisbon, which is reached by two steam roads, each of which runs only two passenger trains on week days and none on Sunday. Neither of these steam roads runs to the principal cities in the county—Salem on the north and East Liverpool and

tion of the new road was begun during the past winter. Then by setting up a temporary power plant, traffic was started over as much of the Youngstown & Ohio River and Youngstown & Southern roads as could be used.

That portion of the road between Salem and Washing-

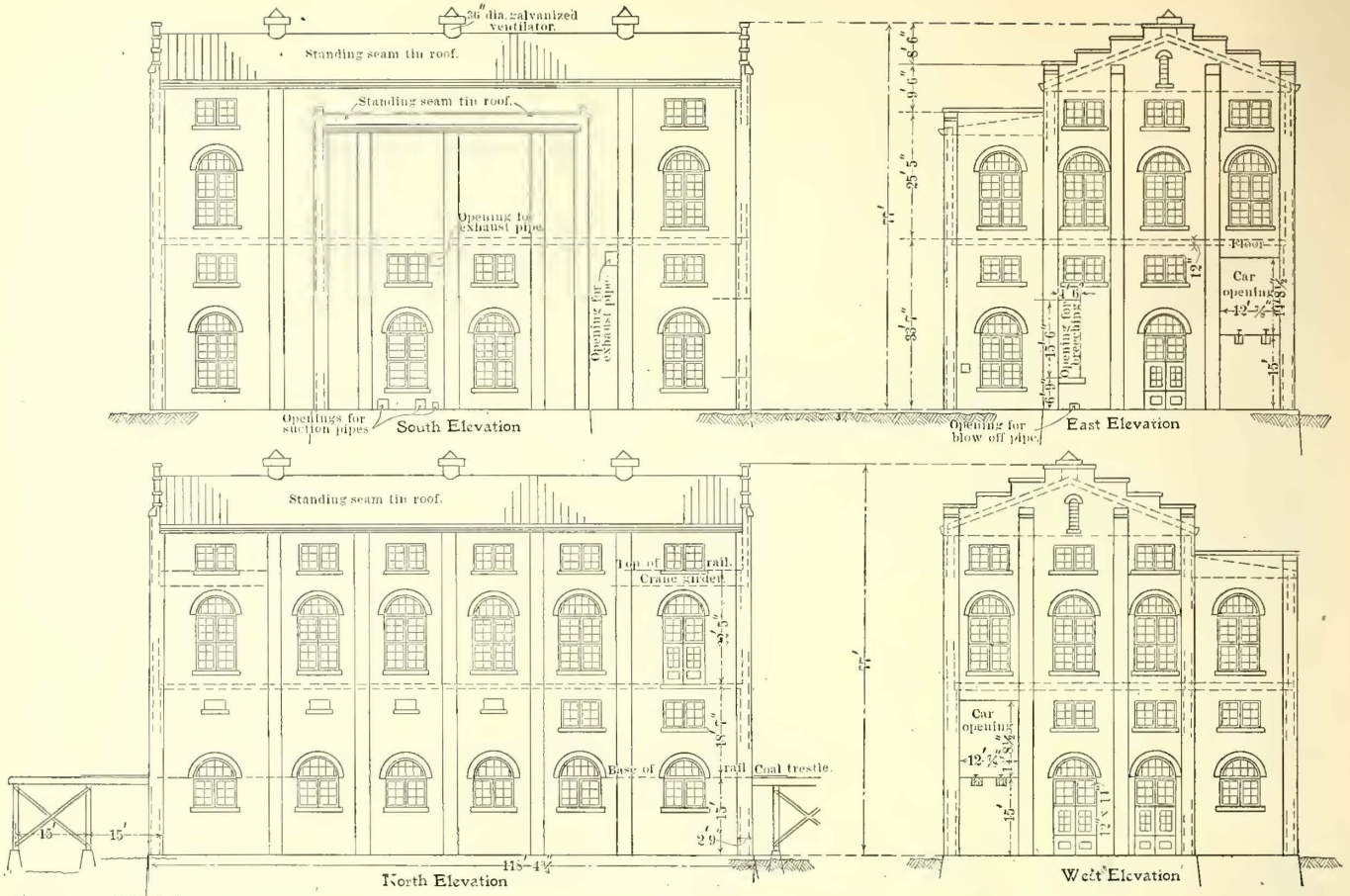


Youngstown & Ohio River Railroad—Interior View of Power Station Taken from Crane

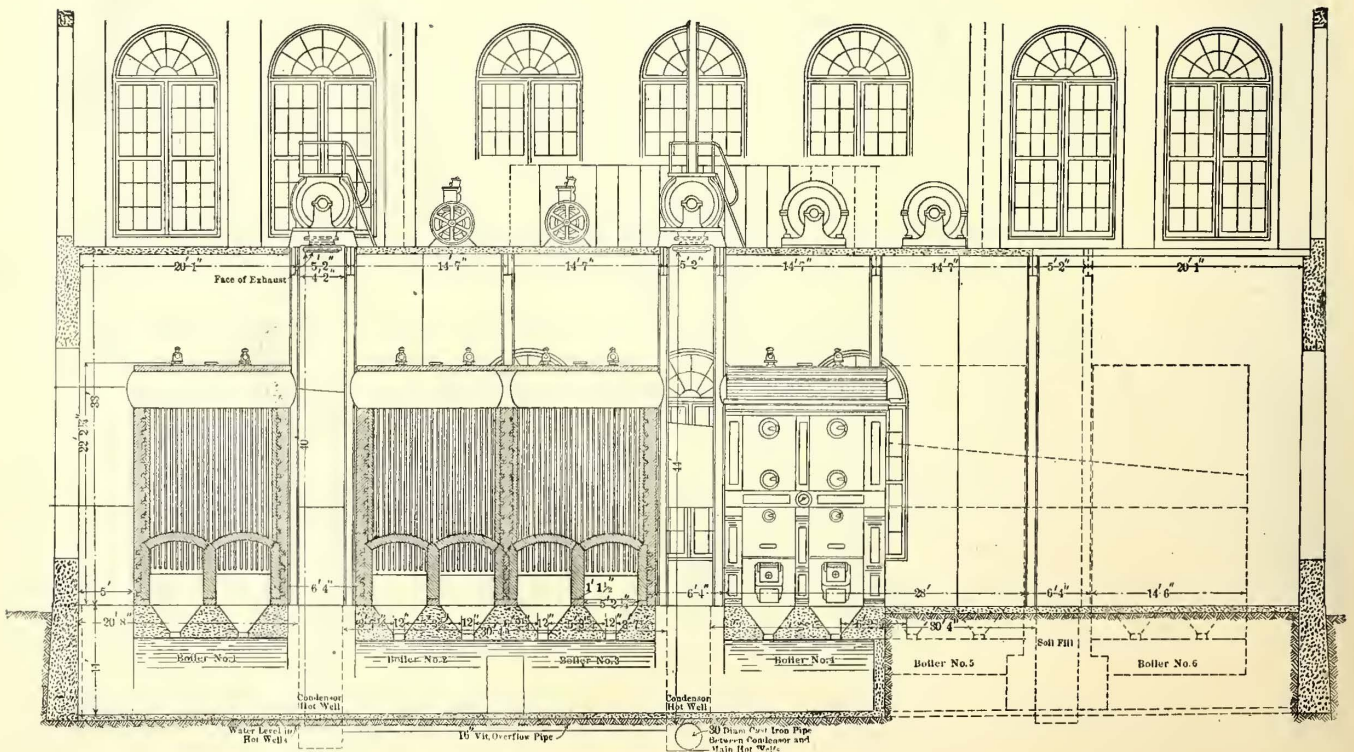
Wellsville close together in the south. To go from East Liverpool to Lisbon, a distance of about 18 miles, one had to travel 63 miles over three different railroads with two or three changes of cars and by thus spending an entire day one could get two and one-half hours for

tonville, about 8 miles long, was originally constructed and operated as a steam railroad, serving a number of coal mines along its line and connecting with the Erie Railroad at Washingtonville. Freight service over this section is still carried on with steam locomotives.





Youngstown & Ohio River Railroad—Elevations of Power Station Building Showing General Features of Building Exterior



Youngstown & Ohio River Railroad—Longitudinal Section of Power Station Showing Arrangement of Boilers on First Floor and Turbines on Second Floor



Of the engineering features of the equipment of this line, the most novel are exhibited in the power station. This station is situated on the line of the new railway at Beaver Creek, about 7 miles south of Lisbon, in the hamlet of West Point. The stream furnishes a fair supply of water fit for use in boilers and the entire surrounding country, comprising several thousand acres, is underlaid with bituminous coal of good quality. In the immediate neighborhood of the power station are outcroppings of No. 6 Appalachian series coal in veins of 4 ft. and greater thickness.

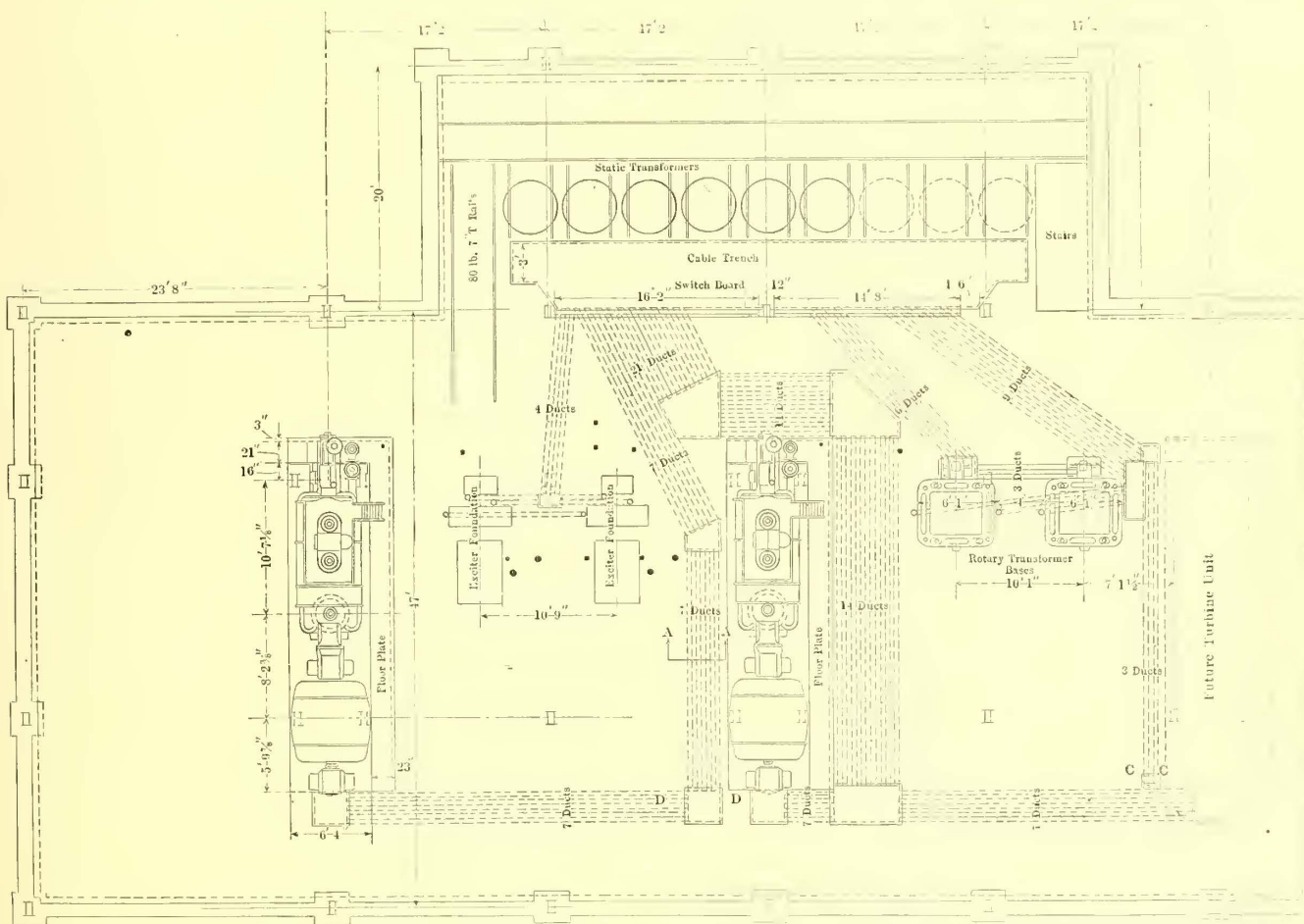
The generating equipment now installed in this power house consists of two 1000-kw turbo-generators with the necessary apparatus for their operation and control. The building and foundations are large enough to enclose a third unit of 2000-kw capacity.

The building foundations consist of concrete laid on a

were accordingly made very substantial. The large bricks lay up rapidly and make a very economical wall.

The ground floor was laid out only large enough to accommodate the boiler plant and a moderate amount of coal storage in front of the furnaces. A projecting bay, added to the middle of the building behind the boilers, accommodates the pumps. The room over the boilers affords a rather liberal space for the turbo-generators, exciters and rotary converters and the space over the pump-room is used for the step-up transformers, the high-tension busbars and the switching apparatus. This high-tension room is separated from the turbine room by the operating switchboard. Each main floor is about 115 ft. x 45 ft. in area, and the bay containing the pump-room and high-tension room is about 50 ft. x 20 ft. in size.

The turbine room floor is of concrete with expanded



Youngstown & Ohio River Railroad—Plan of Second Floor of Power Station Showing Location of Ducts

ledge of moderately hard shaley sandstone about 10 ft. below the surface of the ground. The concrete piers were continued upward to ground level and on them was erected a complete framework of structural steel after the usual manner of steel building construction. The columns in the first story are built up of two 10-in., 15-lb. channels and two 12 in. x 1/4 in. cover plates. As shown in one of the illustrations, this frame was erected, the roof made ready for the covering and the traveling crane in the turbine room was set before the brickwork was begun. The walls are self-sustaining from the ground and enclose the side columns. They are built of 4-in. x 5-in. x 9-in. dark colored shale paving brick laid in cement mortar. While these walls do not carry any of the weight of the machinery, they were expected to assist in steadying the structure and

metal and twisted rods for reinforcement. It is 12 in. thick, of which 7 1/2 in. is above the upper flanges of the floor beams. In this upper section of the floor are laid vitrified tile conduit to receive the cable leads between the various electrical machines and the switchboard. The detail arrangement of these ducts is shown. The tile ducts run in straight lines with large shallow openings molded in the floor wherever the direction of the ducts changes. The cables are racked across these junction boxes which are covered with removable slabs of reinforced concrete. The ducts are drained by small holes through the floor, to prevent any possible accumulation of water.

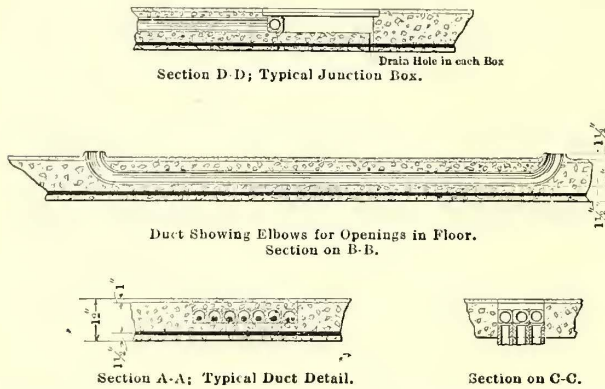
FOUNDATIONS

Each turbine unit is supported on four columns con-

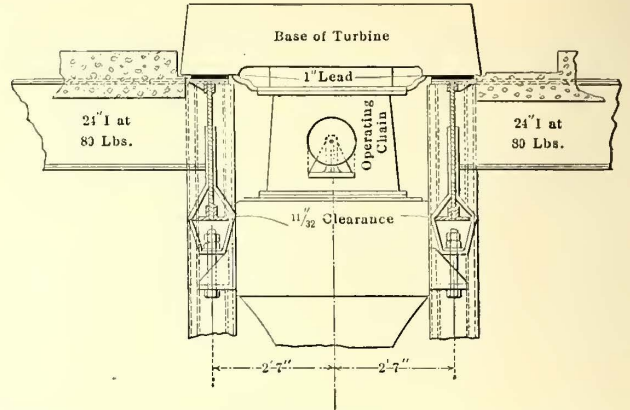


nected at the top by 36-in. plate girders. The generators were placed, as nearly as practicable, symmetrically over one pair of columns, while the turbines overhang slightly at the end. In this respect the drawing of the cross-section

built under the exciters. The foundation bolts extend through the floor with anchor plates underneath. The rotaries were set on insulating wood base frames about 12 in.



Youngstown & Ohio River Railroad—Details of Ducts in Floor

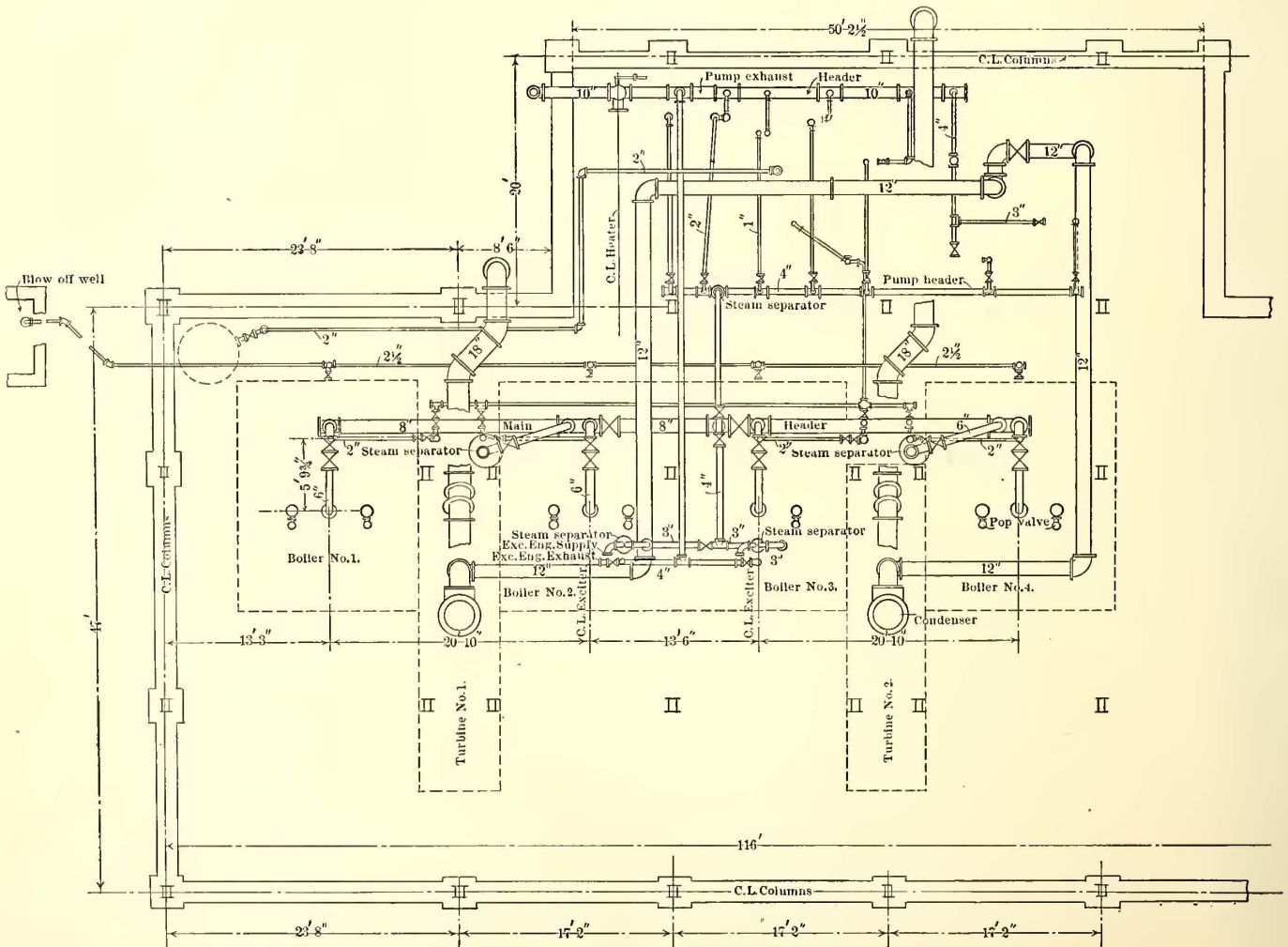


Youngstown & Ohio River Railroad—Steel Framing Under Turbines

of the building which is reproduced is slightly in error as the turbo-generators have been moved about 10 in. nearer the switchboard side of the building. The bed plates of the turbo-generators were set on the upper flanges of the 36-in. girders with a 1-in. space between for leveling. This space was afterward about half filled with lead, melted and poured in.

high, bolted to the floor, and are secured to the base frames by short bolts through the timbers, the heads of which are countersunk in the under side of the frames and separated from the floor by wood blocks.

Because of the lack of experience in this form of power station construction, some apprehension was felt regarding the steadiness of the building and machinery. The interior



Youngstown & Ohio River Railroad—General Plan of Steam and Water Piping

The exciters and rotary converters were set on the finished concrete floor without special arrangement of columns or bracing under them. Small concrete pedestals were

view of the turbine room was taken at night by the ordinary station lighting with exposures of 1 1/2 to 2 minutes and the distinctness of the detail in them shows clearly the







250 r.p.m. to 350 r.p.m., with adjustable speed-throttling governors and safety stops.

One heater—Hoppe's open type exhaust steam feed water heater with 500 sq. ft. of tray surface.

Two pumps—Boiler feed pumps, 18 in. and 10½ in. x 16 in. outside end-packed plunger, pot-valve, single-cylinder, direct-acting, and two piston type single-cylinder hot well pumps of similar capacity; also one tank pump, 6 in. and 8 in. x 10 in., to supply water for turbine glands, oil coolers, transformers, ash wetting, etc.

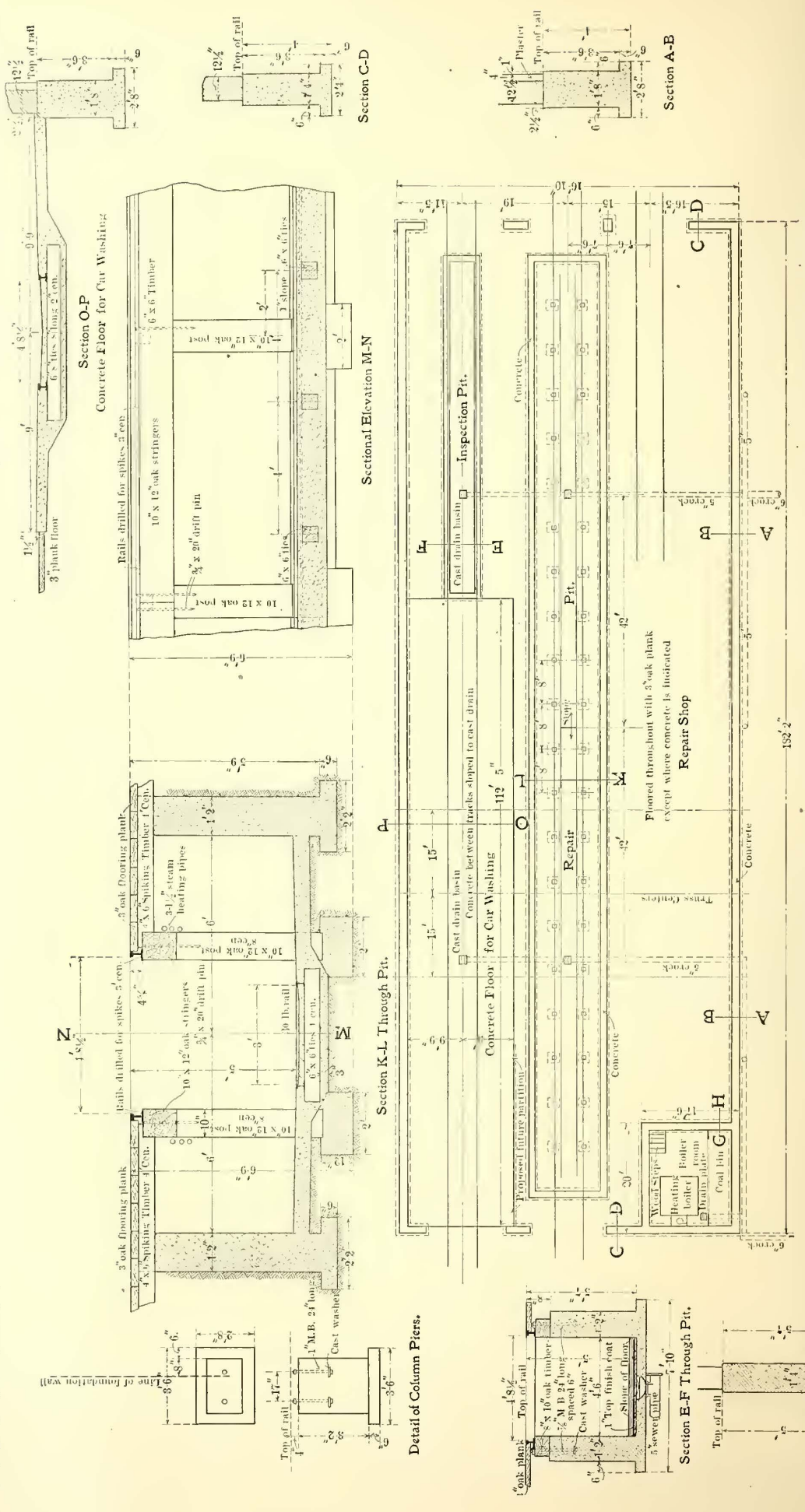
One water tank—Cylindrical steel, 1500-gal. capacity in the turbine room, about 20 ft. above the floor, connected to the piping system supplied by the tank pump.

One crane—Hand power traveling crane, of 20 tons capacity, spanning the turbine room.

CONDENSERS AND PUMPS

The condensers are attached directly to the exhaust flanges of the turbines without intermediate piping except a special cast T for the attachment of the atmospheric exhaust pipe. The condenser and tail pipe are suspended from the 36-in. girders that support the turbines and extend down into the hot wells between the boilers, without other support. This suspension provides for a vertical adjustment so that the joint between the condenser and the turbine can be opened for re-packing if necessary.

The cooling water lines are as direct as possible and the two pumps are cross connected so that either can supply either con-



Youngstown & Ohio River Railroad—Floor Plan of Car Shop and Details of Pits and Foundations

Section G-H



denser. As no foot valves are used on these pumps, they are started, with the valve just above the discharge flange closed, by priming the pumps through a suction connection from the hot well pumps; then the impeller is started and the discharge valve opened, when the pump immediately throws water over into the condenser. Steam ejectors were first used for priming the centrifugal pumps, but the reciprocating pumps proved quicker and more convenient.

Foot valves were omitted from the suction pipes of the centrifugals to save the difficulty and annoyance of cleaning them. The suction pipes of the reciprocating pumps have foot valves with strainers that can be lifted up around the pipe to above the surface for cleaning. To regulate the water level and get a storage and cooling basin for security in case of low water supply, a dam was built across the creek. The condenser overflow is discharged about 300 ft. up stream and can easily be extended several hundred feet further if found desirable.

The boiler feed and hot well pumps are in duplicate and one of each can supply the present boiler capacity at about 35 ft. per minute, leaving a safe margin for increase of boiler plant. The tank pump is cross connected with the hot well pumps so one of these can act as a relay for it.

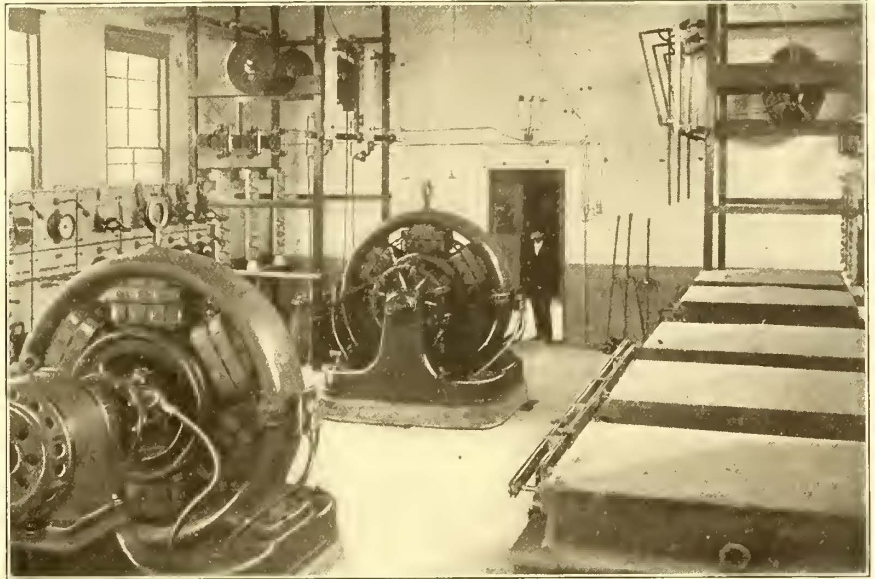
#### STEAM PIPING

The steam piping was proportioned for a mean velocity between 3000 ft. and 4000 ft. per minute at full rated load of the equipment and is arranged in sections or panels sepa-

traps are all fitted up with unions exactly alike, and one spare trap is kept similarly fitted ready to take the place of any one of them.

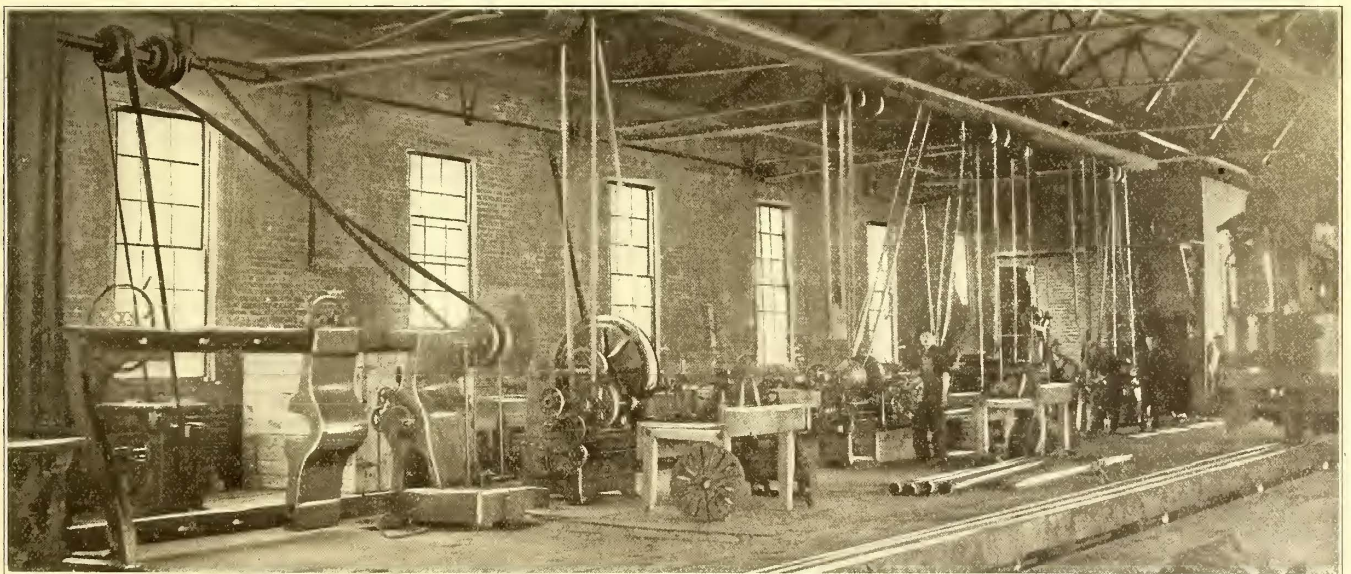
#### COAL HANDLING

Opposite the power station the main track is about 15 ft.



Youngstown & Ohio River Railroad—Interior of Leetonia Substation

higher than the boiler room floor. A trestle at the same level about 500 ft. long and connecting with the main line is extended clear through the boiler room in front of the boilers, so coal cars can be run in and dumped. The trestle at both ends of the building affords a large emergency storage and 500 to 750 tons can be stored in the boiler room. Arrangements will probably be made to mine coal in the



Youngstown & Ohio River Railroad—Interior of Machine Shop Showing Tools

rated by valves. An 8-in. equalizer receives all the boiler and apparatus connections. The connections are shown in the engravings. All the separators and the three sections of the equalizer header are connected separately into a 2-in. drainage header which is divided by valves into sections corresponding approximately to those of the equalizer header. This header drains into five 1½-in. Squire's steam traps which discharge into the feed water heater. These

immediate neighborhood of the plant. In making the cut near the front of the station a vein of coal 3½ ft. to 4 ft. thick was uncovered.

The boiler ash pits are molded of mass concrete and a tunnel extends under them the whole length of the station, in which a track is so laid that a steel hopper car can be run under the ash pits. An electric platform lift is now being installed to raise the car to an elevated track run-



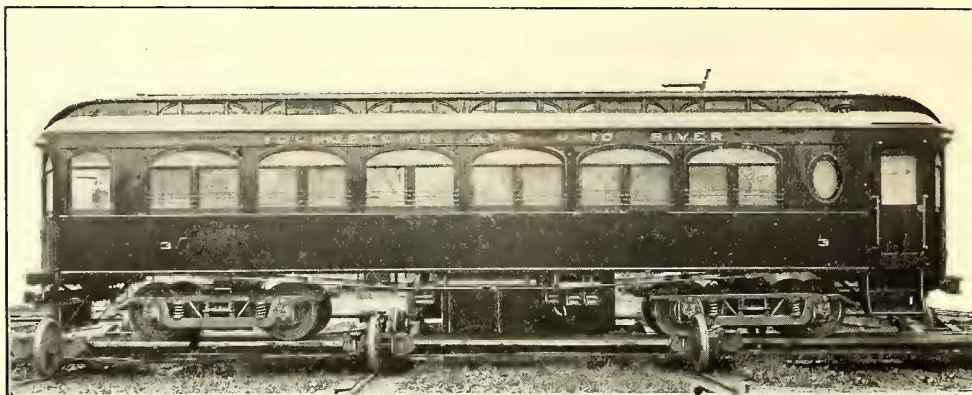
ning over the coal trestle, from which the ashes can be dumped into railroad cars.

#### ELECTRICAL DETAILS

The raising transformers are mounted on roller bases and set on short tracks which lead to a lengthwise de-

rent directly from the low-tension station busbars.

The operating switchboard consists of 10 vertical panels of gray marble containing the usual equipment with a few instruments not always found in stations of this size. Each generator panel contains a polyphase integrating



Youngstown & Ohio River Railroad—Standard Passenger Car

pressed track in which runs a transfer car. Thus transformers may be rolled upon this car and carried to a track at one end of the alcove, which extends into the turbine room under the crane.

The raising transformers are connected in delta on both sides with disconnecting switches in the high-tension leads of each transformer and bolted connections in each low-tension lead. There are two sets of high-tension busbars provided with double throw disconnecting switches so that either transformer bank can be connected to either bus and either bus to either of the two outgoing feeders.

wattmeter, an indicating wattmeter, one a.c. ammeter, a field ammeter and a power factor meter. On swinging brackets at the end of the board are two a.c. voltmeters and one synchronoscope. This equipment is still incomplete and a frequency meter is to be placed beside the switchboard synchronoscope and a station synchronoscope visible from any part of the floor is to be placed on the column in the middle of the switchboard.

The generator field switches have an automatic device that will open them in case of a short circuit in the distributing system, causing a flow greater than the sustained short-circuit current of the generators.

Each rotary converter in the power station and in the substations is supplied with a power factor meter and it is proposed to operate the system at something approximating unity power factor by adjusting the series fields of the rotary converters to sustain the power factor as well as practicable in the load conditions. All rotary converters have reverse current relays.

The general lighting is furnished by Cooper Hewitt mer-



Youngstown & Ohio River Railroad—Substation and Office Building at Leetonia

Along the wall behind the transformers are the fuse type circuit breakers, low equivalent lightning arresters and oil insulated choke coils. The high-tension leads pass through the building wall in 12-in. tiles, both ends of which are closed by polished glass plates with small holes drilled through the centers. Space is left on the wall and tiles are installed for a third high-tension lead. The rotary converters in the power station are supplied with cur-

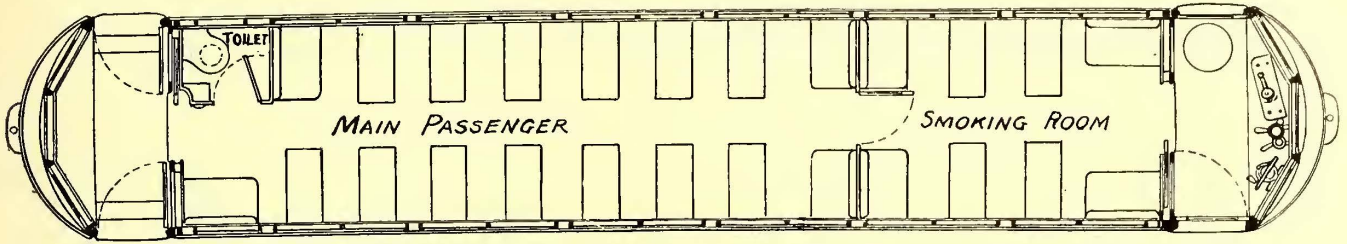
cury arc lamps. The turbine room has three 45-in. tubes hung above the crane, about 28 ft. from the floor, which light 5200 sq. ft. The high-tension room and the pump room each have one 21-in. tube for an area of 1000 sq. ft. and the boiler room has two 45-in. tubes, all hung at about the same height. In the turbine room the illumination has proved rather greater than necessary. In such circumstances one Type K lamp will light 2500 sq. ft. well enough.



No incandescent lamps are used for general illumination, but 20 receptacles are distributed on the walls and columns where they are likely to be needed for attachment of extension lamps. The total power used for lighting during the dark hours is about 3700 watts for a total area of 13,000

is metered and the line is controlled by fuse type circuit breakers.

Each substation contains two 300-kw rotary converters like those in the power station, save that at Salem, which has only one.



Youngstown & Ohio River Railroad—Floor Plan of Passenger Car

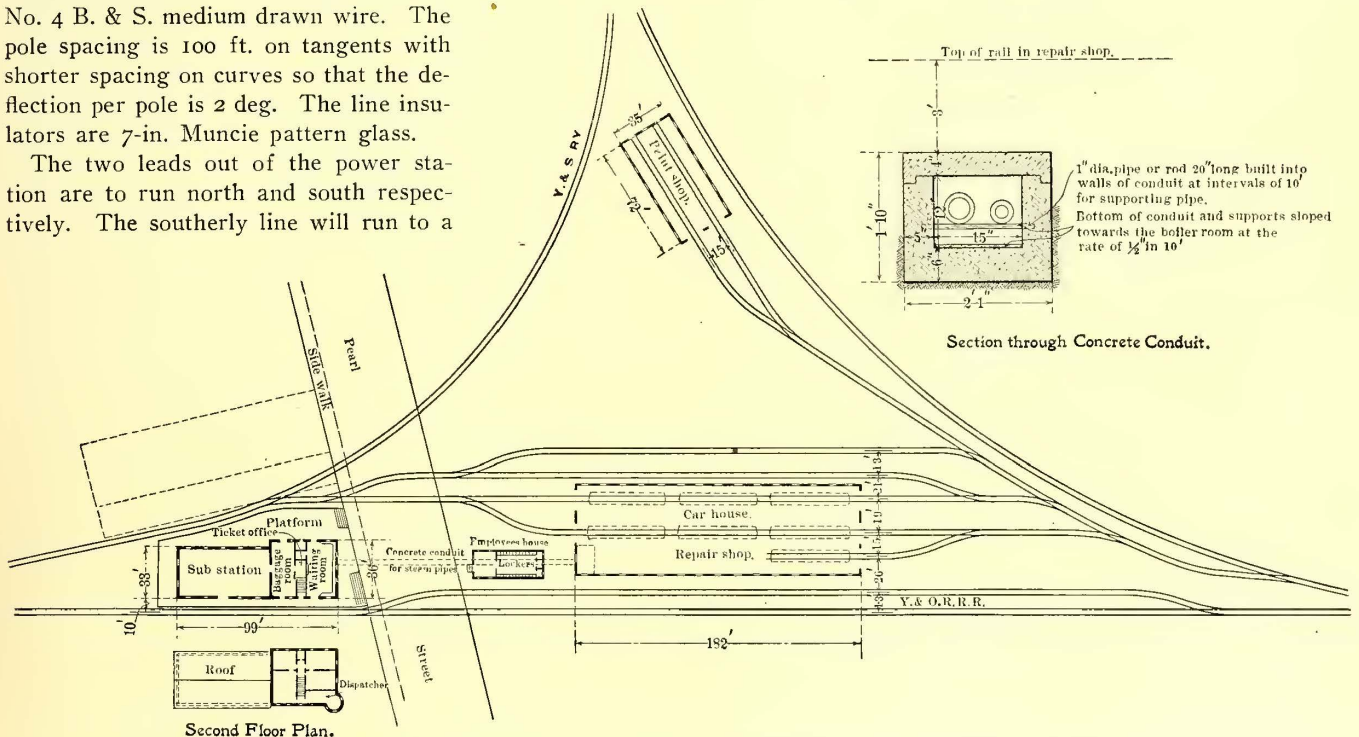
sq. ft., including the ash tunnel, an average of about 0.28 watt per square foot. The illumination is liberal and permits any ordinary work to be done as easily as by daylight. Indeed the instruments and water columns can all be read by the general lighting and the special lamps are provided only for safety in case of a reduction of the exciter voltage great enough to put out the Cooper Hewitt lamps. All wiring to the station lighting is in enameled iron conduit with all fuses and switches on the main switchboard.

TRANSMISSION LINE AND SUBSTATIONS

The transmission line is run on the poles that carry the trolley construction. The general form is shown in one of the illustrations. The line is built of No. 4 B. & S. medium drawn wire. The pole spacing is 100 ft. on tangents with shorter spacing on curves so that the deflection per pole is 2 deg. The line insulators are 7-in. Muncie pattern glass.

The two leads out of the power station are to run north and south respectively. The southerly line will run to a

The substation transformers are of 150-kw capacity and of the oil-insulated, self-cooled type, connected in open delta with one extra transformer at Leetonia. The transformer banks are not parallel on the low-tension side, but the leads and double-throw switches are arranged so that either rotary can be supplied from either bank. The high-tension leads of the transformers contain disconnecting switches and the low-tension leads have bolted connections. The rotary converters are set on insulating wood bases. The frames are grounded through small copper fuses which serve to conduct away the static and give warning in case the insulation should break down. The fuses will burn out before the machine becomes damaged.



Youngstown & Ohio River Railroad—Tracks and Buildings at Leetonia Junction

substation near East Liverpool, about 9 miles. The north line runs to a substation at Leetonia, about 15 miles, thence to another substation at Salem, about 9 miles. At Leetonia the line is connected to the transmission line of the Youngstown & Southern road, through which it supplies power for the operation of that road to Youngstown, about 22 miles. The Youngstown & Southern transmission line branches out of the Leetonia substation, where the energy

CAR SHOP

The car-shop building, while it serves to house all the motor cars of the initial equipment, is intended for a workshop rather than for storage, as it is expected that the amount of rolling stock will have to be materially increased when the road is completed. The illustrations show the arrangement of tracks and details of the working and inspection pits which explain themselves. The following list



of shop tools which have been installed may be of interest, as it illustrates an effort to keep down the maintenance charges of a rather hard service. There is one each of the following:

Two and one-half inch bolt-cutting machine, 44-in. Buffalo forge with hood and power blower, 17-in. power hack-saw, 12-in. emery grinder, 26-in. drill press, 24-in. shaper, 26-in. machine lathe, 22-in. and 48-in. double-spindle back-gear machine lathe, suitable for turning car wheels; 200-ton hydraulic wheel press, band saw, swinging table rip-saw, hydraulic motor lift to run on track in the repair pit and 5000-lb. chain hoist. A temporary gas-heated oven for baking coils is now in use, but will be replaced by one of brick about 7 ft. x 6 ft. x 5 ft.

The car shop and adjoining buildings are heated by steam from a plant in one corner of the shop. The entire shop building is warmed and coils are run along both sides in the repair pit.

#### CARS

The initial equipment consists of six passenger cars and one express, all built by the Niles Car & Manufacturing Company. Three of the cars have baggage compartments, while all have smoking rooms. All the cars are 50 ft. long over the bumpers and are equipped with Baldwin heavy M. C. B. trucks with 36-in. rolled steel wheels. The car bodies are of wood with composite wood and steel floors.

The power equipment consists of four Westinghouse No. 112-B motors with a gear ratio 22:67 and L-4 controllers. The passenger cars are single ended and have straight air brakes, while the express car is double ended and has Westinghouse, Schedule AMM automatic air brakes.

Each passenger car contains 24 fixed 36-in. cross seats, all facing forward, and one side seat, with a center aisle 22 in. wide. The seats have high backs and full railroad outside arms and are upholstered in dark green leather. The interior finish is natural cherry and the outside color is Pullman green. In the combination cars, the baggage compartment occupies the space of six cross seats and is separated from the motorman's cab by a railing. All passenger cars as furnished, with live load, weigh about 33 tons each.

#### ENGINEERS

The location, engineering and construction of this road have been carried out by the Cleveland Construction Company.

### INDEX TO VOLUME XXXI

The index to Volume XXXI of the STREET RAILWAY JOURNAL is mailed with this issue of the ELECTRIC RAILWAY JOURNAL. As already announced, Volume XXXI ended with the issue of May 30 in order that it might end with the concluding issue of the STREET RAILWAY JOURNAL. Volume XXXII began June 6, with the new name.

The report for 1907 of the General Omnibus Company of Berlin, the largest undertaking of its kind in Germany, shows that the company carried 133,800,000 passengers in 1907 as against 128,000,000 in 1906. Owing to the greater increase in expenses than in receipts, and after allowing for depreciation, there was a deficit of about \$130,000 for the year. The directors' report states that the cost of maintaining and improving the motor omnibuses reached nearly 50 per cent of the original cost of purchase.

## INSTRUCTIONS TO OPERATORS IN RAILWAY CONVERTER SUB-STATIONS

BY J. E. WOODBRIDGE

In spite of the complexity of its electrical reactions the operation of a rotary converter is such a simple matter as compared, for example, with that of steam apparatus or air-brake equipments that definite instructions for the operation of converter substations are often neglected altogether or are made too general or incomplete, many points being left to the discretion of the operator. The writer has known of substations left in the charge of country boys, whose training consisted of one or two attempts to start up the machines, with no knowledge whatever, for example, of the meaning of reversed polarity or of the purpose of an adjustable rocker arm or an equalizer switch. While such operation has given surprisingly little trouble, a more intimate knowledge of the equipment and more explicit instructions for its proper use would undoubtedly be beneficial in a large majority of substations.

The following text will give a few hints that have occurred to the writer concerning the best manipulation of the apparatus under normal and emergency conditions, with as definite instructions as it is possible to give for equipments as varied in character and service as those used in railway converter substations.

#### SWITCHING OF HIGH-TENSION CIRCUITS

For the purpose of making these instructions more specific it will be assumed that the substation in question has duplicate incoming high-tension lines and one or more outgoing lines fed from the substation busbars and supplying other outlying substations. Instructions for the switching of such circuits on starting up for the day (if the power is turned off at night) are best governed by local conditions and should be, in general, to close no line switch without telephonic communication from the other end of the line or all other substations fed by it without intermediate switches, that the line is, so far as the operators are aware, clear. Provision should, of course, be made for the protection of linemen should they be working on a line at night.

In case a high-tension short circuit occurs during operation, the usual result is the automatic opening of many or all high-tension oil switches on incoming or outgoing feeder and converter equipments. If power goes off and all oil switches do not operate automatically in such a case, as may happen on a fault not constituting a solid short circuit, the operator should at once open the oil switches not brought out automatically, noting which they are, and beginning with those of the substation machines. After a suitable length of time to allow the substation attendants to clear their oil switches the main station attendant should close in the line (or lines successively) to the first substation. It will be assumed that means are provided for indicating at the substation end when the power is restored. In substations receiving 20,000 volts or more the hissing of lightning arresters of the multigap type is usually sufficient notification if the machines are shut down, providing the lightning arresters are in or near the operating room. In stations where this observation cannot be made some form of potential indicators should be provided on each incoming line equipment.

After receiving power from the generating station via both lines the substation operator should close his incoming line switches and then proceed to close switches supplying the outgoing lines to outlying substations, one at a



time. If, as is usually the case, the short circuit is on a line and has not cleared itself, power will vanish at the instant of closing one of the outgoing line switches in one of the substations. Usually this will again clear out all switches back to the generating station if the short circuit is solid or practically so. The generating station attendant should then at once restore power and the substation attendants should pass it on as before, of course, leaving the faulty line open, and reporting the same to the generating station as soon as all apparatus is in motion.

To avoid confusion in the case of duplicate lines, an operator in a substation so supplied should not pass on power to outlying substations until both incoming lines are alive or he has received notice from the generating station that one is faulty. Otherwise an outgoing line from the substation may be thrown on at almost the same instant as the duplicate line from the generating station, thus leading to mistakes as to which line is at fault. In case there are several outgoing lines in different directions from the main station to substations, or groups of substations not otherwise interconnected, a short circuit on one division of the network may bring out the lines to other divisions, owing to the kick back of power from the converters. On hooking up the lines after such a shutdown, the fault, if it remains, will only bring out the lines to the group of substations to which it belongs, as converters will not be running on the other divisions to give a kick back. For this reason there is no need of telephonic communication to get the lines hooked up consecutively on the several divisions from the power house. Each division can go ahead independently, joining up lines as fast as power reaches each point until the faulty line is reached, when the whole division will probably come out, but other divisions will not be affected.

#### CARE OF TRANSFORMERS

With air-blast step-down transformers care should be taken to open the dampers when the transformers are put in service and to keep the air-blast chamber door closed as well as the dampers under blowers not running. Such transformers will, of course, run safely for a time without blast, but prolonged operation without blast will injure the insulation. Such transformers should also be cleaned by a high-pressure (about 40 lb. per square inch) jet of air at least once per month. This jet should be blown into all passages between the coils accessible both at the top and bottom of the transformer. In small substations, where the cost of an air compressor for this work is not warranted, a car with air-brake equipment should be stopped once a month and connected by means of a hose to the substation for the blowing out of transformers and converters. Owing to the limited tank capacity on cars with straight-air equipment this blowing-out process may have to be rather intermittent, but the greater cleanliness obtained with this apparatus compared with any other method of cleaning will be found to pay.

Faults in transformers, such as breakdowns between coils or turns, usually result in considerable smoke before the fault becomes sufficiently heavy to bring out an automatic switch. Smoking transformers should, of course, be cut out at once to avoid further damage. If fire is ever started in an air-blast transformer the dampers should be closed after filling the top of the transformer with sand. Water should not be used, as it will injure other coils which may be saved. It is hardly necessary to state that several buckets of sand, for fire use only, should be kept in any substation. Oil-cooled transformers require little attention other than an occasional glance at the oil level.

#### CARE OF CONVERTERS

Much more attention should be paid to the cleaning of the internal passages of these machines than is customarily the case. Operators who have run converters for months with nothing more than external dusting would be dumbfounded at the amount of thick black dirt that is blown out of such a machine by a good air jet. Ventilating passages through the armature core, between field windings, etc., eventually fill with grease and dust which cannot be reached except by means of compressed air. With an air compressor in the station each converter should be blown out once a week. Care should be taken not to use too high a pressure back of the nozzle; 60 lb. or 80 lb. per square inch may strip insulation around armature end connections; 40 lb. is usually ample. Particular attention should be paid to the hub, studs and insulation under the collector rings if these are of the open ventilated type. Accumulation of copper cuttings and grease around these parts occasionally leads to bad shorts to the frame of the machine. Without compressed air these parts must be cleaned by thorough and careful wiping at regular intervals of not more than one week. Bolts and nuts on such parts, particularly as brush-holder studs, terminal blocks, pole face winding, etc., should be tightened from time to time. A little experience indicates what nuts are likely to slack off. Bolts in the commutator clamp ring should not be touched except as per instructions given below.

Speed-limit devices, if provided, should be tested from time to time by cutting off the machine from the a.c. supply and weakening the shunt field until the speed rises to 15 per cent or 20 per cent above normal; if the device does not then operate it should be made to do so.

#### CARE OF COMMUTATORS

The writer hesitates to give any instructions on this point owing to the disparity of opinions, due to equally good or bad results obtained by various experts with different methods, which are undoubtedly as successful with a good commutator as unsuccessful with a bad one. In commutator maintenance more than in any other branch of electrical engineering, it is probably true that what is helpful in one case is harmful in another and yet strong prejudices as to what is proper or improper general practice are formed from a limited experience with one type of commutator or at most with one make of machine. In general, however, it may be said that more commutators are injured by over than under attention. Oil should be used very sparingly, especially with self-lubricating brushes, particularly when these are new. Sandpaper should also be used rather more sparingly than it is, and it is hardly necessary to state that emery paper should not be used at all. The best treatment of a moderately rough commutator, where possible, is to nurse it along without turning or sandpapering, taking care to avoid overheating, where possible, by shirking the load onto other machines. Sparking is more often a fault of the brushes than of the commutator. Brushes should slide freely in the boxes, should be trimmed to show evidences of a bearing over the whole brush face and should not be pressed down too hard, particularly when the commutator is in bad shape. If conditions allow shirking of the load to other machines a gradual improvement of the commutator condition can be obtained by nothing more than operation under light load and light brush pressure. In general the commutator, especially of a large machine, has to go through a series of infantile ailments while new. No matter how fine it may look when first started, it



is likely to rough up, but may, as a rule, be brought to the fine glass-like polish characteristic of a well-kept machine by plain running and brush friction, provided it does not have to carry heavy overloads while ailing and does not get too many bad shorts. Occasionally, sparking not otherwise curable may be remedied by respacing the brushes. Such sparking is usually noticeable at certain brush holders, while others are running black. More accurate spacing to exact polar pitch between brushes or more accurate alignment of the brush-holder studs in parallelism with the shaft may cure chronic sparking of this kind. Like generators, rotary converters require a certain amount of brush lead, but that of a converter is much less than that of a generator, as a rule, owing to the fact that a converter has practically no field distortion, the lead required being only sufficient to give a commutating counter e.m.f. under the brushes.

The end-play devices should be kept in continuous opera-

preferable where possible to shim up one end of the base and regrout it to give a gravity component which will slide the armature gently against the end play with field unexcited.

Turning, reclamping or even sand-papering of commutators, should not be left to the usual substation operator, but should be decided upon and preferably done by the superintendent of substations or the electrical engineer of the system. One treatment of the commutators, however, which the writer has seen used with good success might be left to the operators in that it is probably harmless in any case and extremely tedious. This is the use of a straight piece of good soapstone clear of grit pressed against the commutator by hand for at least one hour per day. This serves to polish off slight pits or burns caused by overloads or short circuits and to reduce copper and mica to one uniform level. While it is a tiresome process, the usual operator has considerable spare time on his hands, and if he takes proper pride in the condition of his apparatus he will not shirk this duty.

STARTING OF CONVERTERS

This depends so much upon the design of the converter and particularly of the switching equipment that no general instructions of value can be given. The following detail instructions apply to the standard switchboard equipment provided by the General Electric Company for 25-cycle compound-wound railway converters. This equipment is shown diagrammatically in the two accompanying cuts, of which Fig. 1 shows all switching devices of a three-phase converter between the high-tension a.c. busbars and the d.c. busbars, while Fig. 2 shows the modifications of Fig. 1 for the case of a six-phase converter. Assuming that there is power on the a.c. and d.c. busbars and that all switches of the converter to be started are open, with the exception of the potential plug, which should be inserted on the d.c. converter panel to give a connection to the voltmeter, the proper sequence of events is as follows:

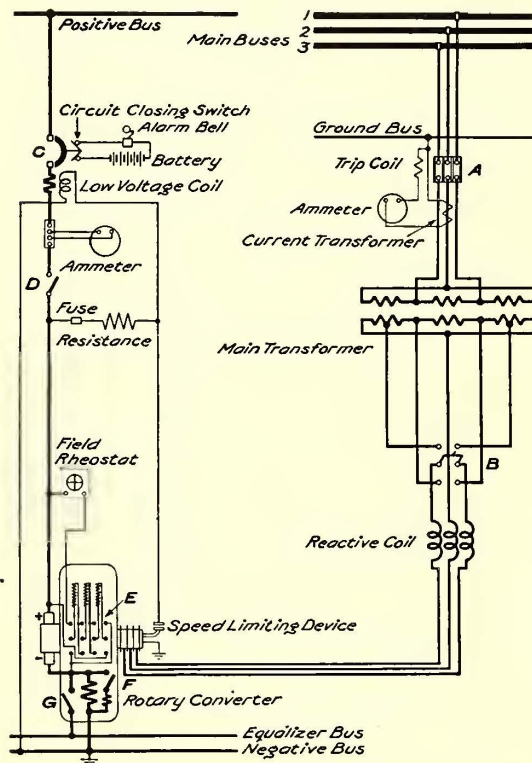


Fig. 1.—Converter Substations—Connections of Rotary Converter Transformer Unit Arranged for A.C. Self Starting

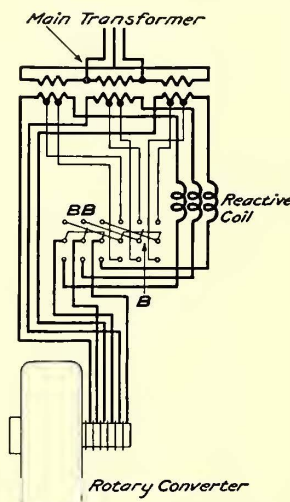


Fig. 2.—Modification of Fig. 1 for Six-phase Converter

tion, and some experts advise staggering of positive brushes into two tracks and of negative brushes into two tracks, which may or may not be the same as those of the positive brushes, rather than staggering positive brushes relative to negative. It may be of interest to give a few more definite instructions regarding the end-play devices. If these operate satisfactorily when the machine is switched off and the field is opened, leaving it free to spin without field, and do not operate satisfactorily, either bumping too hard on the end play or not coming forward against it at all when the machine is running with field, the field structure should be shifted (by moving the dowels) either toward the front or back pillow block until equally satisfactory operation is obtained with or without the field excited. If the end-play device does not operate without field the trouble may be corrected by shifting the field until the required endwise pull is obtained on the armature, but the operation will then vary with the voltage and it is

- First—Close main high-tension switch *A*.
  - Second—Close starting switch *B* upward. (For six-phase machines with tandem switches both switches *B* and *BB* should be closed upward.) Machine will then run up to speed and lock in step, which will be indicated by cessation of beats of d.c. voltmeter.
  - Third—Close equalizer switch *G* and series shunt switch *F*.
  - Fourth—Close field break-up and reversing switch *E* into top position.
  - Fifth—Throw starting switch *B* quickly from top to bottom contacts. With six-phase machines then throw starting switch *BB* quickly from top to bottom contacts.
  - Sixth—Adjust d.c. voltage to approximately that of busbars.
  - Seventh—Push up low-voltage release of circuit breaker and close circuit breaker *C*.
  - Eighth—Close main switch *D*.
  - Ninth—Adjust division of load between machines if more than one are in service by means of field rheostats.
- NOTE.—If other machine or machines are carrying load



when a compound-wound converter is started correct polarity may be insured by closing equalizer switch *G* when machine locks in step. By watching the swings of the d.c. voltmeter as the machine approaches synchronism switch *G* may be closed just previous to the last two or three swings, thus insuring proper locking on the first trial if there is current for the series field from the other machines. If machine locks with wrong polarity as indicated by d.c. voltmeter needle going down off scale, field switch *E* must be closed first into down position, which will cause voltmeter to return above zero when switch *E* must be pulled out and closed into top position.

To shut down rotary converter open circuit breaker *C*, pull out and turn circuit-closing auxiliary switch to stop ringing of alarm bell; open main switch *D*; open high-tension a.c. oil switch *A*; allow machine to run down in speed until volts fall off to about 100 before opening field switch *E* or starting switch *B*; open field switch *E*, equalizer switch *G*, series shunt switch *F* and starting switch *B*.

**DON'TS**

Don't open field switch *E* until machine voltage has run down, otherwise arc of opening inductive field circuit may be blown by armature blast from point to point, giving a

Don't close circuit breaker after a heavy short without plugging voltmeter to converter to make sure that polarity is not reversed.

**POWER FACTOR OF RAILWAY CONVERTERS**

Practically all converters in this country are compound wound, the compounding being obtained, as is well known, by variation of the power factor, and the use of reactance in the circuit. The commonly accepted impression, therefore, that the power factor can be kept at unity is wrong. It can be brought to unity at one load only. Below that load the power factor will be lagging. Above it the power factor will be leading. It is obvious that if the impressed voltage

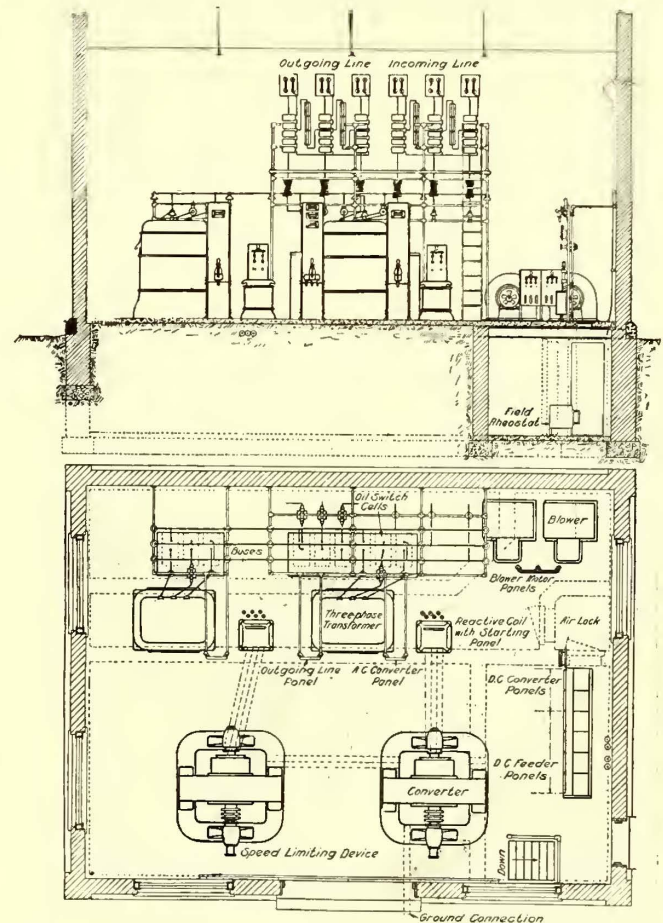
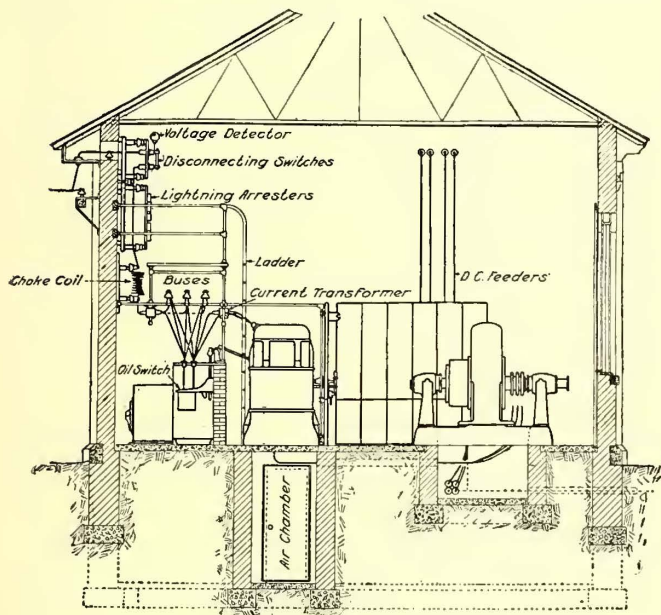


Fig. 3.—Converter Substations—Typical Arrangement of Apparatus in Substation with Distributed Switching

short circuit, or strain may injure insulation of field winding.

Don't open starting switches until machine voltage has run down to zero. This leaves transformers without heavy residual magnetism, which tends to cause extra rush of current when subsequently thrown into circuit.

Don't open oil switch with converter on starting tap and field closed. Under this condition converter tends to build up to full voltage, tending to run up transformers to considerably above normal voltage.

Don't parallel machines on d.c. side without closing equalizer switches.

Don't start converters with field switch *E* closed either in up or down position, or with series shunt switch closed.

Don't close a.c. starting switch slowly into top contacts, for if this is done, rush of current may pit tips of clips and prevent switch blades from going in.

Don't close any switch slowly.

Don't close circuit breaker with main switch *D* closed.

upon the converter is at all times a little low, due to wrong choice of transformer ratios, proper d.c. voltage can be obtained by increased shunt field excitation. On the other hand, if the impressed voltage is high, proper d.c. voltage can be obtained by reduced shunt field excitation. This will change the load at which unity power factor is obtained. Unfortunately ratios are usually so chosen as to give unity power factor at no load when it is not needed, which gives a low power factor leading on load, when unity is badly needed. Regrettably, most operators run their converters above rated voltage by increasing the excitation and thereby the leading currents. This results in a still poorer power factor at full load.

The heating of converter armature conductors is greatly increased by the presence of leading or lagging currents which are set up by improper field excitation. The series field coils of compound-wound converters considerably increase the excitation at full load over that at no load. For this reason compound-wound converters should take a con-



siderable lagging current at no load, which will be cut out by the action of the series field at normal load, thus giving unity power factor and cool running when loaded. For interurban service with low-load factors the converter should take one-fourth full-load current at no load and this current should be lagging. This feature of the current can be determined by adjustment of the field rheostat. If weakening of the field by cutting in more of the resistance increases the a.c. input current is lagging. If it diminishes the a.c. current input the current is leading. If the converter does not give desired d.c. volts with this adjustment of field rheostat the a.c. impressed voltage should be altered by adjustment at the power house, if possible, or by alteration of the primary taps of the step-down transformers feeding the converter. For converters on steadier loads having a high average load factor the a.c. lagging current on no load should be greater than 25 per cent of rated full-

one point to avoid running about, and large substations are still laid out the same way, but modern small substation practice tends to distribution of the switchboard apparatus to the points most convenient for the connections, since the few steps from one switch to another are probably more beneficial than harmful, in that they give a hasty or nervous man a second or so to think between operations. Fig. 3 shows the design of a small substation along these lines and Fig. 4 gives a view of such a substation, in this case the Taunton substation of the Old Colony Street Railway Company. In these stations the high-tension panels are located in front of the transformers and opposite their respective converters, the low-tension a.c. starting switches are just alongside, on top of the reactive coils, the field break-up and equalizer switches (those next used in the normal course of starting) are mounted on the machine frames just across the operating passageway. Care should

be taken to get the field break-up, equalizing and series shunt switches on the side of the converter frame toward the switchboard, so that the position of the equalizer switch, etc., can be seen when paralleling machines. The d.c. voltmeter should also be visible from a position by any equalizer switch. Other points of convenience will also be noted in these layouts. For example, the blowers are located at the switchboard end so that if shut down by the shutting down of one transformer bank the absence of their hum will be noticeable. It will also be noted that the air-blast chamber is of sufficient depth for a man to work in conveniently



Fig. 4.—Converter Substations—Interior of Taunton Substation of Old Colony Street Railway Company

load current, approaching 35 per cent to 50 per cent. Care should be taken that this point is looked after with the converter equalizer switch open if other converters are in operation in the same station, otherwise the current from the other machines will affect the excitation of the machine under investigation.

Machines must not be run above their rated voltage without proper adjustment of taps and a.c. voltage, etc., which should be taken up with the manufacturers. Overheating of armatures is almost certain to occur with compound-converters run above normal d.c. voltage if a high average load is placed upon them. It should be noted in this connection that power factor indicators connected on the line or supply side of the reactive coils often used with compound-wound converters do not give the power factor of the converter. Unless the operator understands this he may be greatly misled.

ARRANGEMENT OF EQUIPMENT FOR CONVENIENT OPERATION  
Early substations concentrated all switching equipment at

with an air hose. In general, if points of this kind are considered in the design of the substations, better operation will be obtained than if a complicated mass of switching apparatus is concentrated in one mess, and the cost of the equipment will be materially less.

Representatives of a number of Canadian street railways unanimously declared their opposition before the Ontario Railway & Municipal Board, on June 5, to the proposal of that body that passengers be prohibited from riding on the front seat of open cars. The order was the indirect result of a recent collision in Ottawa which Engineer Wyse, who made an investigation on behalf of the Railway Board, reported to have been caused by passengers on the front seat distracting the attention of the motorman. W. A. Burrows, secretary-treasurer of the Canadian Street Railway Association, voiced the objection of that body to the proposal. Other representatives also objected. The board reserved its decision.



## FREIGHT HOUSE OF TOLEDO URBAN & INTERURBAN RAILWAY

The Toledo Urban & Interurban Railway has completed the construction of a freight house at Toledo, Ohio. The company started to build a small freight house, but before it was finished the amount of business offered was so encouraging it was evident larger quarters would soon be required. The original plans were therefore altered to provide for the more extensive building shown in the accompanying illustrations. The freight house is located at 154 South St. Clair Street on part of a lot which has a



Interior of Freight House at Toledo

frontage of 200 ft. and a depth of 400 ft. The building faces east. On the north side there are seven doors for drivers of wagons, and on the south side are four doors at the proper level to permit entrance from the freight house to cars, which are switched from the tracks of the Toledo Railways & Light Company in the street on which the

cars are operated between the two roads. The Toledo Urban & Interurban Railway sends four trains of merchandise daily from Toledo, leaving at 9:30 a. m. and 2, 8 and 10 p. m., respectively. The latter two trains consist of two cars. One motor car and both trailers are operated to points on the Western Ohio road. The car that leaves Toledo at 8 p. m. runs to Wapakoneta, a distance of 97 miles, without a stop. The four freight trains that enter Toledo daily are due at 6:30 and 10:30 a. m. and 3 and 6 p. m., respectively. The afternoon train is run through with a trailer from points on the Western Ohio line. As an illustration of the prompt character of the service furnished it may be stated that goods received at the freight house at Toledo by 5 p. m. reach Dayton, a distance of 160 miles, at 9:30 o'clock the next morning. The freight is shipped via the Western Ohio Railway to Piqua, and from there to Dayton over the Dayton & Troy Electric Railway. Freight is shipped also to Ft. Wayne, Ind., a distance of 148 miles, reaching there, if left at the Toledo freight house before 5 p. m., by noon of the following day. This freight is shipped via the Toledo Urban & Interurban Railway and the Western Ohio Railway to Lima, and from there to Ft. Wayne via the Ohio Electric Railway. From Ft. Wayne shipments are made to points on the Ft. Wayne & Springfield Railway, giving the latter company the benefit of a through freight arrangement between Toledo and Decatur, Ind., and the other places which it reaches.

The average amount of outgoing freight handled at the Toledo freight house is about 75 tons a day, and the incoming freight averages about 50 tons daily.

## EXPERIMENTAL SINGLE-PHASE LINE ON THE LONG ISLAND RAILROAD SYSTEM

The Electric Traction Department of the Pennsylvania Railroad has been studying for a long time the relative merits of the various systems of traction available for the operation of the New York terminal and tunnels. To obtain more extensive information of the value of high-volt-



Exterior of Freight House at Toledo

building fronts. The freight house is of pressed brick with concrete foundation and covers an area 25 ft. x 170 ft. In addition to the main floor on which the goods are handled between the wagons and cars there is a basement which is used for storing freight that it is necessary to hold for any material length of time. An elevator is used between the basement and main floor. The basement is 11 ft. in height and the main floor is 14 ft. high. An office is located at the front of the main floor.

The rapid service offered by the Toledo Urban & Interurban Railway and its connections has made possible the development of its freight business to the present point. By traffic agreement with the Western Ohio Railway, through

age single-phase overhead trolley construction under its special conditions, the Pennsylvania Railroad has determined to equip electrically about 5 miles of one of the outlying lines of the Long Island Railroad east of Garden City, where experimental work will not interfere with the traffic. This branch line is practically straight and of low gradients (not exceeding 1 per cent), and suitable for running at speeds up to at least 65 m.p.h.

Several types of overhead catenary trolley construction, both for tunnel and open line conditions, will be installed and tested for both locomotive and multiple unit train operation. The tests will be conducted during the summer and early fall.



**TRANSFER SYSTEM IN BROOKLYN**

The transfer system of the Brooklyn Rapid Transit Company is the outcome of an experience of about 13 years. The system limits the number of changes to connecting lines to two for each passenger and includes provision for an excellent emergency service in case of accidents. Since its

introduction on May 9, 1907, the operation of the transfer system has been highly satisfactory. In order to appreciate the conditions in Brooklyn, it is necessary to understand the distribution of traffic within the city. In general, all lines except those that are purely crosstown lead to New York. The consequence is that a network of lines extends from the ferries and bridges over the East River to all parts of Brooklyn, and these lines connect with others in such a way as to make possible a complete loop by means of the different roads. For instance, a person crossing the Brooklyn Bridge may transfer in Brooklyn to a line connecting with the Williamsburg Bridge, cross that structure and return for one fare to almost the place in New York from which he started. In other words, there

are not, as in New York and many other cities, two general directions of travel, east or west and north or south. Under previous systems of the Brooklyn company where unlimited transfers prevailed, the general abuse of the transfer privilege through loop trips became a matter of civic shame. While loop trips are not prevented entirely by the present system, the number is greatly reduced. The number of different lines on which a person may ride for one fare is limited to three by the present system, except in special cases.

A feature of the present system is the number of emergency transfers provided. This is due to the operation by the company of both surface and elevated lines, and the limitations imposed by operation over the Brooklyn Bridge. An accident on either the surface or the elevated tracks crossing that structure throws the burden of traffic on the other at once, and means must be provided to meet the situation. Another point where an accident means immediate congestion is between the Brooklyn Bridge and Navy Street on Myrtle Avenue, where three of the four elevated lines of the company operate over one structure. The surface lines on lower Fulton Street make service conditions severe, but the new line between Court Street and Flatbush Avenue on Livingston Street, which parallels Fulton Street, furnishes a route to which all cars regularly operated on Fulton Street may be diverted easily in the event of a blockade on Fulton Street.

The general use of transfers in Brooklyn dates from the organization of the Brooklyn Rapid Transit Company in 1895. Prior to that time there were six transfer points on the lines that were combined in the Brooklyn Rapid Transit system. Before the consolidation square tickets dated each

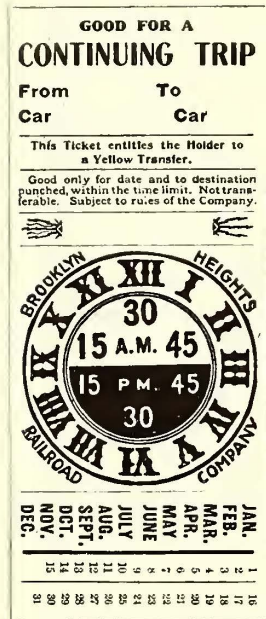
day were used, and were distributed by transfer agents at the intersection of transfer lines. The form of these tickets was continued in use by the new company for a short time only, until separate tickets issued by conductors were adopted for each line. These tickets were punched for the day of the month, the time and the direction of travel and were used until 1900.

The system now in use had its beginning in 1900, when a long ticket dated each day was adopted. This ticket had a clock face similar to the present "continuing" trip ticket and was punched for the hour and minute. It contained the name of the issuing line and all lines on which it was good for a ride. In May, 1905, separate tickets for a. m. and p. m. were adopted in different colors, requiring a punch for the time only. These tickets gave the name of the issuing and the connecting lines. The present form was adopted in May, 1907.

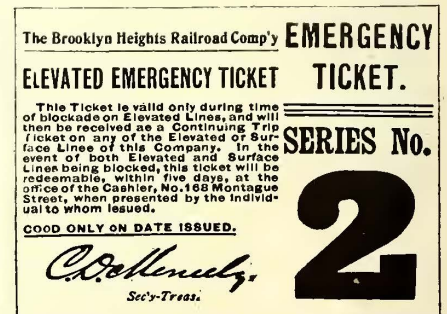
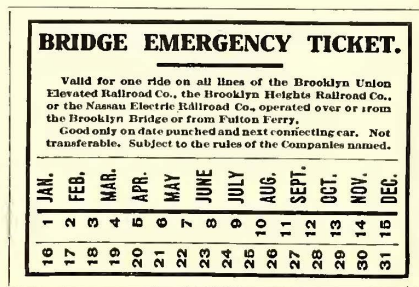
From 1895 to 1907, the method of issuing transfers was changed from time to time in an effort to facilitate the movement of traffic. From 1895 to 1897 all tickets were issued by conductors. In May, 1897, 10 agents were used on the southern division, and in July of that year agents were introduced on the eastern division also. In 1903 these agents were discontinued except at points where transfers are issued from short lines to through cars. About two years ago agents were stationed during the summer at several important transfer points, but after a short trial it was found that the transfers could be issued as satisfactorily and with less confusion by the conductors.

The present system includes a conductor's continuing trip ticket, a transfer agent's continuing trip ticket, two conductor's transfers of different colors, a conductor's special ticket, a transfer agent's special ticket, an elevated transfer agent's ticket, a bridge transfer, a car to car transfer, a bridge emergency ticket and an elevated emergency ticket. Specimens of several different types are illustrated herewith.

The conductor's continuing trip ticket is on white paper and is issued by feeder lines. It is honored on the connecting line as a cash fare, the holder being entitled to a yellow transfer on which in turn a green slip may be issued. The transfer agent's continuing trip ticket, which is on white paper and entitles the holder to a yellow transfer, is issued only where there are short spur lines. Instead of the name



Transfer with Clock Face



Sample Emergency Transfers

of the line this transfer contains the number of a transfer station. The time is punched in fractions of the hour.

Except in a few special cases all regular yellow and green transfers issued by conductors are good in either direction on the connecting line. The yellow transfer is issued on payment of a cash fare or on a white continuing trip ticket and the green ticket is issued on presentation by the passenger of a yellow ticket. The efficient working of the system largely depends upon the strict observance of this order. Each yellow and green transfer bears the name of the



issuing line. At the top of a yellow transfer there are printed, in alphabetical order, the names and numbers of the lines to which the issuing line transfers directly. Opposite the names of the lines, under the heading "Second transfer lines," are printed the number or numbers of the "direct transfer lines," to one of which the passenger must first transfer by yellow ticket, and then with green ticket to the line on which he desires to travel. If the desired line is not in the list of direct transfer lines, second transfer lines or under the heading "Important" the line is not operated by the company receiving the fare and the passenger is not entitled to a transfer.

The green transfer differs slightly from that printed on yellow paper except that the smaller number of names of other transfer lines required on the list permits a more orderly display of the names of the different lines with their numbers. The same method of dating and of divisions for a. m. and p. m. is followed with both the yellow and the green slips. On the yellow transfer the time of the nearest hour only is punched, but on the green transfer and all special transfers the number of the line which issued the yellow ticket is punched also, preventing the passenger from re-transferring to the line from which he came. To insure compliance with the rule regarding the punching on the green transfer of the number of the line which issued the yellow transfer, a penalty is imposed on a conductor of 5 cents for turning in a green transfer without the original line number punched thereon.

The conductor's special ticket, which is issued only to feeder lines and in exchange for a green transfer, contains the name of the issuing line and is punched at the nearest hour. The transfer agent's special ticket differs from the conductor's special ticket in having the station number in place of the name of the issuing line and in having places provided for punching the quarter hours.

The transfer ticket issued from the elevated division by transfer agents is on yellow paper, provides for the continuation by surface car of a journey begun on the elevated line, and is punched for the quarter hours.

The bridge "Buffalo" transfer is good on any surface or elevated line eastbound in Brooklyn and is dated daily. This transfer is simply a precautionary transfer to provide for the ready transfer of passengers from the elevated to surface lines, or vice versa, on account of some special contingency on the bridge.

The "car to car" transfer is intended as a general emergency ticket and is accepted at all points by surface and elevated lines. It retains the clock-face of the old style transfer. As this transfer is punched for the month, day, hour and minute, it affords a quick method of relieving a blockade that fully protects the company from abuse. The ticket that provides for an emergency transfer of a passenger from the surface to the elevated line crossing the bridge, or vice versa, is punched for the month and day and is good only on the next connecting car.

The elevated emergency ticket provides for a transfer of a passenger during a blockade on an elevated road to the surface lines or to another elevated line. This ticket is honored by the surface lines as a cash fare, but is valid during the time of the blockade only; if not used for transportation it is redeemable, within five days, at the office of the company. The surface emergency ticket, good on all surface lines from Brooklyn to Park Row, Manhattan, provides for the transfer of a passenger from the elevated lines crossing the Brooklyn Bridge to a surface line in the event of a blockade.

The transfers are delivered by the printer to the stock

room two days in advance of the day they are dated. One day before the transfers are to be used they are delivered to the depots by special car and receipts are taken from the depot masters. Transfers are given to conductors when they report for work about 10 minutes before they take out cars. This allows very little time for conversation between the train men after they receive the transfers and reduces to a minimum the temptation for men to traffic in the slips if they work on different lines starting from the same car house. Conductors on lines passing the car house are given only one pad of each kind of transfers at a time, while men on lines that do not pass the car house receive a supply of tickets for the day. The practice of registering all transfer tickets on separate clocks has been followed since Feb. 11, 1907. Between that date and Aug. 1, 1900, both cash fares and transfers were registered on one clock, and between 1900 and 1903 all fares were registered as passengers boarded the car.

The following table shows the increases in cash and transfer passengers on the Brooklyn Rapid Transit system:

YEAR.	Passenger Receipts.	Number Passengers at 5c. each.	Number Transfers Received.	Per cent. transfer to cash passengers.
1899.....	\$10,058,343.83	201,166,876	41,893,744	20.82
1900.....	11,206,716.01	224,134,320	42,051,924	18.7
1901.....	11,718,942.39	234,378,848	56,140,101	23.95
1902.....	12,321,264.60	246,425,292	50,883,702	20.65
1903.....	13,086,840.14	261,736,802	53,436,921	20.41
1904.....	14,429,546.04	288,590,920	56,804,382	19.68
1905.....	15,649,400.80	312,988,016	70,073,877	22.38
1906.....	17,586,721.57	351,734,430	96,455,314	27.4
1907.....	18,401,174.96	368,023,498	136,240,669	37.

### CHANGE IN ROCHESTER INTERURBAN FARES AND INTERCHANGE AGREEMENTS

The Rochester (N. Y.) Railway Company has made a change in its excursion rate policy on the Rochester to Sodus Bay and other interurban lines. At the terminal of the Sodus Bay line, which is 41 miles long, there is a popular water resort which induces quite a traffic from lovers of boating and fishing. Last year the regular rate to Sodus Bay was 90 cents for the round trip, but the company also offered an excursion rate of 75 cents, effective from May 1 to October 1. The latter ticket was supposed to be limited to the day of sale except that it was also good from Fridays to Mondays. The result was that the majority of the passengers took advantage of the 75-cent rate for week-end travel. On Sundays the business was too large to handle, while through the week the equipment was idle. This year excursion trips to Sodus Bay are limited to \$1, while the regular rate is \$1.16 under the new tariff. One way tickets figure out 1.75 cents per mile, excursion 1.5 cents and cash fare 2.1 cents. The ticket sales now amount to 90 per cent of the total business and the collection and accounting problems are therefore simplified materially for the departments which are responsible for that part of the business.

Special one-day excursion tickets are sold for \$1 during June, July, August and September, except Saturdays, Sundays and holidays. The company believes it the wrong policy to give the cheapest rate on Sundays and holidays. Passengers should be tempted to ride on the light days of the week when they can travel in greater comfort. This policy also pleases the regular riders, who do not enjoy being crowded on days of heavy traffic by those who take advantage of excursion rates.

All interstate traffic agreements with steamboat and railroad companies for passenger and freight business have been revoked by the Rochester Railway Company.



## ATTITUDE OF STATE COMMISSIONS TOWARD ACCOUNTING SYSTEM

Some of the State commissions which have jurisdiction over electric railways have already taken action on the revised classification of accounts suggested by the Interstate Commerce Commission.

Announcement has been made of a conference of the State railroad commissioners of Wisconsin, Illinois, Indiana, Ohio, Second District of New York, and Michigan, at the offices of the Illinois Railroad and Warehouse Commission in Chicago on June 12. In a letter regarding this meeting Louis C. Cramton, secretary Michigan Railroad Commission, says: "It is probable that the tentative Interstate Commerce Commission classification of accounts for electric railways will have some consideration. The meeting, however, was not called primarily for that purpose, the primary object being to promote a better understanding among the commissions of the states that will deal largely with the same lines and the same problems. It is probable that the discussion at the proposed meeting, which will be informal, will cover a wide range of topics."

Letters to the *ELECTRIC RAILWAY JOURNAL* from State commissions give the following information on the subject:

H. D. MANINGTON, Secretary Railroad Commission of Ohio—This commission has adopted the revised classification of accounts for electric railways prepared by the Interstate Commerce Commission.

HARRY S. CALVERT, Secretary Pennsylvania State Railroad Commission—Up to this time the commission has not taken up the subject. An investigation of the matter is being made now.

CHARLES E. MANN, Clerk Board of Railroad Commissioners, Massachusetts—The board after a careful consideration of present unsettled conditions in regard to railroad and street railway accounting has decided that for the coming fiscal years, commencing June 30 and Sept. 30, respectively, it will require returns from railroads and street railways on the same form of blank as now used, hoping that before another season matters will have been formulated in such a way as to enable the board to settle upon some definite plan for the future.

DWIGHT N. LEWIS, Secretary Board of Railroad Commissioners, Iowa—Under the laws of this State, this board has no power to supervise street railways, the only electric railways over which this board has jurisdiction being the interurban lines. I have not, as yet, had time to examine the proposed classification of accounts for electric railways, so am unable at this time to advise you what action the board will take.

CHARLES B. RILEY, Secretary Railroad Commission of Indiana—This commission has not yet taken action on the subject.

H. C. BROWN, Clerk North Carolina Corporation Commission—Our commission advised the statistician of the Interstate Commerce Commission that it would adopt the classification as proposed or adopted by that commission.

D. B. CORNETT, Secretary Kentucky Railroad Commission—This commission has taken no action yet in this matter.

WILLIAM H. STANLEY, Secretary South Dakota Board of Railroad Commissioners—Inasmuch as this commission has no jurisdiction in matters affecting electric railways it was thought best not to offer any criticisms or suggestions in regard to the matter and Prof. H. C. Adams was so advised. I might say in this connection that this commission is dis-

posed to accept and adopt the accounting systems proposed by Professor Adams, so far as they relate to matters within the jurisdiction of this commission, believing that they are most carefully prepared by Professor Adams with the assistance of numerous other experts of the first class after a most thorough and exhaustive investigation.

E. C. SHINER, Secretary Board of Railroad Commissioners of Kansas—The board has had considerable correspondence with Prof. H. C. Adams, in charge of statistics and accounts, Interstate Commerce Commission, regarding the system of accounts for electric railways, and has advised Professor Adams that the board desires the use of such classification of accounts by Kansas electric lines and that such accounting system be inaugurated, to commence with the fiscal year. It is, however, the intention of the board, before any formal action is taken in the premises, to advise the Kansas electric lines interested and give their representatives an opportunity to appear and be heard in respect to the adoption of such accounting system.

LOUIS C. CRAMTON, Secretary Michigan Railroad Commission.—The revised classification submitted by the Interstate Commerce Commission is now under consideration by this commission. No final action will be taken prior to a conference with representatives of the electric railway companies of this State, which will be held with the commission at its office at Lansing at an early date.

RICHARD T. WILSON, Clerk Virginia State Corporation Commission.—It is the policy of this commission to follow, as far as possible, the system of accounting adopted by the Interstate Commerce Commission for all public service corporations, and it is our purpose to do so in the case of electric railways. In view of the fact, however, that the proposed system will not be made effective by the Interstate Commission until Oct. 1, 1908, this commission has concluded that it will be best to continue under its present system of accounting until July 1, 1909, as we desire to avoid two systems of accounting during the fiscal year.

## A 12,000-HP STEAM TURBINE FOR BUENOS AYRES

The works of Franco Tosi, Legnano, near Milan, Italy, have under construction for a Buenos Ayres central station a steam turbine which will develop 12,000 hp at normal load and 14,200 hp for two hours. The steam pressure required is 12 atmospheres (176.4 lb. per sq. in.) and the steam is superheated to 300 deg. C. The speed is 760 r.p.m. The turbine is direct connected to a Brown-Boveri three-phase, 25-cycle, 12,000-volt alternator, which receives a 220-volt current from a shaft-coupled exciter. A surface condenser is provided and the steam consumption is about 14.1 lb. per kw-hour. The combined weight of turbine, alternator and condenser is about 369 tons.

The steam turbine is of the Parsons type, with a Fullagar low-pressure balancer. Its designs, however, were got out in the Tosi works. The cylinder is of cast iron and is divided into two parts horizontally, and each of these parts consists in turn of two others. The shaft is of forged steel. A valve body fitted laterally in the cylinder contains the main steam valve, which is operated by hand, while the throttle valve is controlled by a valve gear which regulates the quantity of steam admitted into the turbine. The turbine shaft is carried in two spherical bearings arranged for forced lubrication. It is connected with the alternator shaft by a flexible joint which allows of small displacements. Where the shaft emerges from the casing at both ends the joints are made steam-tight by packed grooves.



At the high-pressure end a worm is fitted on the shaft to transmit movement by gearing to two vertical shafts running at 175 r.p.m., to each of which is fitted a rotary pump which takes oil by suction from a plate tank under one of the ends of the casings and delivers it at a pressure of 1.5 atmospheres. The two pumps work in parallel and send oil into a single pressure pipe from which it is forced through a cooler to the bearings. An auxiliary steam pump is employed to force the lubricant into the bearings at the start, because the main oil pumps only begin to suck oil after a speed of one-quarter of the normal number of revolutions has been reached. One of the above 175-r.p.m. shafts carries a speed governor which controls the distributing gear slide valve and a safety governor which acts on the hand shut-off of the main steam valve of the turbine, closing it instantaneously should the speed exceed the normal by 15 per cent. A thrust block fitted at the head of the turbine serves to prevent axial movements of the shaft and to take up the axial thrust.

The cylinder is constructed to resemble a tube as closely as possible. There are no steam ways cast solid, these being replaced by tubes and expansion joints to avoid all

cylinder as far as possible. It is of considerable width, however, and attains almost the diameter of the condenser in order that the steam may pass without eddy into the condenser, being distributed uniformly over the entire surface of the tubes which are to condense it.

The rotor drum is made of steel, forged in one piece. On the low-pressure side the drum is connected by a cast-steel head to the forged steel shaft by force fit when hot. On the high-pressure side the shaft is likewise fitted hot into the drum, and the end is provided with a steam chamber in order that the shaft head and drum may expand equally. The usual practice of this firm with other turbines is to have screw flange connections between these pieces, but it always uses the steam chamber.

The distributing valve gear controlling the steam inlet valve is not worked by steam as in the Parsons turbine, but by oil at  $1\frac{1}{2}$  atmospheres pressure, supplied by the main pumps already mentioned. The use of steam requires a very accurate adjustment and maintenance of the various parts, especially in plants in which the steam is not clean. By the use of oil this disadvantage is removed, because all the parts are at a low temperature and are well lubricated.

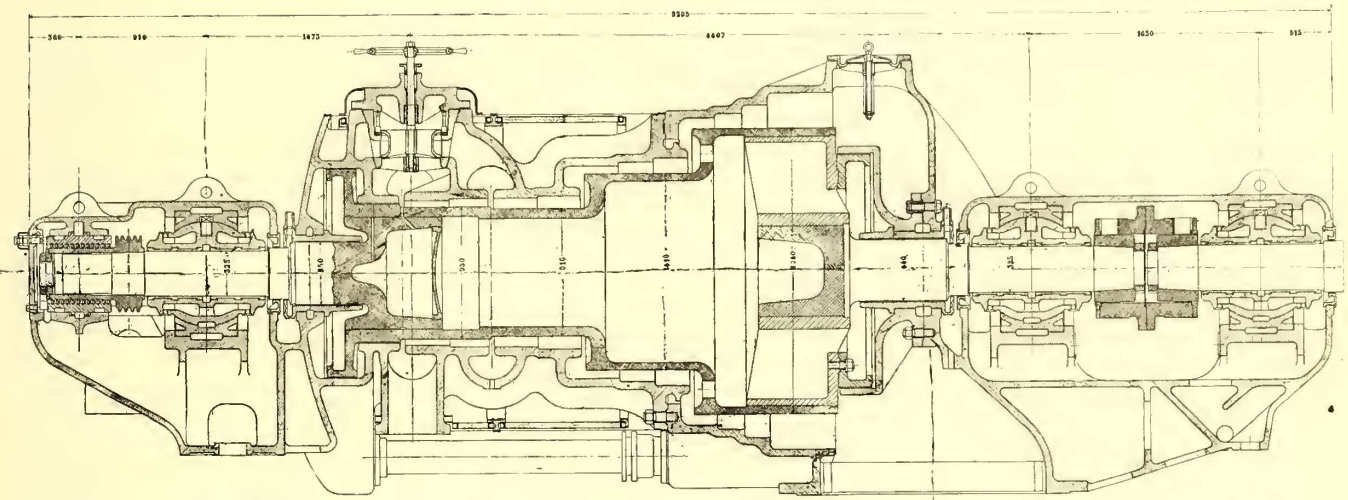


Fig. 1.—Cross-section of 12,000-hp Steam Turbine for Buenos Ayres. (Dimensions are given in millimeters.)

twist, and leave the case free to expand. The main valve body is independent of the cylinder, and rests on the foundation plate. The steam reaching it from the main pipe passes through the throttle valve and is conducted to the cylinder by a U-shaped tube to allow expansion.

The number of rows of blades is such as to allow but a small difference of pressure between them, and, therefore, a limited velocity of the steam. It is asserted that the steam thus yields up its energy to the wheels of the rotor under the best possible conditions, because the reduced velocity places the losses by leakage and friction at a minimum. The lowest radial clearance above the blade ends is 1.8 mm (0.7 in.), which is more than sufficient to prevent grazing, while it is small relatively to the length of the blades, so that the loss owing to escape of steam at the periphery of the wheel is very little. On the other hand, this loss is not considered detrimental to efficiency, because as the steam escapes through the clearance at the periphery it is sharply throttled, and the velocity which it acquires generates heat. This causes the superheating of the steam, or at least tends to dry it before it acts upon the following blades, thus diminishing the loss by friction.

The exhaust chamber of the turbine is rectangular and of limited axial dimensions to reduce the length of the

turbine cannot run if the engineer forgets to start the small auxiliary pump already described, because steam cannot be admitted to the turbine. This prevents injury to the bearings, which are completely dry of oil before starting. Moreover, the turbine stops if, for any reason, the oil under pressure supplied by the pumps should fail.

The speed of the turbine is but very little influenced by the pressure of steam, while it is extremely sensitive to the steam distribution. This, it is pointed out, is of great importance, because the pressure in the boilers continually fluctuates and drops at the moment of maximum load, and in ordinary cases causes a noticeable diminution of speed in the turbine.

The valve gear is composed of the following parts: The inlet valve *A* is balanced, has a double seat, and is connected by a joint, which leaves it free to rotate, with the rod of a piston *B* sliding in a cylinder *C*, into the lower part of which the oil under pressure is admitted or discharged by means of a rotary distributor *D*. The latter is controlled by a centrifugal governor. The pressure of the oil driven by the piston is counterbalanced by a spring *L*.

In the valve *D* are provided four longitudinal channels, which serve for the passage of the oil under pressure to



the cylinder *C*, when the piston *B* is to be raised; and as many others which discharge the oil from *C* when *B* is to be lowered.

These channels correspond to the ports made in the valve *M*, Fig. 2, which rotates about *D*, and which, by means of the lever *PQ*, is actuated by the rod of the piston *B*. The slide valves *D* and *M* turn in a chamber *N* which terminates in a tube containing oil under pressure, and from which a discharge pipe branches off. When correctly adjusted, the slide valves *D* and *M* are in such a position that the admission and discharge channels for oil are closed. When the load varies, by an increase, for instance, the centrifugal governor drops and causes *D* to turn to open the channels so that the pressure oil enters the cylinder *C*, the piston *B* rises, opens the valve *A*, and causes the valve *M* to turn so as once more to close the channels opened by *D*. The valve thus closes in a position corresponding to the fresh load, and when adjustment has effected itself, the two distributors *D* and *M* are found in the same relative position as previously; that is, as though they formed together a single rigid pin, and the governor

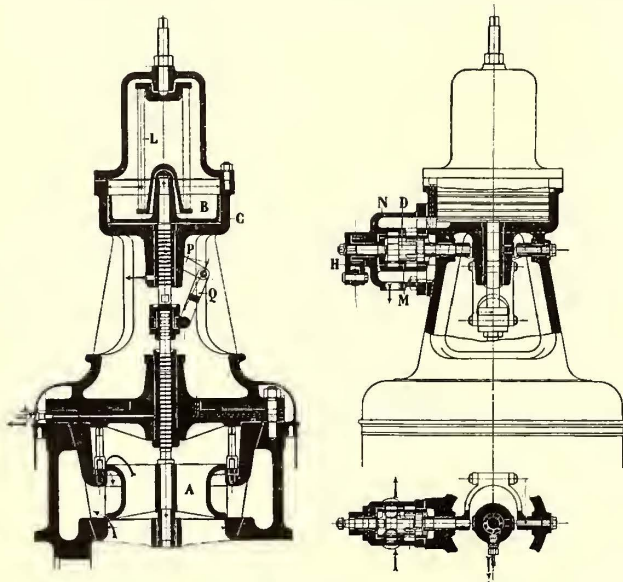


Fig. 2.—12,000-hp Turbine, Details of Valve Gear

rotating this pin had directly transferred the valve to its new position.

The regulation, the maker claims, is, therefore, rapid because the valve *D* opens a large admission or discharge port for oil so as rapidly to raise or lower the piston *B* and the valve *A*. It is stable because the valve *D*, drawing after it the valve *M*, rapidly closes the port previously opened, thus preventing over-regulation; it is sensitive because the slide *D* is perfectly balanced by the special disposition of its channels, and it is energetic in view of the abundant dimensions of the oil piston *B*, which are such as to have a great power available to overcome any friction which may develop in the valve gear.

The cylinder has a non-conducting layer placed beneath its outside lagging, which is easily dismantled and re-mounted without injury. In this way the outside losses of heat are limited; greater uniformity of temperature between the inner and outer parts of the walls of the cylinder is secured, and the outside temperature of the engine is kept at a low point.

The surface condenser was constructed by the firm of Tosi in accordance with its own designs. It consists of the condensation chamber placed directly beneath the turbine,

a submerged air pump, and two centrifugal pumps for the water circulation. The condenser body is cylindrical and is made of sheets hydraulically riveted. The steam enters from an upper rectangular port, subdivided into two currents by passages; the steam passing through each of these makes three turns round the brass tubes, in the interior of which the circulation water flows, the latter likewise making three turns.

The gaseous products and the condensed steam are made almost as cool as the temperature of the cold circulation water, which allows of extracting them by one wet air pump. The inside of the condenser body is designed in such a way as to avoid noticeable resistances to the currents of steam, and to utilize the entire surface of the tubes. The condenser body does not rest rigidly on the flooring, but is supported by three balancing appliances, each of them capable of balancing, in addition to its weight, that of a part of the tubing and the circulating water. This arrangement, however, completely relieves the turbine cylinder from the considerable load due to the atmospheric pressure on the area corresponding to the exhaust, which is about 68,324 lb., while leaving the various parts complete freedom to expand. Naturally this load always exists, but its action is only to compress the connecting flanges between the turbine and the condenser. If, however, it had been decided—in order to leave the expansion free—to interpose an expansion joint of the sliding or flexible type between the turbine and the condenser, the action of the atmospheric pressure would, on the one hand, have counter-balanced the weight of the condenser body, but, on the other, have stressed the turbine casing, producing a deformation in the latter.

The air pump consists of two double-acting cylinders with vertical axes which work in parallel. The operation is as follows: The piston, in rising, effects suction from below; not through valves which would produce resistances, but through an annular aperture which it opens. In descending it compresses below and sucks above; again rising, it compresses above and forces the air and water out through the valve plate into the chamber above the piston. The clearance is small in volume, and even at a very low pressure, i. e., about that of the condenser, the yield in volume is said to be excellent. The tightness between the suction chambers and the corresponding compression chambers, as likewise the piston guide, is secured by means of the water itself, which is sucked up. This is found to be good enough without having recourse to spring packings. The maker points out that the wear and tear of the pistons is very small, owing to their vertical arrangement, and claims that the obtainable vacuum is invariable even after lengthy running. It is also claimed that this type of pump presents the advantages possessed by dry pumps with slide valve distribution and equilibrium channels, but that it is much more simple and accessible, and always remains at a low temperature; while in dry pumps, notwithstanding the circulation around the cylinders, such high temperatures are reached as to render lubrication difficult.

The double compression arrangement allows a siphon system to be maintained in the circulation water pipes, so that the two resistances overcome by the centrifugal pump are limited to the internal friction of the pipes and the difference of head. It is necessary to extract the air accumulating in the higher part of this system, as it would increase the resistance to be overcome by the centrifugal pump. This air is extracted by a pump and an ejector connected with the second compression chamber of the air



pump, and this, in the maker's experience, in no wise diminishes the vacuum obtained in the condenser. The pump is driven by a 440-volt, 80-hp, 145 r.p.m. d.c. motor.

The volumetric displacement of the pump is, furthermore, abundant for rapidly exhausting the air contained in the condenser and turbine at the start and of obtaining a good vacuum even in the event of infiltrations of air through the stuffing-boxes of the turbine flanges, the suction tubes of the boiler feed pipes, etc.

The centrifugal circulating pumps work in parallel. They are constructed for a lift of 32.8 ft., and to each is coupled up a 440-volt, 90-hp, 496 r.p.m. d.c. motor.

The circulation system works, as already stated, by siphonic action. At its highest point a chamber is fitted in which accumulates the air extracted by the second chamber of the air pump, a small non-return valve being interposed. Connection may be interrupted by a valve operated by a float, which prevents circulation water unadapted for feeding, and which would afterward mingle with the condensed steam, from entering the air pump. To the condenser a valve is attached to turn the exhaust to atmosphere in the event of stoppage of the condenser motors.

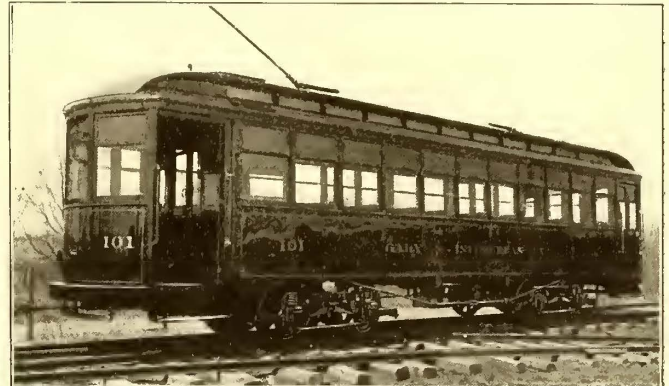
**THE PRINGLE EMERGENCY BRAKE**

P. J. Pringle, manager of the Burton-on-Trent (England) Tramways, has invented an emergency track brake which has been applied to six cars on that system. The operative part consists of a steel or iron shoe, with its base shaped to engage the rail head and its top provided with a flange and inclined groove to engage the car wheel. Each shoe is hung close to the wheel by a slotted link under pressure from a compression spring so that when free the shoe drops into the rail groove, while the wheel flange mounts the shoe, thereby converting the weight on the wheel into braking effort. The shoe is held off the rail by a wire cable connected to a platform lever and is put on by pressing a

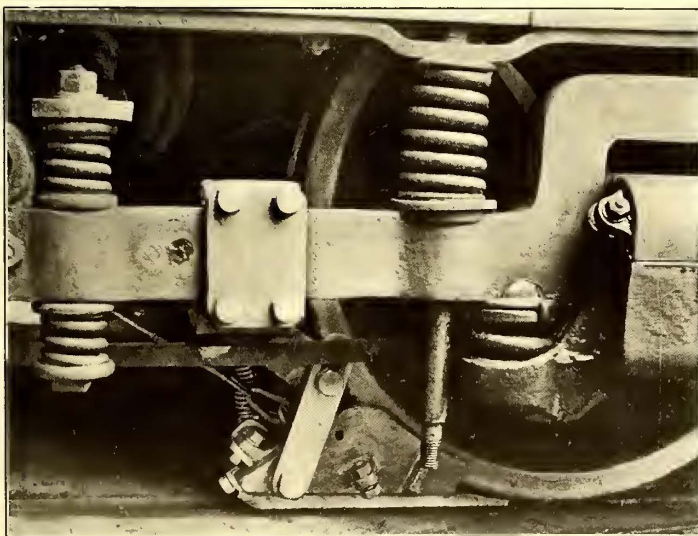
Braking" and the back one "Backward Braking," so that in a backward runaway the motorman brakes the wheels which normally would be in front. This emergency brake can be applied from either end. It is reported that Mountain & Gibson, Ltd., have taken the manufacturing rights.

**CARS FOR THE NEW STEEL CITY**

The Danville Car Company has recently delivered to the Gary Interurban Railway, Gary, Ill., several semi-steel, semi-convertible cars mounted on Brill No. 27-G1 trucks, ready for operation. The bodies are 30 ft. long; the length over vestibules is 40 ft.; the length over bumpers, 42 ft.; the width over sills, 8 ft. 1/4 in.; the width over the belt rail, 8 ft. 2 in.; the extreme width over all, 8 ft. 4 in.; the height



Interurban Car for Gary & Interurban Railway, Gary, Ill. from under side of sill to top of roof, 9 ft. 1 1/4 in. The bottom framing consists of two center 6-in. I-beams with wood fillers. The outside sills are double, with 7-in. x 3/4-in. steel plate between. The end and cross sills are braced with iron brackets and tie rods at suitable intervals, which extend across the bottom framing. The 10-in. steel body



Application of Track and Wheel Brake for Emergencies

Handles and Levers Controlling the Emergency Brake

second lever, which lifts a detent out of the first lever to free the shoes. The arrangement of these levers is shown in one of the illustrations. An advantageous feature is that the breakage of the cable applies the brake, since the function of the wire is really a negative one.

As arranged at present on a single truck car, only the two rear wheels are braked, but the operating platform lever has two knobs, the front one being marked "Forward

bolsters are inserted and bolted to longitudinal sills and a conduit is arranged between the center sills for carrying the cables, etc. The under-truss rods are 1 1/8 in. in diameter. The outside and ends are sheathed with tongue-and-groove yellow pine and plated with sheet steel. The interior is also covered with sheet steel below the arm rail, but there is a 2-in. opening at the bottom to enable the window pockets to be cleaned.

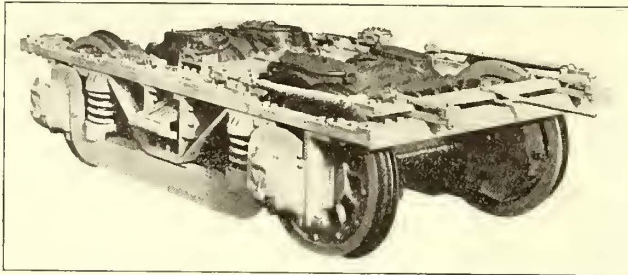


**MOTOR TRUCKS FOR THE NEW YORK, NEW HAVEN & HARTFORD RAILROAD**

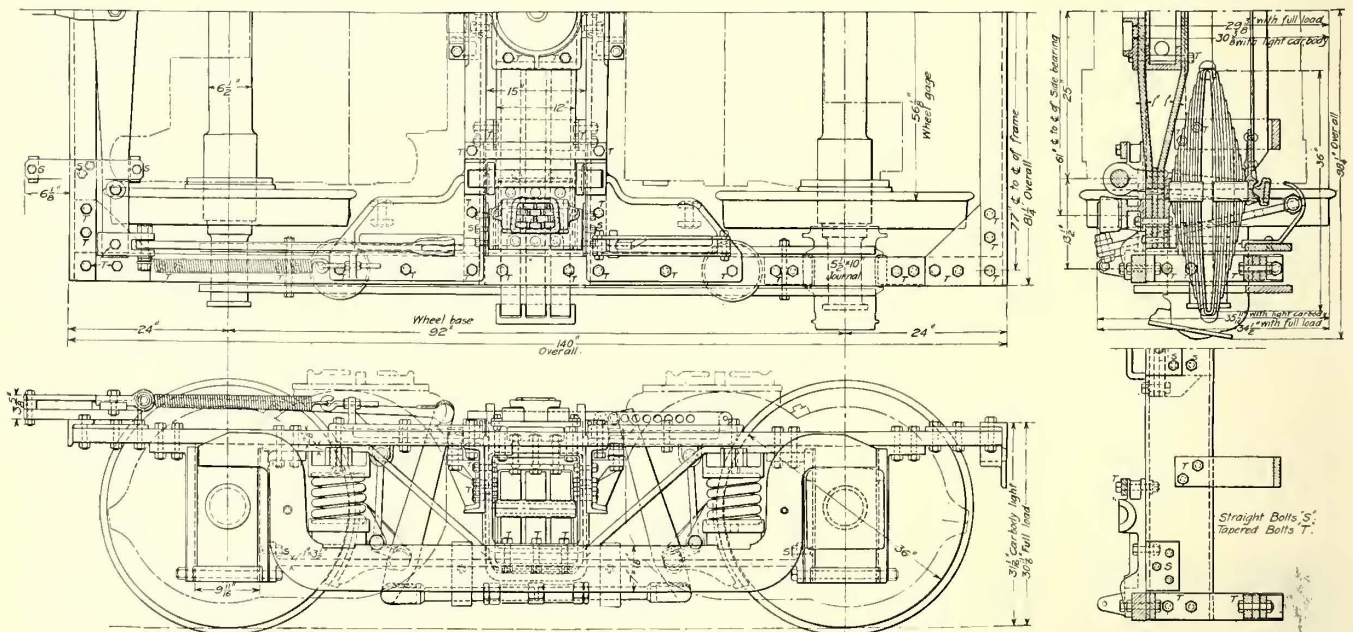
The American Locomotive Company has recently completed an order for four motor trucks for the New York, New Haven & Hartford Railroad. These trucks are designed for service on the New Canaan branch of the road,

load 15,000 lb. The cars will have two GE-603-A, 125-hp single-phase motors per truck and will be operated at a maximum speed of 50 m.p.h.

The trucks, which are of the builder's type B592, while presenting no unusual features of construction, are interesting as indicating the design considered by the manufacturer and railroad company as desirable for heavy high speed service. The top frames are made of wrought iron side bars  $2\frac{3}{8}$  in. thick and  $4\frac{1}{4}$  in. wide, tied together at the ends by angle iron end frames reinforced by steel plate corner gussets. The swinging bolsters are built up of 12 in. x 1 in. wrought iron bars. The 10-in. steel channel transoms are carried on lips on the frame center braces, thus reducing the shear on the bolts through brace and transom. The cast steel transom gussets make a very rigid connection between transoms and side frames. These gussets include bearings for swing link pins, brake hanger lugs and brake release spring brackets and thereby eliminate a number of



**Truck Carrying Two 125-hp Single-phase Motors**



**Construction Details of Truck for Two 125-hp Single-phase Motors**

running from New Canaan to Stamford, a distance of 8 miles. This branch is at present a steam road, but is being electrified and will act as a feeder for the main line.

small parts usually bolted or riveted to the frame and transom. The wear or rubbing pieces between the bolster and transom prevent the bolster from cramping in starting or



**Combination Passenger and Baggage Car for the Electrified Branch of the New York, New Haven & Hartford Railroad Between New Canaan and Stamford**

The trucks will be used under 68-ft. combination baggage and passenger cars, having a seating capacity of 51. The total weight of the equipment complete without passenger or freight load is approximately 160,000 lb.; the maximum passenger load will be approximately 8000 lb. and the freight

stopping. The wrought iron pedestals have steel plate wear pieces covering all wearing surfaces and are tied together at the bottom by large bolts through the pedestal legs and cast iron thimble or spreader. Safety straps are provided under the spring plank, over the top of the bolster and under



the brake bottom connections. All the brake lever holes and hanger pins are designed for large bearing surfaces and are case hardened.

The principal dimensions and weights are as follows: Wheel base, 92 in.; total length, 11 ft. 8 in.; transverse centers of frames, 6 ft. 5 in.; height from top of rail to truck center plate, 30 $\frac{3}{8}$  in. (with light car body); maximum load at center plate, 53,250 lb.; wheels, 36 in. diameter; axles, 6 $\frac{1}{2}$  in. diameter; journals, 5 $\frac{1}{2}$  in. x 10 in.; weight without motors, wheels or axles, 8600 lb.; weight complete without motors, 14,900 lb.

### GASOLINE EMERGENCY WAGON IN BROOKLYN

The Brooklyn Rapid Transit Company is now experimenting with a gasoline emergency wagon and if satisfactory will adopt gasoline motor wagons in its emergency service and substitute them for the horse-drawn revenue collection wagons. The chassis and running gear were purchased, but the body was taken from one of the regular emergency wagons of the company.

To test the vehicle, it was placed in Crew House No. 2 on Herkimer Street, the territory of which includes the Bedford and East New York sections and such remote suburban places as Carnarsie, Bergen Beach and Jamaica. Crews are instructed to report by telephone with their stations as soon as a job is finished so they may be assigned again if necessary, but frequently on the runs to remote places a return had to be made to the crew station for new horses before a second call could be answered. This, of course, is unnecessary with the motor truck. During three very warm days last month the wagon ran more than 120 miles on emergency calls.

The wagon is equipped with a two-cylinder 20-hp air-cooled engine with direct drive, the engine shaft being con-



Brooklyn Gasoline Emergency Wagon

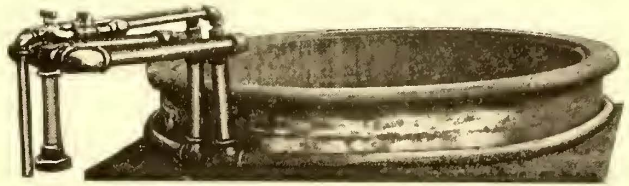
nected to the differential and the differential to the rear wheels. The speed is 14 m.p.h. The tires are solid rubber and are expected to have a life of 20,000 miles. At an average run of 30 miles per day this would make them last two years. The consumption of gasoline is 1 gal. for 9 miles, so that at 14 cents a gallon the average daily cost for fuel is about 50 cents. In addition 50 cents a day is allowed for lubrication, making the operating cost, exclusive of repairs, \$1 a day. Besides the regular side lamps the motor wagon

carries an acetylene searchlight which is mounted on the dash and can be trained on the work under way. The purpose is later to mount a tower at the rear of the wagon. At present ladders are used, but they are not satisfactory, as a man has to be at the foot of the ladder to divert wagons to insure the safety of the man at work and the crew is reduced by one man on this account.

The body of the wagon is painted the standard B. R. T. colors. The wagon is manned by the regular emergency wagon crew, and no additional expense has been entailed for labor.

### A GAS BURNER FOR HEATING TIRES

The accompanying illustration shows a simple and inexpensive gas burner for heating tires which has been designed and built at the shops of the Aurora, Elgin & Chicago Railroad Company at Wheaton, Ill. A gasolene burner was formerly used for this purpose, but it was expensive to operate and dangerous as well. A high-proof gasolene was required and it was found to be impossible



Gas Burner for Expanding Tires

to store it even in tightly closed metal casks without a loss from evaporation greater than the amount actually burned during the comparatively infrequent use of the burner. Some time was necessary to start the burner and it frequently flooded so that the fire had to be put out and the tire allowed to cool down before starting up again. The burner shown was built and, after several experiments were made to determine the proper size and location of the air nozzle, it was made to work with complete success at the surprisingly low consumption of 4 cu. ft. of gas per minute. It requires at the most 25 minutes to expand a tire sufficiently to remove it from the center, and with illuminating gas at \$1 per 1000 cu. ft., the cost is only 10 cents. Tires have been removed in 15 minutes at a cost of 6 cents.

The burner is made of 1-in. iron pipe with 1-in. pipe connections for gas and  $\frac{1}{4}$ -in. pipe connections for air. The air and gas pipes are attached by unions to mains run under the floor. The risers divide at the top and join the two halves of the burner which are made separate and overlap at their ends. The air pipes have small thumb cocks inserted in them to regulate the intensity of the blast, but the gas is turned into the burner at the full service pressure of 3 oz. The air pipes are led into the vertical legs of the gas pipe connections through a reducing T, which is used instead of an ordinary elbow at the upper bend. They are carried down inside of the vertical legs and are bent outward at the bottom to discharge the air directly into the burner pipe. The burners have  $\frac{3}{16}$ -in. holes drilled in them spaced  $\frac{1}{2}$  in. apart.

One of these burners with holes on the inside is used for removing tires, and an exactly similar burner of smaller diameter and with holes on the side is used for expanding tires before shrinking them on centers. The cost is trifling and the burners can be made in any shop equipped with pipe-fitting tools.



## ELECTRIC RAILWAY LEGAL DECISIONS

### LIABILITY FOR NEGLIGENCE

#### Alabama.—Carriers—Injury to Passenger—Contributory Negligence—Stepping from Moving Car.

It not being necessarily negligence for a passenger to alight from a moving car, even by stepping in the opposite direction to the movement of the car, a plea of contributory negligence in so doing, which does not show the speed of the car, is insufficient.—(Birmingham Ry., Light & Power Co. v. Dickerson, 45 S. Rep., 659.)

#### Alabama.—Carriers—Charges—Reasonableness of Rules—Knowledge of Rules.

The rule of a street railway company that when a train consists of several cars, each one having a separate conductor, a person who takes passage in one car and pays his fare must remain on that car until his trip is completed, and if he changes to another car must again pay a fare, is reasonable.

Where a passenger goes from one street car to another after paying his fare, he may be ejected from the second car for refusing to again pay a fare, though when he entered the second car he did not know of the rule of the company requiring such payment, it being sufficient if he is informed of such rule and given an opportunity to pay the fare before being ejected.—(Birmingham Ry., Light & Power Co. v. Stallings, 45 S. Rep., 650.)

#### Alabama.—Carriers—Passengers—When Relation Terminates—Alighting Passenger—Negligence—Evidence—Sufficiency.

The relation of a street car passenger does not end when he leaves the car, but continues until he has reasonable opportunity to leave the carrier's roadway, after the car reaches the place to which he is entitled to be carried.

Where a street car passenger on a dark night signaled the conductor to let her off at a regular stopping place, and the conductor understood, but failed to let her off there, and let her off beyond, where the track was very rough, and while attempting to cross the track fell and was injured, the company was negligent, entitling her to recover, unless she was guilty of contributory negligence in crossing the track, or unless she assumed the risk.

In an action for injury to a street car passenger, a plea that she assumed the risk by voluntary and knowingly alighting between stations, appreciating the danger of doing so, was unsupported, where the evidence showed that the passenger, with the conductor's assistance, alighted from the car before she knew she was beyond her destination, or between that station and the next one.—(Melton v. Birmingham Ry., Light & Power Co., 45 S. Rep., 151.)

#### Alabama.—Carriers—Street Railways—Action by Ejected Passenger—Complaint—Sufficiency—Negligence—Transfers—Burden of Proof—Serviceable Transfer—Failure to Issue—Effect—Objections to Testimony—Time for Making—Carriers—Ejection of Passenger—Damages Recoverable—Recovery Not Excessive.

A complaint against a street railway company, averring that plaintiff was ejected from a car through a conductor's negligence in incorrectly punching a transfer given plaintiff to show his right to ride on the car from which he was ejected, sufficiently avers the negligence charged.

In an action against a street railway company for ejecting a passenger who presented an improperly punched transfer, the burden was on him to show that the conductor on the first car was bound to issue a transfer to him to the car from which he was ejected.

A street railway conductor's failure to issue a serviceable transfer, when bound to do so, makes the company liable for injuries suffered by a passenger in consequence.

An objection to a question asked a witness, made after answer, is too late, where the answer is not made so quickly as to preclude a prior objection.

One wrongfully ejected from a street car may recover damages arising from his weak physical condition, drawn to the conductor's attention, and other damages proximately resulting from the wrong, including the expense and inconvenience to which he was put, and humiliation and indignity suffered.

Two hundred and eighty-seven dollars was not an excessive recovery against a street railway company for wrongfully ejecting a passenger weakened by typhoid fever and compelled to walk home.—(Birmingham Ry., Light & Power Co. v. Turner, 45 S. Rep., 671.)

#### Georgia.—Carriers—Carriage of Passengers—Management of Conveyances—Sudden Jerks—Trial—Instructions—Expression of Opinion.

In a suit to recover damages against a street car com-

pany, where the allegation of negligence is the negligent movement of the car of the defendant, causing a sudden, violent and unusual jerk which threw the plaintiff across the seat of the car, it was erroneous to give in charge to the jury the following instructions: "If, in reviewing the testimony, you are satisfied that plaintiff was injured by a sudden, violent and unusual jerk, and that he could not, by the exercise of ordinary care and diligence, have protected himself against the consequences of this negligent act, then he would be entitled to recover." The error in this instruction is twofold: First, that a recovery could be predicated on proof of a sudden, violent and unusual jerk. To make a jerk an act of culpable negligence it must have been unnecessary at the time and place where it occurred as well as violent and unusual. Second, that the charge contained an assumption by the judge and an instruction to the jury that the act mentioned constituted negligence; and that "this negligent act" had in fact been proved.—(Augusta Ry. & Electric Co. v. Lyle, 60 S. E. Rep., 1075.)

#### Georgia.—Master and Servant—Injury to Employee—Promise to Repair.

In an action for damages against an electric street railway company by a motorman on account of personal injuries, the petition alleged as follows: While operating a car of the defendant, he discovered that the brake was out of order and would not catch. He telephoned to the day foreman to furnish him with another car, stating the defective condition of the one in use. The foreman promised to immediately substitute another car for the one which the plaintiff was operating; but three and one-half hours elapsed before this was done. In consequence of the defective condition mentioned, the plaintiff was compelled to exert all of his strength and to throw his weight upon the brake in order to stop the car. As a result of this overexertion he was afflicted with a hernia. Held, that the petition was properly dismissed on general demurrer.—(Freeman v. Savannah Electric Co., 60 S. E. Rep., 1042.)

#### Idaho.—Trial—Motion for Nonsuit—Effect of Motion—Street Railroads—Injuries to Persons on Track—Contributory Negligence—Burden of Proof—Failure to Look and Listen—Reciprocal Right and Duty—Duty of Keeping Car Under Control at Crossing.

In an action to recover damages for the injury or death of a person, by reason of being run against and over by a street car, a motion for a nonsuit at the close of the plaintiff's evidence should not be granted, unless the facts presented by the evidence are such that but one conclusion could reasonably be drawn from them, and that conclusion is that no recovery can be had under the evidence.

In this class of cases the burden of proving contributory negligence is with the defendant.

Failure to look and listen before crossing a street car track at a public street crossing is not, as a matter of law, negligence per se.

The right and duty of pedestrians, and the right and duty of the person in charge of the motive power of a street car when crossing streets, are reciprocal, and each is bound to use equal diligence to avoid collision.

A street car should be kept under the reasonable control of the motorman when crossing a street, and persons with or without vehicles, passing over the track at street crossings, may assume that care will be used to reduce the speed at such crossings.—(Pilmer v. Boise Traction Co., Ltd., 94 Pac. Rep., 432.)

#### Illinois.—Limitation of Actions—Amending Pleading—Effect—Carriers—Street Railway—Collision—Injury to Passenger—Question for Jury—Instructions—Negligence—Trial—Cure of Error—Instructions.

Where the original declaration in a personal injury action against a street railway company stated a good cause of action defectively, alleging that the company so carelessly "propelled" its car that a collision occurred, an amended declaration, filed after two years from the injury, alleging that the company so carelessly "conducted and managed" its car as to cause a collision, did not state a new cause of action as affected by limitations.

In an action against a street railway for injury to a passenger caused by a collision, held, under the evidence, proper to refuse to direct a verdict for the company.

An instruction, in a personal injury action against a street railway company, that, if it could have avoided the collision by exercising the highest degree of care consistent with the practical operation of the road, plaintiff could recover, was erroneous for not limiting the company's negligence to that charged in the declaration.

An instruction, in a personal injury action against a street railway company, that, if it could have avoided the collision by exercising the highest degree of care consistent with the practical operation of the road, plaintiff could



recover, being erroneous as authorizing recovery on negligence not pleaded, the error was not cured by other instructions fully covering the question.

Each instruction must state the law correctly as far as it goes, and, in a personal injury action against a street railway company, an instruction that carriers are required to exercise extraordinary care in carrying their passengers was reversible error, for not limiting the duty to care consistent with the mode of conveyance and the practical operation of the road, though other instructions stated the limitation.—(Ratner v. Chicago City Ry. Co. et al., 84 N. E. Rep., 201.)

**Illinois.**—Negligence—Imputed Negligence—Driver and Passenger—Evidence.

In an action against a street railway company for injuries received by a person in a wagon which collided with a street car, evidence examined, and held to show that the driver of the wagon was in sole charge thereof, and that the person injured had no control whatever over the driver or the movement of the wagon.

In order that the negligence of one person may be properly imputed to another, they must stand in such relation of privity that the maxim, "Qui facit per alium facit per se," directly applies.

Where a person who while riding on a wagon the driver of which he had no control over was injured by a collision between the wagon and a street car without fault on his part, the negligence of the driver could not be imputed to him so as to defeat a recovery against the street railway company for injuries caused by the concurring negligence of the driver and the company.—(Nonn v. Chicago City Ry. Co., 83 N. E. Rep., 924.)

**Indiana.**—Carriers—Injuries to Passengers—Street Railways—Actions for Injuries—Pleading—Proximate Cause of Injury—Questions for Jury—Contributory Negligence—Witnesses—Examination—Answers—Responsiveness—Testimony.

A complaint alleged in one paragraph that plaintiff was a passenger on defendant's street car; that a trailer was attached thereto; that plaintiff notified the conductor of his desire to alight at a certain crossing; that the car stopped at the crossing, and he attempted to alight, but, while descending, the car negligently started with a sudden jerk, the force of which threw plaintiff down with one foot upon the rail, and while in this position the rear car passed over his foot, causing the injury complained of. A second paragraph charged the same facts down to the allegation as to stopping the car at the crossing, but charged that, when the crossing was reached, the speed was slackened so that the car was moving not faster than two miles an hour; that the step of the car projected within a foot of the ground; that the conductor instructed plaintiff to alight while the car was moving at that rate, and that plaintiff attempted to do so, and while he had one foot on the ground alongside and underneath the step the conductor negligently, and with knowledge of plaintiff's position, increased the speed of the car with a sudden jerk, and by such jerk threw plaintiff to the ground underneath the rear car, and that, while in that position, before he could remove his body, the car wheels ran over his leg, causing the injury complained of. Held, that both paragraphs sufficiently showed that the alleged negligent acts complained of were the proximate cause of the injury, and it was unnecessary to formally charge that such was the fact.

Whether one incumbered with bundles was negligent in alighting from a street car moving at the rate of three miles an hour held for the jury.

Where plaintiff, in an action for personal injuries, when asked, with reference to his wounded leg, "When does it hurt you?" replied, "Hurts me nearly all the time, and there is a big hole in there yet, in the bottom," a motion to strike out all after "time," as not responsive, and because there was no claim for damages for such injury, was properly overruled, as the words were descriptive of the injury, and explanatory of the cause of the pain.—(Hammond, W. & E. C. Electric Ry. Co. v. Antonia, 83 N. E. Rep., 766.)

**Indiana.**—Street Railroads—Operation—Negligence—Collisions—Negligence.

The placing of an inexperienced motorman in charge of a car, accompanied by a skilled motorman to teach him the work, and to see that no harm will come from his inexperience, is not negligence on the part of the street railway company.

In an action for injuries in a collision between a street car and a wagon, evidence held insufficient to show negligence of the street railway company proximately causing the collision.

A motorman seeing a horse and wagon standing beside the track, and out of danger, may assume that he can safely

pass without slacking the speed of his car, and that either the horse is properly secured or that it will not be frightened at the car.—(Columbus St. Ry. & Light Co. v. Reap, 82 N. E. Rep., 977.)

**Indiana.**—Master and Servant—Fellow Servants—Electric Railroads—Employees.

A checkman on an interurban electric road, employed to look after the reception and discharge of freight and express matter, is a fellow servant of a general trainmaster, as affecting the company's liability to the checkman for injuries caused by the trainmaster's negligence in running a car against one on which the checkman was employed.—(Indiana Union Traction Co. v. Pring, 83 N. E. Rep., 733.)

**Indiana.**—Carriers—Carriage of Passengers—Performance of Contract of Transportation—Transfers to Connecting Lines.

Where plaintiff received a passenger's transfer slip from a conductor on one of defendant's street car lines and entered the first car leaving the point of transfer within the time required by the company's rules, but was ejected from that car because the conductor on the other car had incorrectly punched the transfer slip so as to entitle plaintiff to a transfer only on an earlier car, he may recover for his unlawful ejection and his right of recovery is not affected by the fact that he left the car without compelling the conductor to resort to force to expel him.—(Indiana Ry. Co. v. Orr, 84 N. E. Rep., 32.)

**Indiana.**—Separate Causes of Action—Street Railroads—Negligent Equipment of Cars—Evidence—Questions for Jury—Negligence—Operating Cars Without Fenders—Street Railroads—Accident to Pedestrian—Contributory Negligence.

The acts of negligence not being dependent on one another, separate causes of action are set up by a complaint alleging the circumstances of the killing by a street car of a child while crossing a street, and averring that the car was run at a dangerous and unreasonable speed, and a greater rate than allowed by ordinance; that the only means of stopping the car was a hand brake, which was insufficient for such purpose; that while the street was straight and level a long distance, and the child was in plain view of the motorman, the car was run to within 50 feet of the child at said high rate of speed, and till it was too late to stop it; that no warning signal was given; that there was no guard or fender on the front of the car, and that its vestibule did not afford the motorman a proper lookout.

The complaint for the killing of a child by a street car, alleging acts of negligence not dependent on each other, need not allege the separate causes of negligence in separate paragraphs.

That a street car runs 150 feet after the brakes are set is evidence that the car's equipment for stopping was ineffective.

It being a question of fact whether the conditions were such as to render the omission of the motorman of a street car to sound the gong between street crossings negligence, it is properly left to the jury.

Whether it is negligent to operate a street car without a fender is a question for the jury.

An adult, much less a child, is not necessarily negligent in failing to anticipate negligent operation of a street car.—(Louisville & S. I. Traction Co. v. Short, 83 N. E. Rep., 265.)

**Indiana.**—Street Railroads—Collisions with Vehicles—Negligence of Servants—Pleading—Proximate Cause of Injury—Pleading—Pleading—City Ordinance—Municipal Corporations—Ordinances—Repeal—Statutory Provisions—Master and Servant—Injury to Servant—Assumption of Risk—Negligence of Co-employee—Negligence of Master—Operation of Railroad—Pleading—Injury to Servant—Assumption of Risk—Employer's Liability Act—Construction—Railroads—Accidents at Crossings—Proximate Cause of Injury—Trial—Special Findings—Street Railroads—Collisions—Negligence—Evidence—Evidence—Best and Secondary—Collateral Matter—Railroads—Operation—Municipal Regulation—Speed Ordinance—Validity—Street Railroads—Collisions—Negligence—Crossing Railroad Track—Street Railroads—Collision—Action.

In an action against a street railway company for wrongful death through a collision between the locomotive on which decedent was riding and defendant's street car, a paragraph of the complaint directly charging defendant with negligence, and charging that decedent met his death by reason of the negligence of defendant as therein alleged, was sufficient, though it did not allege that defendant's servants were at the time in the line of their duty.

In an action for wrongful death, the complaint alleged



that while one of defendant railroad company's locomotives, on which decedent, an employee, was riding westerly, was approaching a street crossing, defendant street railway company, whose tracks crossed the railroad tracks, negligently ran its car upon the crossing without sending its conductor ahead as required by a city ordinance to ascertain whether locomotives or cars were approaching; that a collision ensued, and, to escape injury, decedent jumped from the locomotive; that at the same time another of defendant railroad company's locomotives, which was running easterly on a parallel track at a speed in violation of a city ordinance, struck the street car, and decedent was killed. Held, that these averments did not show that the first collision was a remote, rather than a proximate, cause of the injury, in view of a direct averment of negligence of the street railway company as the cause of the accident.

In an action for wrongful death of an employee of defendant railroad company, an averment that its locomotive was being run at the time at an unlawful speed, in violation of a city ordinance "which is and was at the time of the injury as follows" (setting it out), sufficiently alleged that the ordinance was in force at the time of the injury.

Act March 6, 1891, governing cities of more than 100,000 inhabitants, gave the right to regulate the speed of cars and locomotives, and also to secure the safety of citizens and others in the running of trains through the city, and provided that all ordinances, etc., not inconsistent with the act should remain in force until repealed by the Common Council, etc. Held, that the act did not repeal an ordinance passed in 1866, under authority of Acts Sp. Sess. 1865, p. 3, c. 1, limiting the speed of locomotives and cars.

A railroad employee does not assume the risk of injury resulting from the violation by a co-employee of a city ordinance limiting the speed of locomotives and cars.

In an action against a railroad company for wrongful death of an employee, the company alleged that, while a street car was standing across defendant's tracks, one of defendant's engines negligently ran against the car and threw it from the tracks, etc., whereby decedent was injured. Held, that the allegation of negligence was sufficient on demurrer.

Employer's Liability Act, section 1, makes every railroad or other corporation liable for personal injury suffered by any employee while in its service "(4) where such injury was caused by the negligence of any person in the service of such corporation who has charge of any . . . locomotive engine or train upon a railway, or where such injury was caused by the negligence of any person, co-employee or fellow servant engaged in the same common service in any of the several departments of the service of any such corporation, and said person, co-employee or fellow servant at the time acting in the place and performing the duty of the corporation in that behalf, and the person so injured, obeying the order of some superior at the time of such injury, having authority to direct." Held, that the doctrine of assumed risk is not applicable to cases arising under such fourth subdivision.

In an action for wrongful death, the complaint alleged that while one of defendant railroad company's locomotives, on which decedent, an employee, was riding westerly, was approaching a street crossing, defendant street railway company whose tracks crossed the railroad tracks negligently ran its car upon the crossing without sending its conductor ahead, as required by a city ordinance, to see whether locomotives or cars were approaching; that a collision ensued between the locomotive and the car, and that, to escape injury, decedent jumped to the ground; that at the same time another of defendant railroad company's locomotives, which was running easterly on a parallel track at a speed, in violation of a city ordinance limiting the speed to 4 miles an hour, struck the street car, and decedent was killed. It was also alleged that the brake on the street car was defective. The answers of the jury to interrogatories stated, in substance, that the first collision was a slight one; that the eastbound locomotive was running at the rate of 12 miles per hour at the time of the first collision; that it was then 250 feet away, and could not have been stopped in time to avoid the collision, though it could have been stopped if running at the rate of 4 miles per hour; that the brake on the street car did not fail to work; and that the failure of the engineer of the eastbound locomotive to begin to stop his train promptly when he saw the first collision was not the sole and proximate cause of the second collision. In answer to the question: "What, if any, careless or negligent act of any person engaged in running said street car caused, or helped to cause, said first collision?" the jury answered: "The act of the conductor in beckoning the motorman to come on." Held, that there was nothing in the answers to show that the negligence of each defendant in approaching the crossing was not a proximate cause of the injury.

In an action against a street railway company and a rail-

road company for wrongful death from a collision, evidence held not to show freedom of street railway from negligence proximately contributing to the injury.

In an action against a railroad company for wrongful death from an accident at a street crossing, oral evidence that the crossing was within the corporate limits of a city was admissible.

A city ordinance limiting the speed for locomotives while passing through the city did not become invalid from a failure to afterward limit the speed of electric cars; the fact that such cars are more readily controlled than steam cars affording just ground for distinguishing between them in respect to speed.

The attempt of those in charge of a southbound street car to cross a double railroad track when a westbound train was almost on the car, and an eastbound locomotive was but a few hundred feet away, with the bell ringing and having whistled for the crossing, was gross negligence.

In an action against a street railway company for wrongful death in a collision between a street car and a locomotive at a crossing, plaintiff alleged that defendant's car proceeded to cross the railroad track without sending some one ahead, as required by a city ordinance, to look for approaching trains, and the complaint contained an independent charge that defendant negligently failed to make proper investigation to ascertain whether trains were approaching, and negligently ran its car in front of the locomotive. Held, that proof of a violation of the ordinance was not essential to plaintiff's recovery.—(Indianapolis Union Ry. Co. et al. v. Waddington, 82 N. E. Rep., 1030.)

**Indiana.**—Master and Servant—Existence of Relation—Liability for Injury.

Where defendant's agent, who solicited and looked after the transportation of freight, agreed to attend to the loading of plaintiff's racing mare into defendant's car, whereupon plaintiff instructed him to "go to the boys and get the mare," and the agent directed the boys where to take her, and was present at the loading, and pushed a chute out of the car and helped place it in position, and the boys, plaintiff's employees, protested that the chute was too pliant, to which the agent replied, "I will stand it if she hurts herself," and thereupon the boys under the agent's supervision attempted to load the mare into the car, during which, on account of the chute's unfitness, she fell, and was permanently injured, defendant is liable for such injury; plaintiff's employees in loading the mare being servants of the defendant, and acting under orders of defendant's agent, whose duty it was to control the loading of the animal, so that any negligence on their part was negligence of defendant, and not contributory negligence of plaintiff.—(Indiana Union Traction Co. v. Benadum, 83 N. E. Rep., 261.)

**Iowa.**—Street Railroads—Operation—Injuries to Persons—Contributory Negligence—Crossing Street—Contributory Negligence—Evidence—Question for Jury—Petition—Negligence—Injury Avoidable Notwithstanding Contributory Negligence.

A person crossing a street has a right to assume that an approaching street car a block away is running at a lawful rate of speed, and if he could cross in safety before the car running at that speed could reach him he is not chargeable with contributory negligence in crossing without stopping to look just before reaching the track, unless he becomes aware that the car is running at a greater speed.

A traveler in crossing a street was struck by a street car running at an unlawful rate of speed, which he had seen approaching when a block distant. Held that, in the absence of any direct evidence as to whether he knew the speed of the car, the fact that he was struck was not conclusive evidence of contributory negligence, as the presumption that he would exercise care for his safety would negative any knowledge on his part of the speed at which the car was coming.

Evidence in an action against a street railroad company by one who was struck by a car while crossing the track considered, and held to make the question of contributory negligence one for the jury.

The petition in an action against a street railroad company by one who was struck by a car while crossing the track alleged that defendant was negligent in not stopping the car before striking plaintiff. Held, that this was a sufficient allegation to raise the question whether defendant, with knowledge of plaintiff's danger due to his own negligence, used reasonable precautions to avoid injuring him.

A street railroad company is liable for striking a person with a car if the motorman knew of his danger, in time to have avoided injuring him in the exercise of reasonable care, even though he was negligent in putting himself in a place of danger and continued to be negligent in not looking out for his own safety.—(Powers v. Des Moines City Ry. Co., 115 N. W. Rep., 494.)



# News of Electric Railways

## Electric Railway Contracts of the Galena Signal Oil Company

At a hearing in New York on June 3 before Franklin Ferriss, special examiner for the United States Government, some interesting facts about the electric railway work of the Galena Signal Oil Company were presented by C. C. Steinbrenner, auditor of the company's railway department.

The witness submitted in evidence the standard car lubricating form of contract used, the exhibit being a copy of the second annual agreement with the Philadelphia Rapid Transit Company dated May 31, 1907, and covering the period of June 1, 1907, to June 1, 1908. The standard contract provides for the sale of the different oils at established prices and is followed by a guarantee that the cost shall be a certain percentage less than during the time preceding contract with the Galena Company, or that the cost shall not exceed a certain flat rate.

The Philadelphia contract specifies that oil for car journals and bearings shall be priced at 20 cents a gallon and that the guaranteed cost shall not exceed 12.06 cents per 1000 miles. The guaranteed figure was 90 per cent of what lubrication had cost the Philadelphia Rapid Transit Company with the preceding contractor.

Section 5 of the Philadelphia contract provides that the railway company will pay for delivered material within 60 days from date of invoice and an amount up to what the guaranteed cost would be based on the monthly mileage record of the railway. Final settlement under the guaranteed clause is made at the end of the year.

The second contract submitted was one with the Pittsburgh Railways Company covering both cars and power houses. In this contract car lubrication is on the basis of 30 cents per 1000 car-miles and machinery lubrication for power houses and substations on the basis of 15 cents per 1000 kw-hours output.

The third contract exhibited was with the Metropolitan Street Railway Company, of Kansas City. This calls for car lubrication at 20 cents per 1000 car-miles and 12 cents per engine-hour, or 1000 kw-hours output. The Kansas City contract also contained a clause headed "Oil cups to be leased at 25 cents." This related to a patented oil cup for motor journal bearings leased at this price if Galena oil is used for these bearings. Prior to taking up this branch of lubrication it was the universal custom to use grease for lubricating motor journals. The rental charged was stated to be absolute cost, but the use of the cup is optional with the railways under contract.

Mr. Steinbrenner then identified an exhibit which showed the total mileage of all companies in the United States and Canada to be 41,350. This figure was secured by taking the 1906 mileage of these companies as reported by the *Street Railway Journal* and then adding an amount equal to the average annual increase for the two or three preceding years. In 1907 the total mileage of the electric railways under Galena guarantee contracts was 10,974, or about 26.7 per cent of all the electric railway mileage in the United States and Canada. The total mileage of the 29 companies that simply buy Galena oil outright was given at 1024, or 2.4 per cent of the total mileage. From this it appears that during the five years the Galena Company has been in the electric railway field it has secured 29.1 per cent of the total mileage.

Taking again the *Street Railway Journal's* figures as a basis, Mr. Steinbrenner said that of 93,200 cars in the United States and Canada 31,559 cars, or 35 per cent of the total, are under guarantee contracts and 1072 cars (1.1 per cent) under gallonage contracts. The number of companies holding Galena contracts is now 151. Among these companies are the Aurora, Elgin & Chicago Railway; Birmingham Railway & Light Company; Boston Elevated Railway; Illinois Traction System; Consolidated Railways of Connecticut; Georgia Railway & Electric Company; International Railway Company, of Buffalo; the Interborough Rapid Transit Company, of New York; the New York surface lines, and the Brooklyn Rapid Transit Company, of Brooklyn.

Asked regarding lubricating conditions on different roads, the witness said there was a wide variation in cost owing to variety of equipment and the degree of acquaintance with modern lubricating methods. Consequently, as the Galena Company usually guarantees to do the lubricating for 10 per cent less, it follows that there must be correspondingly wide difference in its contract rates.

At the afternoon session on June 3 Mr. Steinbrenner identified an exhibit showing the guaranteed cost per 1000 car-miles to the Helena (Mont.) Light & Railway Com-

pany to be 58.28 cents and to the Butler Passenger Railway Company 15 cents. These differences were explained as being due to local conditions. The Helena price was the guaranteed 10 per cent reduction of the previous cost. Power house lubrication costs per 1000 kw-hours range from 2¼ cents to 40 cents in different parts of the country. In the case of the Rochester Railway & Light Company, it appears that the cost of lubricating the steam machinery is 15 cents per 1000 kw-hours and for the hydro-electric units only 2 cents on the same unit basis.

## Program of Annual Meeting of New York State Association

The program has been announced of the 26th annual meeting of the Street Railway Association of the State of New York, at the Clifton Hotel, Niagara Falls, Ont., June 30 and July 1. The program for the morning session on Tuesday, June 30, includes the reports of committees as follows: Classification of accounts, electric express and freight service, height of car step and repair shop. The following will take part in the discussion on the report of the committee on standard repair shop: W. W. Cole, vice-president and general manager of the Elmira Water, Light & Railroad Company; R. A. Dyer, Jr., assistant general manager of the Rochester, Syracuse & Eastern Railroad; F. P. Maize, master mechanic of the Rochester Railway; W. H. Collins, general superintendent of the Fonda, Johnstown & Gloversville Railroad. At the afternoon session the following papers will be read: "Commutating Pole Railway Motors," by E. A. Anderson, of the railway department, General Electric Company; "Observations on Pay-as-You-Enter Cars by the Mechanical Man," by W. H. Evans, master mechanic of the International Railway, Buffalo; "The Pay-as-You-Enter Car from an Operating Standpoint," by C. A. Coons, superintendent of transportation of the International Railway, Buffalo. The session will be concluded by the appointment of the nominating committee.

The session Wednesday morning, July 1, will be taken up largely by a paper on "Signals for Interurban and Local Traffic," by F. B. Harrington, superintendent of signals of the New York Central & Hudson River Railroad. The following subjects suggested by C. R. Barnes, of the New York Public Service Commission, Second District, will be discussed under miscellaneous business at convenient times during the sessions: "The Use of Curtains on the Front End of Suburban Cars During the Daytime," "Some Practical Means to Enable Passengers Desiring to Board Trains to Stop Them at Flag Stations," "The Equipping of City Cars with Red Flags and Lanterns on Lines Which Cross Steam Tracks at Grade," "The Practice of Carrying Musical Instruments on City Cars."

The entertainments will include a banquet on the evening of June 30, a trip through the power house on the Canadian side, a drive through the park and a bridge-whist tournament for the ladies and a trip through the gorge.

Accommodations at the Clifton Hotel can be arranged directly with the hotel manager. No arrangements have been made for exhibits, but exhibitors will be welcomed and arrangements may be made for them with the hotel management. The usual full fare will be made by the railways one way, with a special one-third returning fare.

## June Outing of New England Street Railway Club

The June outing of the New England Street Railway Club will be held at Portland, Maine, June 25. A very interesting itinerary has been arranged and the event promises to be one of the most successful in the history of the club. Included as a feature of the outing is a trip by steamer from Boston to Portland. The plan is to sail from Boston Wednesday, June 24, on the *Governor Dingley* and return from Portland Thursday evening, June 25, by boat, arriving in Boston Friday, June 26. The program for the day at Portland includes a steamboat ride down the harbor, a trolley ride to Old Orchard or Underwood Park for a ball game, a shore dinner at Cape Cottage, the theater at Cape Cottage or outdoor vaudeville at Riverton. E. A. Newman, general manager of the Portland Railroad, will arrange all the details. The price of a ticket, including berth in outside stateroom on the steamer, is \$3.50. It is requested that all who desire to go write at once to John J. Lane, secretary of the club, Boston, so that proper reservation may be made.



### Program of the Master Car Builders' Convention at Atlantic City June 17-19

The forty-second annual convention of the Master Car Builders' Association will be held at Atlantic City, N. J., June 17-19. The sessions of the convention will be held in the Greek Temple on the new Million Dollar Pier. The Marlborough-Blenheim hotel has been chosen as headquarters and the president, executive committee and secretary of the association will have offices there. The registration booth will be in the entrance of the pier. Those attending the convention should report at this booth and register immediately upon their arrival.

The program for the three sessions is as follows:

WEDNESDAY, JUNE 17, 1908.

10 a. m. to 1:30 p. m.

Prayer.....10 a. m. to 10:05 a. m.  
Address of president.....10:05 a. m. to 10:15 a. m.  
Intermission.....10:15 a. m. to 10:20 a. m.

To permit visitors to retire, although all are requested to remain.

Reports of secretary and treasurer, 10:20 a. m. to 10:30 a. m.  
Assessment and announcement of annual dues; appointment of committees on correspondence, resolutions, nominations, obituaries, etc.,

10:30 a. m. to 10:40 a. m.  
Election of auditing committee....10:40 a. m. to 10:45 a. m.  
Unfinished business.....10:45 a. m. to 10:50 a. m.  
New business.....10:50 a. m. to 11 a. m.

Discussion of reports on:

Revision of Standards and Recommended Practice, exclusive of Protection to Trainmen,

11 a. m. to 11:15 a. m.  
Triple valve tests.....11:15 a. m. to 11:30 a. m.  
Brake shoe tests.....11:30 a. m. to 12 m.

Topical discussion:

Stresses to which car wheels are subjected. To be opened by Geo. L. Fowler.....12 m. to 1 p. m.  
Discussion of report on tests of M. C. B. couplers,

1 p. m. to 1:30 p. m.

Adjournment.

THURSDAY, JUNE 18, 1908.

9 a. m. to 1:30 p. m.

Discussion of reports on revision of rules for loading long materials.....9 a. m. to 9:15 a. m.

Cast iron wheels.....9:15 a. m. to 10 a. m.

Rules of interchange, including decisions rendered during the year by the arbitration committee, and report of arbitration committee on revision of both freight and passenger car rules...10 a. m. to 10:15 a. m.

Journal box and pedestal for passenger cars with journals 5 in. x 9 in. x 5½ in. x 10 in.,

10:15 a. m. to 10:30 a. m.

Marking of freight equipment cars.10:30 a. m. to 10:45 a. m.

Air brake hose.....10:45 a. m. to 11 a. m.

Automatic connectors.....11 a. m. to 11:15 a. m.

Bracing of steel freight cars.....11:15 a. m. to 11:30 a. m.

Side bearings and center plates.....11:30 a. m. to 12 m.

Topical discussions:

1. Manganese or other special steel coupler knuckles. Does it pay to use them? If so, what is the difference in cost from other steel knuckles?

To be opened by S. P. Bush.....12 m. to 12:30 p. m.

2. The abolishment of the brake beam safety chain.

To be opened by J. J. Hennessey....12:30 p. m. to 1 p. m.

Discussion of report on steel passenger cars,

1 p. m. to 1:30 p. m.

Adjournment.

FRIDAY, JUNE 19, 1908.

9 a. m. to 1:30 p. m.

Discussion of reports on:

Ventilation and heating passenger cars,

9 a. m. to 9:30 a. m.

Protective coatings for steel cars..9:30 a. m. to 9:45 a. m.

Location of ends of running boards..9:45 a. m. to 10 a. m.

Protection of trainmen.....10 a. m. to 10:30 a. m.

Side door and end door fixtures..10:30 a. m. to 10:45 a. m.

Tank cars.....10:45 a. m. to 11 a. m.

Subjects.....11 a. m. to 11:15 a. m.

Unfinished business:

Reports of committees on correspondence, resolutions and such other committees as may be named during the convention.....11:15 a. m. to 12 m.

Topical discussions:

1. Should journals of standard axles when fillets are partially worn, be made longer in order to get in a full size fillet? If so, what should be the limit of the length of journals?

To be opened by W. E. Fowler.....12 m. to 12:20 p. m.

2. The advantages and disadvantages of the all-steel box cars.

To be opened by W. R. McKeen, Jr..12:30 p. m. to 1 p. m.

Election of officers.....1 p. m. to 1:30 p. m.

Adjournment.

The forty-first convention of the American Railway Master Mechanics' Association will be held at the same place on the first three days of the following week, June 22-24.

Manufacturers of railway supplies, as in previous years, will have an elaborate display of exhibits which will be grouped on the new Million Dollar Pier.

### The Situation in Cleveland

The railway committee of the Cleveland City Council last Wednesday heard complaints regarding the service of the Municipal Traction Company. Residents along the Wade Park line objected to the service being given in this section. President DuPont promised to consider the complaints, but stated that he thought many people had been benefited on account of the time gained in reaching the business district.

On Friday evening a meeting was held to discuss a double-track express line on Superior Avenue. The company proposes to widen the street by taking out the boulevard or grass plots and pushing the curbs back to the pavement. The residents said a change of the kind proposed would spoil the appearance of the street, and the fast cars would make it dangerous to pedestrians. It was also said that residence property would be reduced in value. Mayor Johnson spoke briefly at the meeting and stated that there would be 14 ft. between the outside tracks and the curb. The plan, as outlined by the Mayor, is to have a four-track system on the street, the inside tracks to be used for the express service, the cars to stop only at crosstown lines.

The Mayor said he would not attempt to build the line without the consent of the property owners, but that on Euclid Avenue the case is different and he proposes to build a two-track line between East Twenty-second Street and East Fortieth Street.

### Affairs in New York

To obtain certain changes in the route of the proposed Broadway-Lexington Avenue subway, New York, the Public Service Commission has applied to the Appellate Division of the Supreme Court for the appointment of a commission of three to hear testimony as to the advisability of making the changes. The modifications asked concern the district between Ninth Street and Thirty-sixth Street, where a straightening would result from allowing the line to pass under Grace Church and other property, and a change from a two-track road, as originally planned, to a four-track system north of 129th Street. The latter would allow a crossing of the Harlem River to Park Avenue in the Bronx, and would give better connections at 138th Street with other subways. Should the report of the special commission to the court favor the modifications, the Public Service Commission could proceed with the work of building the subway without first obtaining the consent of property owners.

The Public Service Commission, First District, has replied to the proposal made by the Interborough Rapid Transit Company to build a subway in Flatbush Avenue, Brooklyn. The answer says that work will continue on the Fourth Avenue subway while the offer of the Interborough company is under consideration, and that plans have so been drawn as to make it unnecessary to perform any alterations should the work be allotted to the Interborough company. The commission adds that the plans provide for two tracks, which the Interborough Rapid Transit Company is to operate if it desires. Consequently the company is to have the opportunity of running over the route, whether it is in charge of the construction or not. Only a short stretch will have to be built to connect the new and the existing tubes at Flatbush and Atlantic Avenues.

The Board of Estimate and Apportionment has referred to the Comptroller and Corporation Counsel the question of authorizing \$2,850,000 bonds to provide funds for commencement of the construction on the Fourth Avenue subway in Brooklyn.

### Semi-Annual Meeting of the American Society of Mechanical Engineers

The semi-annual meeting of the American Society of Mechanical Engineers will be held in Detroit, Mich., June 23-26. An entire session will be devoted to hoisting and conveying machinery. Among the other subjects the following papers are announced: "Clutches," by Henry Souther; "Thermal Properties of Superheated Steam," by Prof. R. C. H. Heck, of Lehigh University; "Horse Power, Friction



Losses and Efficiencies of Gas and Oil Engines," by Prof. Lionel S. Marks, of Harvard University, and "A Journal Friction Measuring Machine," by Henry Hess, of Philadelphia. Among the excursions planned is one to the University of Michigan at Ann Arbor. The gas power section of the society will hold a session and the Society for the Promotion of Engineering Education and the Society of Automobile Engineers will hold a meeting in Detroit at the same time. The sessions will be arranged to avoid overlapping of the work of different sections as much as possible.

#### Legislation Affecting Electric Railways

**Massachusetts.**—A bill has been introduced in the Senate which it is proposed to substitute for the bill to authorize the consolidation of the Boston Elevated Railway and the West End Street Railway. This bill provides in part that a "street railway company, incorporated under the laws of this commonwealth, may purchase and hold the whole or any part of the capital stock of any other such street railway company whose railway connects with, intersects or forms a continuous line with its own." The bill further provides that "such railways shall be considered as connecting with, or intersecting each other, or forming a continuous line if one of them connects with or intersects or forms a continuous line with a railway leased to or operated by the other, or with a railway any part of the stock of which is owned by such other."

**New York.**—Governor Hughes has signed the bill providing that all railroad franchises in Buffalo and Rochester shall be sold at public auction. Some time ago the Court of Appeals decided that the law requiring franchises to be sold at public auction did not apply to Buffalo and the new measure was passed to make plain the intent of the law.

**Line Between Wellsburg and Bethany, W. Va., Opened.**—The Pan Handle Traction Company, of Wheeling, W. Va., opened its new line between Wellsburg and Bethany on June 2.

**Milwaukee Ordinance Recommended for Passage.**—The ordinance providing for franchises to the Milwaukee Electric Railway & Light Company to enable it to extend its lines in the northwestern part of Milwaukee has been recommended for passage by the council committee on railroads.

**Increases in Wages at Reading and Lebanon, Pa.**—The United Traction Company, of Reading, Pa., has increased the wages of its motormen and conductors from 16 2/3 cents to 17 cents an hour. The Lebanon Valley Street Railway has increased the wages of its trainmen from 15 cents to 15 1/2 cents an hour.

**Interurban Railway at Louisville Completed.**—The Louisville (Ky.) Railway has completed its line between Louisville and Fern Creek, 12 1/2 miles distant, and will place the line in regular operation soon. A trip was made over the line a few days ago by T. J. Minary, the president, and a party of newspaper men and invited guests, including many men prominent in Louisville.

**Need of an Electric Railway Between Paterson and New York.**—M. R. McAdoo, of New York, has written to the editor of the Paterson, N. J., *Call* directing attention to the desirability of improving transit facilities between Paterson and New York. Mr. McAdoo intimates in his letter that if enough interest is expressed in the subject he is prepared to assist in the promotion of a new rapid transit line to connect the cities.

**Indiana Rules.**—The committee of officials of the Indiana interurban electric railways and the Indiana Railroad Commission held the final meeting in the State House at Indianapolis, June 5, 1908. The railway members of the committee present were: C. D. Emmons, Ft. Wayne, chairman; H. A. Nicholl, Anderson; C. C. Reynolds, Indianapolis; A. A. Anderson, Columbus; C. G. Lohman, South Bend, and Fletcher M. Durbin, Evansville.

**Meeting of Pennsylvania Association.**—The annual meeting of the Pennsylvania Street Railway Association will probably be held in Harrisburg this year. Legislation affecting electric railways to be brought before the next session of the Legislature will be considered. The advisability of electing a permanent secretary, with headquarters in Harrisburg, is under consideration. The time and place of the meeting will be determined by the executive committee of the association.

**Annual Meeting of the American Institute of Electrical Engineers.**—The annual meeting of the American Institute

of Electrical Engineers will be held June 29, to July 2 at the Traymore, Atlantic City, N. J. Thirty-six papers are scheduled. J. R. Bibbins will present one on turbines and one on gas engines. Other papers of especial interest to electric railway engineers are: "From Steam to Electricity on a Single-Track Road," by J. B. Whitehead; "Induction Motors for Multi-speed Service with Particular Reference to Cascade Operation," by H. C. Specht; "The Determination of the Economic Location of Substations in Electric Railways," by Gerard B. Werner; "Conductor Rail Measurements," by S. B. Fortenbaugh.

**Attitude of Chester Company in Strike.**—J. A. Rigg, president of the Chester (Pa.) Traction Company, met the commissioners of Delaware County in Philadelphia last week and stated the attitude of the company toward its former employees. The position of the company is that the rate per hour for the men must remain at 17 cents, but the other questions are open to arbitration. Mr. Rigg said there was a heavy decline in receipts following the recent financial crises and that the employees at Chester were reduced proportionately with employees of the company elsewhere. Objection was made to the reduction at Chester and advantage was taken of the reduction to allege a number of other grievances.

**Convention of Canadian Electrical Association.**—The convention of the Canadian Electrical Association is to be held in the Chemistry & Mining Building of the University of Toronto on June 17, 18 and 19. Space has been provided in which to make exhibit of standard, special or new devices which manufacturers and dealers may desire to bring to the attention of those in attendance. This space consists of two large rooms about 32 ft. x 50 ft., and the corridors of the basement and ground floors subdivided into units and about 40 sq. ft. Applicants for space should state whether electric current is required, the kind and how much. W. G. Chace is chairman of the exhibits committee.

**American Institute of Chemical Engineers to Be Formed.**—The committee appointed at Atlantic City last June to consider the formation of an "American Institute of Chemical Engineers" has found a strong sentiment favoring closer relations between those who particularly specialize in chemical engineering, and it has been determined to hold a meeting for the purpose of organization at the Engineers' Club, 1317 Spruce Street, Philadelphia, June 22. Committees will be appointed at the morning session and at the afternoon session reports of these committees will be heard. The election of officers and the perfection of the organization will take place at the evening session. William M. Booth, Dillage Building, Syracuse, N. Y., is temporary secretary of the institute.

**Franchise Suit in Newark.**—There will be brought up for argument during the present term of the Supreme Court the suit of the city of Newark against the North Jersey Street Railway for the annulment of the ordinance passed by the Board of Works Jan. 19, 1905. Under the provisions of this agreement the city and the company entered into an arrangement whereby the company paid to the city 5 per cent of the gross receipts of the lines operated partly or wholly within the city limits. The city seeks to set aside the ordinance on the ground that the basis of the payment of the 5 per cent of gross receipts is inequitable and that the company should be compelled to pay to the city the amount the municipality avers to be due. There are other important questions involved, among them the bringing of all street railway grants, for whatever period originally made, under the perpetual tenure given under an ordinance passed by the Board of Works in 1893.

**Meeting of Purdue Branch A. I. E. E.**—At the meeting of the Purdue Branch of the American Institute of Electrical Engineers last month at Purdue University, "Engineering Education" was the topic of discussion. A study, led by Dean Benjamin, Professor Harding and Professor Plumb, was made of recent institute papers on this subject. "Electrical Engineering Education," by Charles P. Steinmetz, and "The Best Engineering Education," by C. F. Scott, formed the nucleus of the discussion. Dean Benjamin said that the main defects in the present electrical engineering training in some colleges appear to be as follows: Insufficient remuneration of the teachers, which makes most of the best men unavailable for educational purposes; competition between colleges, which leads to a curriculum marked more by the quantity of the subjects taught than by the thoroughness of the teaching; a tendency to teach the trade of electrical engineering rather than to educate intelligent and resourceful electrical engineers; unsatisfactory teaching of allied sciences, which gives a fragmentary knowledge of some details.



# Financial and Corporate

## Stock and Money Markets

NEW YORK, June 10, 1908.

The price tendency in stocks on the Wall Street market for the week has been downward. With light trading and an almost entire absence of outside buying, prices have sagged and some of the previous advance has been lost. The sale of \$50,000,000 of Union Pacific Railroad bonds was one of the factors in the market. The large financial interests in the Union Pacific properties were anxious to uphold the market for the sentimental effect a higher level of prices would have on the figure to be secured for the bonds. Speculators were convinced that with the consummation of the sale the movement in the market would be abandoned and their realizing sales produced falling prices. While net changes in stock prices for the week ending June 6 were advances in many instances, the close in almost all cases was lower than the highest for the week and the course of the market during the first three days of the current week has been downward, with trading at stagnation point.

Following the reduction in the price of steel bars of the week previous, the leading steel manufacturers of the country, after a special session June 9, announced a general reduction in prices for all products except steel rails. This action was probably brought about by pressure of the independent manufacturers. It is generally believed that reductions will be productive of orders and will aid in keeping mills in operation. The reductions should help to clear the atmosphere and have a beneficial effect; they imply recognition of the changed conditions which now prevail.

Little effect was caused by the receivership of the Wheeling & Lake Erie Railroad. The fact that this property and the Pittsburg terminal will be reorganized on a business basis was encouraging.

Rates for money in this country and abroad were easier. Rates of discount in Germany, Sweden and the Netherlands were lowered during the week and the outside markets in London and Paris were more favorable to borrowers. In the New York market call money ranged from 1½ to 1¾ per cent, while time loans were made as low as 2¼ per cent for 60 days.

## Other Markets

Traction securities in Philadelphia have been a trifle more active than in recent weeks, with a tendency toward lower prices. Philadelphia Rapid Transit Company stock reached 12½, which is the low mark for the year.

There was little trading in electric railway securities in Boston and price changes were fractional.

Cleveland Railway Company stock has not yet been listed on the Cleveland exchange. Small lots of the stock are said to have been sold at several points below par.

Some trading took place in the Baltimore market in the bonds of the United Railways & Electric Company, but price changes were nominal. The funding 5s sold at 76½, the 4s were steady at 85½ and the income bonds rose to 51½.

Electric railway securities were dull in the Chicago market with prices practically unchanged.

Quotations for various traction securities as compared with last week follow:

	June 2.	June 9.
American Railways Company, Philadelphia.....	44½	*44½
Boston Elevated Railway.....	a134	a134
Brooklyn Rapid Transit Company.....	49½	48¾
Chicago City Railway.....	a190	
Cleveland Electric Railway.....	a51¾	a54
Consolidated Traction Company of New Jersey.....	71	71
Consolidated Traction Company of New Jersey, 5 per cent bonds.....	—	102¾
Detroit United Railway.....	37½	37
Interborough-Metropolitan Company.....	12½	11½
Interborough-Metropolitan Company (preferred).....	32½	32
Manhattan Railway.....	137½	135
Massachusetts Electric Companies (common).....	10	10¼
Massachusetts Electric Companies (preferred).....	*44½	*49
Metropolitan West Side Elevated Railway, Chicago (common).....	*18	—
Metropolitan West Side Elevated Railway, Chicago (preferred).....	*54	—
Metropolitan Street Railway.....	26	—
North American Company.....	63¾	60
Philadelphia Company, Pittsburg (common).....	39	39
Philadelphia Company, Pittsburg (preferred).....	—	41¼
Philadelphia Rapid Transit Company.....	14¾	12¼
Philadelphia Traction Company.....	89½	*87
Public Service Corporation, 5 per cent collateral notes....	a97	a96½
Public Service Corporation, certificates.....	a70	a69
Twin City Rapid Transit Company, Minneapolis (common).....	90½	91½
Union Traction Company, Philadelphia.....	52	†47¾

a Asked.  
\* Last sale.  
† Ex. dividend.

## Annual Report of Georgia Railway & Electric Company

In the calendar year 1907 the gross earnings of the Georgia Railway & Electric Company, of Atlanta, Ga., amounted to \$3,309,341, as compared with \$2,500,574 in the preceding year. The large gain is due in part to an increase in miles of track. During the year the company built 10.4 miles of new track, making a total operated of 161.1 miles of single track. Of this total 150.2 miles have been built or rebuilt since Jan. 1, 1899.

In his statement to shareholders P. S. Arkwright, the president, states:

"During the year \$1,039,931 was expended on new construction, consisting of extensions of track, additional track making double track, electric line construction, additions to steam and electric plants, additional cars with electric equipment, acquisition of land and construction of buildings, together with additions to the car shops and structures thereon and additional mains, services, meters and improvements for the gas company.

"The common stock was increased \$2,500,000. Of this increase 4952 shares were sold to raise funds for the uses of the company and 20,048 shares were distributed among the common stockholders in payment, at par, of the extra dividend of 33 1/3 per cent declared out of the surplus.

"Consolidated mortgage bonds to the amount of \$158,000, par value, were certified and issued to the company in accordance with the deed of trust, on account of new construction and properties acquired. Underlying bonds of the Atlanta Consolidated Street Railway of the par value of \$25,000 were retired in accordance with the sinking fund provision in the mortgage and \$10,000, par value, of the first consolidated mortgage bonds of the Georgia Railway & Electric Company were retired in accordance with the provisions in the mortgage securing these bonds.

"The contract with the City of Atlanta for lighting the streets, which expired April 1, 1908, was renewed for a period of five years from that date. The company agreed to a reduction of its maximum rates to private consumers from 12 cents to 10 cents per kw-hour for current used for lighting purposes, and from 7 cents to 6 cents per kw-hour for current used for power purposes. The question of the city lighting contract and the electric current rates of the company are, therefore, satisfactorily settled for five years.

"The assessment of the physical property and franchises for taxation was very largely increased. This was done without arbitration or litigation. The amount at which the company is now assessed for taxation is entirely satisfactory to the public authorities.

"The company has dealt liberally with the public and has furnished good service in every department."

The statement of earnings compares as follows with the two preceding years:

	1907.	1906.	1905.
Gross earnings.....	\$3,309,341	\$2,500,574	\$2,112,973
Operating expenses.....	1,663,282	1,216,032	1,160,641
Net earnings.....	\$1,646,059	\$1,284,542	\$952,332
Taxes and interest.....	784,675	613,968	497,856
Balance.....	\$861,384	\$670,574	\$454,476
Preferred dividends.....	120,000	120,000	120,000
Surplus.....	\$741,384	\$550,574	\$334,476
Common dividends.....	428,448	120,292	.....
Surplus.....	\$312,936	\$430,282	\$334,476

The balance sheet as of Dec. 31, 1907, shows \$909,529 accounts and bills payable.

## New York Central & Hudson River Railroad to Combine Electric Railways

The New York Central & Hudson River Railroad has applied to the Public Service Commission of the Second District of New York for permission to transfer from the Mohawk Valley Company, which is controlled by the New York Central Company, the interests of the railroad and the Central Railway Syndicate in the street railways of Rochester, Syracuse, Utica and Schenectady, to a new corporation, the purpose of which is to unite the operation of the various companies. Plans are said to have been under way to control the electric railway interests of the New York Central road through the Mohawk Valley Company some time ago, but upon the passage of the Public Service Commission's law these plans were abandoned. The Mohawk Valley Company owns stock in the following companies: Utica & Mohawk Valley Railway, Oneida Railway, Syracuse Rapid Transit Railway, Rochester & Eastern Rapid Transit, Schenectady Railway, Rochester Railway, Rochester & Suburban Railway, Rochester & Sodas Bay Railway and the Ontario Light & Traction Company. Decision has been reserved.



**Berkshire Street Railway, Pittsfield, Mass.**—Plans have been announced for consolidating the Berkshire Street Railway and the Bennington & North Adams Street Railway and for the establishment of electric railway communication between Springfield and Pittsfield, by connecting the Western Massachusetts Street Railway and the Berkshire Street Railway. The General Court will be asked to pass a bill providing that the Berkshire Company may construct a railway to connect the system with the summit of Greylock Mountain, extend its line south from Great Barrington through Sheffield to the Connecticut line, and connect this extension with the town of Egremont. The extensions will involve an expenditure of \$2,000,000. The financing will be arranged through the New York, New Haven & Hartford Railroad, which controls the lines.

**Boston Elevated Railway.**—Gross earnings for May were \$1,214,000, which compares with \$1,181,000 in May of last year, an increase of \$33,000. It is thought that the gross earnings of the company for the fiscal year ending Sept. 30 next will show the smallest increase of any year in the company's history. For the 1907 fiscal year gross earnings showed an increase of \$425,781, a gain of 3.1 per cent. For the eight months ended June 1 the increase in gross has been less than \$150,000. The increase in gross for the year is not expected to exceed \$200,000.

**Boston & Worcester Street Railway, Worcester, Mass.**—Gross earnings for May were \$48,184, compared with \$42,836 a year ago, an increase of \$5,348, or 12.6 per cent.

**Calumet & South Chicago Railway, Chicago, Ill.**—The Calumet & South Chicago Railway, which acquired the property of the Calumet Electric Street Railway and the South Chicago City Railway, has executed a mortgage covering the entire rights and property of the combined companies to secure an issue of \$5,000,000 of 5 per cent bonds maturing in February, 1927. The bonds are redeemable at any interest date before maturity at 105. The First Trust & Savings Bank, of Chicago, is trustee of the mortgage. The proceeds from the sale of these bonds will be used to pay for the rehabilitation work required under the new ordinance accepted this spring by the consolidated company.

**Camden & Trenton Railway, Camden, N. J.**—The receiver has filed a report in the Court of Chancery showing that receipts from February to May were \$45,123 and disbursements \$36,881. The net earnings for March were \$4,138 as compared with \$1,672.57 for the corresponding month of last year. For April, this year, the net earnings were \$4,138 as compared with \$2,416 last year. In May, this year, the net earnings were \$5,622.87 as compared with \$3,312 last year. The receiver reports that the line has been improved through repairs to rolling stock and equipment.

**Chicago Consolidated Traction Company, Chicago, Ill.**—On June 1 the Chicago Consolidated Traction Company defaulted on the interest on its issue of \$6,750,000 of 4½ per cent general mortgage bonds. The Chicago Railways Company, when it took over the Chicago Union Traction Company, lessee of the Chicago Consolidated Traction Company, did not assume guaranty of either principal or interest of the bonds issued by the Consolidated Traction Company.

**Chicago Railways Company, Chicago, Ill.**—The February statement of the Chicago Railways Company shows an increase of \$47,116 in gross earnings, as compared with the corresponding month of last year, or 6.5 per cent. Expenses exceeded by \$33,578 the 70 per cent of the gross earnings to be charged to operating expenses in accordance with the ordinance. Detailed receipts and expenses for the two months follow:

February.		1908.	1907.
Receipts:			
Passengers	.....	\$742,826	\$700,873
Other income	.....	16,116	10,953
<b>Total</b>	.....	<b>\$758,942</b>	<b>\$711,826</b>
Expenses:			
Maintenance of way and structure	.....	\$30,087	\$62,126
Maintenance of equipment	.....	61,245	138,717
Operating power plant	.....	83,725	79,178
Operating cars	.....	280,800	225,233
General expenses	.....	88,362	101,332
Taxes (est.)	.....	16,609	16,609
Other expenses	.....	4,008	.....
<b>Total</b>	.....	<b>\$564,836</b>	<b>\$623,195</b>
Balance	.....	194,195	88,632
Balance based on 70 per cent	.....	227,683	188,632
5 per cent interest return	.....	135,788	128,249
<b>Net income</b>	.....	<b>\$91,895</b>	<b>*\$39,617</b>
Dividend:			
City, 55 per cent	.....	\$50,542	*\$21,789
Company, 45 per cent	.....	41,352	*17,827
*Decrease. †Actual.			

**El Paso (Tex.) Electric Railway.**—This company is reported to have increased its capital stock from \$750,000 to \$1,500,000.

**Interborough Rapid Transit Company, New York.**—The earnings for the quarter ended March 31 follow:

	1908.	1907.
Quarter ended March 31:		
Gross earnings	\$6,354,431	\$6,031,899
Operating expenses	2,795,931	2,496,657
<b>Net earnings</b>	<b>\$3,648,500</b>	<b>\$3,535,242</b>
Other income	318,340	233,712
<b>Total income</b>	<b>\$3,966,840</b>	<b>\$3,768,954</b>
Interest, taxes and rentals	2,638,205	2,514,078
<b>Surplus</b>	<b>\$1,328,634</b>	<b>\$1,254,276</b>

Earnings for the nine months ended March 31 compare as follows:

	1908.	1907.
Gross receipts	\$17,811,055	\$16,339,152
Operating expenses	7,926,593	6,994,421
<b>Net earnings</b>	<b>\$9,884,462</b>	<b>\$9,345,031</b>
Other income	914,863	577,441
<b>Total income</b>	<b>\$10,799,325</b>	<b>\$9,922,472</b>
Interest, taxes and rentals	7,983,009	7,218,793
<b>Surplus</b>	<b>\$2,816,316</b>	<b>\$2,703,679</b>

**Metropolitan Street Railway, New York.**—The receivers have sold the \$3,500,000 of receivers' certificates authorized recently to the Central Trust Company and to W. A. Read & Company. They carry 5 per cent interest and run one year.

**Norfolk & Ocean View Railway, Norfolk, Va.**—Charles Parker Breese has applied to the United States Court for the appointment of a receiver for the Norfolk & Ocean View Railway, formerly the Bay Shore Railway, long in litigation. H. W. Anderson, the general counsel for the Norfolk & Portsmouth Traction Company, has given out the following statement: "Application has been made by a man named Breese claiming five bonds of the Bay Shore Terminal Company to file a certain petition in the old suit in which the mortgage was foreclosed, praying certain relief with respect to a certain contract for the sale of his bonds. The property of the Bay Shore Terminal Company is owned by the Norfolk & Ocean View Company and the Norfolk & Portsmouth Traction Company is in no way involved in the matter and cannot be affected thereby. The court did not permit the petition to be filed, but set the matter down for a hearing June 22. The suit is merely an incident in closing up the old Bay Shore litigation and is of no importance to the Norfolk & Portsmouth Traction Company, which is not a party to the suit. This disposes of the erroneous reports regarding a receivership for the Norfolk & Portsmouth."

**Northern Texas Traction Company, Fort Worth, Tex.**—This company has increased its capital stock from \$250,000 to \$3,000,000.

**Philadelphia Rapid Transit Company.**—The Philadelphia News Bureau publishes the following: "The partial abolition of free transfers by the Philadelphia Rapid Transit Company has proved to be a very wise and proper measure. The public at large has not opposed it, as the ordinary rider has been convinced that he was taxed and inconvenienced by the wholesale distribution of free transfers which got into the hands of people who paid nothing for them and who secured a ride and the seat of the man who paid his fare. In the two weeks since the company did away with wholesale transfers it has been demonstrated that the company will save more than \$1,000,000 per year by abolishing free riding. This addition to the company's revenues will not cost the honest rider appreciably, as it comes from people who have not paid fares, but are now compelled to do so. This result is far beyond the expectation of Philadelphia Rapid Transit Company officials, who never knew what the actual loss was until the free transfer was abolished."

**Somerset Water, Light & Traction Company, Somerset, Ky.**—Judge Jarvis has appointed J. L. Waddell, of Somerset, formerly superintendent of the water works, receiver of the Somerset Water, Light & Traction Company, on application of the Louisville Trust Company.

**Toledo (Ohio) Urban & Interurban Railway.**—It is reported that the committee which investigated the advisability of the purchase and control of the Toledo Urban & Interurban Railway for \$750,000 by the Toledo, Bowling Green & Southern Traction Co. will make an adverse report. The committee is said to have found the physical condition of the railway good, but it is thought to be unwise to take the property over at the price fixed. The meeting of stockholders will take place on July 9, instead of July 2, as announced some time ago.



# Traffic and Transportation

## Brief of Natick & Cochituate Street Railway on 6-Cent Fares

The Natick & Cochituate Street Railway, Natick, Mass., has submitted a brief to the Massachusetts Board of Railroad Commissioners in reply to the arguments of Chairman Sweetser of the Wellesley Board of Selectmen regarding the 6-cent fare. Mr. Sweetser argued that the necessary increase in net revenue could properly be secured by the abolition of free transfers at Wellesley Square, by an increase in the unit of fare on the Needham and Cochituate branches without increase on the main line, or by reduction in the schedule.

In its reply the company states that the abolition of free transfers would seem to be against the policy of the board in allowing passengers to ride from any point within the limits of one town or towns to any other point within the limits of the same town or towns for one unit of fare; and that passengers should be allowed to ride from the center of one town or towns to the center of adjoining towns for one fare. The company has increased the transfer privileges at town centers on this basis from time to time. Citizens of Wellesley living on the Needham branch should be allowed the same ride on the main line from Natick to Newton Lower Falls as persons who happen to live elsewhere in the town. Tampering with fare limit points will work hardship. It seemed better to secure a proper return to the company by a general increase in the unit of fare than that fare limits should be disturbed. The abolition of transfers would not increase the net revenue, and the petitioners did not take account of the fact that whenever a transfer is issued, the car on which the fare is paid is credited with but half the fare. An increase in the fare on the branch line would cause a reduction in revenue through inevitable decline in traffic, and would therefore be an expedient of doubtful value.

The company states that it is practically impossible to treat the branches as separate and distinct properties. The division of capitalization assumed by the petitioners between the branches in their proportion of gross revenue is arbitrary. The company knows of no basis by which the capitalization can be proportioned to the different branches. It is still more difficult to estimate the cost of operation for each branch. The petitioners multiplied the average car-mile operating expenses in 1907, 15.78 cents, by the mileage operated on each branch and on the main line. This method assumes that expenses are the same for different portions of the lines. The expense of operating the Needham branch in reality is much less than that of the main line. The cars are smaller and are operated at lower speeds. A large proportion of the fixed expenses would not be reduced by abandonment of the branches. It is impossible to determine the expenses of the Needham and Cochituate branches. It does not seem unfair that those who travel chiefly on the main line should contribute something toward maintenance of branch lines which are not so profitable, if such is the case. The enterprise should be treated as a whole. The decision of the board on the petition of citizens of Grafton for reduction in fares on the Grafton line of the Worcester Consolidated Street Railway emphasizes the importance of treating such problems from the standpoint of the system as a whole. The arrangement of fares on the branch lines on a different basis from that used on the main line would not be acceptable to the public.

The company considered making reductions in service in order to effect sufficient saving to increase the net revenue materially. Reduction from a 15 to a 20-minute headway is possible during a few months of the year only, and during the last month a service has been operated on Saturdays, Sundays and holidays which gives a mileage equivalent to that run on the corresponding days of last year. A 10-minute service is now planned during the afternoon and evening hours. The car-mile saving will be less than the petitioners figured. As the consumption of power grows less, the cost of the remaining power increases. Wages of superintendents, starters, inspectors and others would not be decreased, and the expense for car crews would not be cut down because the reduction in car hours cannot be made to correspond with the reduction in car miles. No account is taken of the falling off in the volume of travel through reduced service. Some saving will be effected by the reduced schedule during the months in which it can be maintained, but there seems to be no hope of saving anything like \$7,400, as figured by the petitioners. The returns of the company with the increased fare do not show an increase approaching 20 per cent., as assumed by the petitioners. The increase will not do more than enable the

company to pay a return on the invested capital within the figure recognized by the petitioners as fair (7 per cent) and as soon as the revenue warrants it is planned to partially reduce the rate for workmen's tickets.

Figures of the mileage and earnings of the Natick & Cochituate road were submitted as follows:

	Mileage of cars		Increase	Earnings per car-mile		
	1907	1906		1907	1906	Increase
Oct. ....	44,961	44,887	74	18.87	18.96	*0.09
Nov. ....	43,767	43,658	109	17.65	18.03	*0.38
Dec. ....	14,488	44,674	*186	15.86	16.52	*0.66
	1908	1907		1908	1907	
Jan. ....	40,160	44,474	*4314	15.90	15.11	0.79
Feb. ....	35,295	39,566	*4271	16.81	15.63	1.18
Mch. ....	38,358	44,778	*6420	18.52	16.83	1.69
Apr. ....	38,918	43,447	*4529	18.76	17.64	1.12
† May ....	24,013	27,629	*3516	21.09	18.21	2.88

\* Decrease.

† First 19 days only.

## Fare Collectors on Fifth Avenue Buses

It is reported that society women are waging a campaign against the automatic fare-collecting device used by conductors on the Fifth Avenue buses. Richard W. Meade, president of the New York Transportation Company, which controls the buses, has made the following statement on the subject:

"The present method of collecting fares was instituted for the same reasons that have led to the adoption of the system on a number of street railways throughout the country. The method facilitates operation by simplifying the work of the conductors in receiving and accounting for fares and without imposing any hardship upon the passenger.

"Under the old system a large part of the time and attention of the conscientious conductor was necessarily given to maintaining a balance between the indication of his fare register and the fares collected, leaving him that much less opportunity to attend to the more important duties, from the point of view of our passengers, of watching for signals to stop the bus, of assisting travelers to get on and off and of giving the signal to start the bus in motion properly after passengers had entered or alighted.

"The present method of collecting fares also overcomes the objection which so many women have to permitting their white-gloved hands to come in touch with the more or less grimy hands of the conductor, whose work of pulling the bell rope and handling change and dirty bills makes it impossible for him to keep his hands immaculate, although our orders are that every conductor shall wash his hands at the end of each trip.

"Our automatic device makes it possible for a woman to avoid contact with the conductor, as all she has to do is to slip her dime into the slot of the nicked box which he presents. Of course, if the woman does not happen to have the exact change, handy she will have to risk contact with the conductor's hands when he makes change.

"Not the least important of the good features of the system is its effect upon the morale of the conductors. The fact that every passenger deposits, in effect, a fare directly into the treasury of the company, relieves the conductors who carry the automatic fare-collector from any possible suspicion of the dishonesty which has so unfortunately been associated hitherto with such employment, and in so many cases placed an unwarranted stigma upon honest, conscientious and faithful employees.

"The best answer we can make to what we believe to be a thoughtless criticism is the fact that since the adoption of this system we have received a large number of appreciative and commendatory comments."

## Receivers Unable to Comply with Orders of New York Commission

The receivers of the New York City Railway have notified the Public Service Commission, Second District, of their inability to operate the system in compliance with some of the orders requiring increased service, assuming the principle of adequacy of service underlying these orders to be applied to the entire system, without bringing about the entire disintegration of the system through inability to meet rentals and interest on securities of subsidiary companies.

In a letter of protest to the commission the receivers estimate that, in order to carry out the commission's ideas, it would be necessary to make these capital expenditures: Cars, \$3,192,000; car-house facilities, \$1,596,000; power-plant facilities, \$4,149,820; total, \$8,937,820.

The receivers figure the annual expense of the increases ordered by the commission to be: Operation, \$809,400; taxes, \$55,807; insurance, \$20,744; interest, \$536,269; total, \$1,422,220.



The receivers point out that the expenditures enumerated are in addition to those for which payment was to be made through the issue of \$3,500,000 receivers' certificates, recently sold. It appears that of the \$3,500,000 expended, the covered by the present certificates, approximately \$1,000,000 is money spent for maintenance and betterment of plant and equipment, substantially in accord with orders of the commission already issued. Of the remainder a little less than \$1,000,000 is for the purchase of 125 new cars, already ordered, and the balance, with certain insurance money, will be used to replace car-house property destroyed by fire. The pay-as-you-enter cars on the Fourth and Madison Avenue line were financed outside of the issue. The receivers state to the commission:

"It must be evident to you that it is impossible for us to incur any such obligations (as the \$8,937,820 referred to above), but granting, for the sake of argument, that we might attempt to carry out your orders, we would place such a burden on the property that in all probability the leaseholds would become unprofitable, and there would result a dissolution of the entire system in so far as it would be possible for us to default on the contracts and leases, leaving on our hands the Metropolitan Street Railway proper.

"As a result of the loss of the leased lines, the Metropolitan Street Railway would not have at its disposal sufficient funds to operate its lines in accordance with such orders as you have issued, and on account of the loss of the control of the leased lines the Metropolitan Street Railway would have to discontinue a very large percentage of its comparatively more profitable routes. This would bring about an utter demoralization of surface-car transportation facilities on Manhattan Island, involving a practical abolishment of the transfer privilege, a radical rearrangement of the routes of the cars, and resulting inconvenience and financial loss to the community. Briefly, this would mean that there would be no adequate means of surface-car transportation at all.

The commission has replied to the receivers, saying in part:

"The commission understands that the expenditures referred to in your letter, approximating \$9,000,000 for additional cars, carhouses, facilities and power plant are not the result of the orders already adopted or now under consideration, but would be the expenditure necessary to provide adequate service upon all of the lines under your jurisdiction. However, the commission is gratified to know that, in your opinion, adequate service can be secured without a greater capital expenditure.

"The commission also understands that you do not contend in your communication that the service orders previously adopted or those now being considered under hearing orders will render it impossible for you to continue the operation of the lines under your jurisdiction as a unit, but that under certain contingencies which might arise you would be unable to pay the rentals called for in the inter-company agreements."

The receivers replied in part as follows to the statement of the commission:

"We do not desire to enter into any discussion as to the advisability of placing additional service on certain lines affected by the orders of the commission, because the receivers are unable financially to carry out those orders. It is not necessary to discuss the merits of orders, compliance with which is financially impossible.

"The entire system of our distribution would be disorganized, and the attempt to regulate the service in accordance with the orders of the commission would render it necessary for us to default on certain of the leases. As a consequence of the abrogation of the leaseholds, disruption of the system would follow, so that instead of accomplishing an improvement in the service the orders of the commission would produce results directly to the contrary.

"We are of the opinion that the distribution of the 1475 cars at our disposal has been made to the best possible advantage of the traveling public. If it is your judgment that our assignment of the cars is founded on illogical premises, we shall be very glad to consider any suggestions which you may have to offer with the object of redistributing these cars and providing transportation facilities proportioned more nearly in accordance with what you believe to be the relative needs of the public as a whole."

The receivers will ask authority from the court to discontinue payment of rentals on additional leased properties.

### East Boston Tunnel Service of the Boston Elevated Railway

Complaints by the Boston Board of Aldermen of the East Boston service of the Boston Elevated Railway were

heard by the Massachusetts Board of Railroad Commissioners on June 4.

C. S. Sergeant, vice-president, and George R. Tripp, superintendent of transportation, represented the company. Mr. Sergeant stated that for anything with like conditions he considered the service through the East Boston tunnel and East Boston the equal of any in the world. The total one-way car service through the East Boston tunnel varies from 1 car per hour during the night to 48 between 7 and 8 a. m. and 54 between 5 and 6 p. m. The light hour car service through the tunnel in one direction is 28 cars and the total number of one direction cars through the tunnel scheduled in 24 hours is 593.

Mr. Sergeant filed a count of the traffic made by employees of the company at the Maverick Square (East Boston) portal of the tunnel on May 26 and 27, 1908. Cars with standing passengers were counted by adding to the known seating capacity the number of passengers standing. A summary was presented showing the number of cars by half hours and the average number of passengers per car. The count extended from 5:30 a. m. to 12:30 a. m. The summary follows:

Time.	Inward.		Outward.		Time.	Inward.		Outward.	
	Cars.	Avg. Pass.	Cars.	Avg. Pass.		Cars.	Avg. Pass.	Cars.	Avg. Pass.
5.30 to 6....	6	49	3	17	3 to 3.30....	14	24	16	28
6 to 6.30....	17	45	12	13	3.30 to 4....	15	31	12	27
6.30 to 7....	21	52	20	22	4 to 4.30....	14	28	15	35
7 to 7.30....	23	51	21	13	4.30 to 5....	21	16	17	37
7.30 to 8....	24	57	24	13	5 to 5.30....	27	20	24	59
8 to 8.30....	24	56	25	12	5.30 to 6....	27	17	26	65
8.30 to 9....	16	50	19	3	6 to 6.30....	24	15	30	57
9 to 9.30....	13	39	16	12	6.30 to 7....	18	24	19	43
9.30 to 10....	14	34	14	16	7 to 7.30....	14	33	16	37
10 to 10.30..	14	27	12	19	7.30 to 8....	17	35	16	33
10.30 to 11..	14	28	14	20	8 to 8.30....	11	26	13	34
11 to 11.30..	13	19	14	21	8.30 to 9....	15	16	13	25
11.30 to 12..	14	25	15	24	9 to 9.30....	12	19	13	23
12 to 12.30..	14	25	13	30	9.30 to 10....	11	20	12	29
12.30 to 1....	14	30	15	27	10 to 10.30..	12	21	12	28
1 to 1.30....	15	34	14	21	10.30 to 11..	14	18	12	32
1.30 to 2....	15	36	15	20	11 to 11.30..	10	17	13	41
2 to 2.30....	15	29	14	21	11.30 to 12..	10	14	10	25
2.30 to 3....	13	25	14	27	12 to 12.30..	6	9	9	19

Mr. Sergeant stated in conclusion that the Boston Elevated Railway does not receive a cent of the tunnel tolls, which are actually a detriment to traffic, and said that 62 per cent of the tunnel passengers transfer free to it from the other lines of the company. He requested the board to allow the stops between streets to be discontinued, as they interfere seriously with rapid transit with the large cars and powerful equipments in use.

### Violation of Order Causes Accident on Washington, Baltimore & Annapolis Road

Several persons were killed and about 15 injured in a head-on collision between two cars on the Washington, Baltimore & Annapolis Electric Railway at 7:50 p. m. June 5, at Camp Parole, about 2 miles from Annapolis. The cars were special cars, one from Baltimore and the other from Annapolis. Among the passengers were W. E. Slaughter, general traffic manager of the company, and several members of his family. Mr. Slaughter's daughter was killed and his son badly injured. Mr. Slaughter was injured, but the indications are that he will recover. J. N. Shannahan, vice-president and general manager, went to the scene of the accident as soon as word of the collision was received, and after doing everything possible to relieve the suffering of those injured, spent the balance of the night making a rigid investigation as to the cause of the accident. After returning from the scene of the accident Mr. Shannahan issued this statement:

"A careful investigation as to the cause of the deplorable accident has been made by the officials of this company. The investigation shows clearly that the accident was due to the violation of a plain written order, which amply provided for a safe running of these cars.

"The owners of this property have spared no expense to eliminate all ordinary causes of danger to the traveling public by building the very highest type of interurban road, and eliminating all grade crossings, and adopted the most improved system of train management, as well as selecting trainmen of ample experience and paying them the highest rate of wages in this State.

"To protect us and our passengers against injuries resulting from violation by a trainman of a plain written order, which is just as necessary for his own protection as for the protection of the passengers, we have to rely to a reasonable extent upon his having the same instinct of self-preservation as other men, if not more. I presume, of course, that there will be a full investigation into the cause of this accident by the coroner, and perhaps the above is about as full a statement as I ought to make in advance of that inquiry."



### Milk Traffic of Worcester (Mass.) Roads

E. G. Connette, general manager Worcester Consolidated Street Railway, writes as follows regarding the milk train which has been established on the Worcester & South-bridge Street Railway: "The General Court of Massachusetts passed a bill recently allowing electric roads to run milk cars. We have started the operation of a milk car between Charlton City and Worcester, a distance of 20 miles. We are carrying nearly 100 cans of milk each day and, as the contracts of the milk producers expire, we expect that a large amount of the milk traffic which is now carried by steam trains will be diverted to our line from the milk producers' district. The rate is made in accordance with the size of the can and the distance hauled. I expect that arrangements will be made before long so that milk will be carried not only on our lines into Worcester, but also on through cars to Boston via the Boston & Worcester Street Railway."

### Improving Service and Morals in New York

Frederick W. Whitridge, receiver of the Third Avenue Railroad, of New York, has had posted in the cars the following official notice:

#### HELP US TO KEEP THESE CARS CLEAN

Do Not Spit on the Floor!  
Do Not Throw Rubbish or Filth on the Floor!  
Do Not Let Anybody Else Do These Things!  
We Wish to Please the Public!  
We Ask the Public to Help Us!  
Inform Us of Everything Wrong!  
Be Sure Your Complaints Will Be Attended To!

Another form has been posted conspicuously in the cars. It says:

#### "THOU SHALT NOT STEAL"

Every passenger who does not pay his fare—STEALS.  
Every conductor who does not turn in fares collected—STEALS.

#### "THOU SHALT NOT STEAL."

**Western New York & Pennsylvania Traction Company, Olean, N. Y.**—This company has issued a very handsome folder, beautifully illustrated, which gives a map of the portions of Pennsylvania and New York through which it operates, including the lines from Bradford to Olean, to Seneca Junction, to Salamanca, Riverside and other places. A plan is given of the company's amusement resort at Rock City. Complete schedules are given of the different lines.

**Right to Haul Freight Questioned.**—The right of the British Columbia Electric Railway Company, Ltd., to haul freight for its own use in Victoria, B. C., is causing controversy. The city solicitor has decided that it would not be advisable to allow the company to haul freight for outside firms. The matter has been referred to other authorities and the company announces its intention of appealing if an adverse opinion is given. In the meantime the city has refused the company the right to erect poles on certain streets.

**Advertising Campaign of Jacksonville Electric Company.**—The advertisements of the Jacksonville (Fla.) Electric Company, which are now appearing in the newspapers of Jacksonville, are issued in connection with a publicity campaign which was undertaken with the object of keeping the public informed concerning the work which the company is doing from time to time in behalf of the community. The advertisements discuss schedule changes, rearrangement of lines to improve service, etc., and give suggestions to the public from time to time which if followed will help to reduce accidents.

**Result of Increased Fares on the Brockton & Plymouth Street Railway.**—Stone & Webster, of Boston, general managers of the Brockton & Plymouth Street Railway, Plymouth, Mass., report satisfactory results from the 6-cent fares received on that line during April, the first month the increased rate was in effect. Passenger receipts in April, 1908, increased 4 per cent over April, 1907, and if special car receipts, which were exceptionally heavy in April, 1907, are deducted for each month, the remaining passenger receipts for April, 1908, show a gain of 7 per cent over the corresponding month of the previous year, a very satisfactory showing in view of business conditions. A feature of the statement was the heavy ticket sales, which amounted to nearly 32 per cent of the total passenger traffic.

## Personal Mention

**Mr. A. L. Drum** has been appointed the representative of the Calumet & South Chicago Railway Company on the Board of Supervising Engineers, Chicago Traction.

**Mr. O. C. Macey**, of Cairo, Ill., has been appointed division superintendent of the Alton, Granite City & St. Louis Traction Company, of Alton, Ill., succeeding Mr. W. R. Bailey, resigned.

**Mr. Wilbur C. Fisk**, of Harvey Fisk & Sons, of New York, has been elected a director and vice-president of the Hudson & Manhattan Railroad Company, operating the tunnel between New York and New Jersey.

**Mr. A. W. Q. Birtwell**, formerly with the Northern Texas Traction Company, has entered upon his duties as assistant treasurer of the Puget Sound Electric Railway and the Tacoma Railway & Power Company.

**Mr. J. S. Simpson** has resigned as assistant treasurer of the Puget Sound Electric Railway and the Tacoma Railway & Power Company, of Tacoma, Wash., with which he has been connected for the last eight years.

**Mr. John M. Boyer**, of London, Ohio, has been appointed claim agent for the Ohio Electric Railway Company. Mr. Boyer was at one time probate judge of Madison County and later was engaged in electric railway construction work in the east.

**Mr. George L. Collins** has been appointed manager of the Ontario Light & Traction Company, of Canandaigua, N. Y., to succeed Mr. R. M. Searle. Mr. Collins was formerly manager of the Consolidated Gas & Electric Company, of Batavia, N. Y.

**Mr. R. J. Ludlam**, of the Long Island Railroad, has been appointed assistant trainmaster, with offices at Long Island City, and will have jurisdiction over the following electric railways controlled by the Long Island company: Huntington Railroad, Nassau County Railway, Northport Traction Company and the Ocean Electric Railway.

**Mr. N. C. Draper** has resigned, as vice-president and general manager of the Eastern Wisconsin Railway & Light Company, of Fond du Lac, Wis., to become district manager of the Ohio Electric Railway, with headquarters at Zanesville, Ohio. He will have charge of the city lines in Newark and Zanesville and the interurban line from Columbus to Zanesville. Mr. Draper was formerly with the Westinghouse Electric & Manufacturing Company at Cleveland.

**Mr. R. T. Gunn**, superintendent of transportation of the Fort Wayne & Wabash Valley Traction Company, of Fort Wayne, Ind., has been appointed general manager of the Eastern Wisconsin Railway & Light Company, of Fond du Lac, Wis., effective June 15. Mr. Gunn was formerly general manager of the Lexington Railway & Light Company, of Lexington, Ky., and previous to his connection with that company was superintendent of the Norfolk Railway & Light Company, of Norfolk, Va.

**Mr. Clement C. Smith**, president of the Columbia Construction Company, of Milwaukee, has been elected president of the Eastern Wisconsin Railway & Light Company, of Fond du Lac, Wis. He will continue to serve as vice-president of the Sterling, Dixon & Eastern Electric Railway Company, of Sterling, Ill., vice-president of the Lee County Lighting Company, Dixon, Ill., and president of the Citizens' Gas Company, of Kankakee, Ill. There has been no change of ownership or control of the stock of the Eastern Wisconsin Railway & Light Company.

**Mr. C. A. Hammond** has resigned as claim agent of the Seattle (Wash.) Electric Company, and Mr. George Carson has been appointed to succeed him. Mr. Carson was formerly division inspector of the company and was familiar with the working of the department. Before assuming his new duties Mr. Carson, at the request of the company, made a tour of the West to study claim department methods in other cities. He spent two weeks during April in San Francisco and Los Angeles investigating the systems of handling claims and devising ways of attracting the attention of employees to the causes of accidents.

**Mr. Benjamin E. Tilton**, whose appointment as engineer of maintenance of way of the Rochester (N. Y.) Railway was noted in the STREET RAILWAY JOURNAL of May 30, was formerly engineer of maintenance of way of the Municipal Traction Company, of Cleveland, which succeeded to the property of the Cleveland Electric Railway. His connection with the last-named company extended from May, 1907, to May, 1908. Before that time he was engineer in charge of



grade-crossing work in Cleveland. From 1901 to 1907 Mr. Tilton was with the Pennsylvania Railroad working under the chief engineer of maintenance of way. The property at Rochester under his jurisdiction includes about 100 miles of city and suburban railway.

**Mr. A. J. J. Pfeiffer**, general manager of the Calcutta Tramways, is in this country on a short business trip. Before returning to London he expects to visit Mexico. Mr. Pfeiffer was formerly connected with the General Electric Company and went abroad in 1897 to install important railway equipments in Paris and Milan for the French Thomson-Houston Company. Among the roads constructed under Mr. Pfeiffer's direction was the Milan-Gallarate-Porto Ceresio third-rail line to the Italian lakes. In 1902 Mr. Pfeiffer became connected with Dick, Kerr & Company, in London, and soon after visited Calcutta, India, in the interests of that company to install the system of which he subsequently was appointed general manager.

**Mr. W. W. Cole** has resigned as vice-president and general manager of the Elmira (N. Y.) Water, Light & Railroad Company, to become general manager of the public utilities department for Dodge & Day, engineers, of Philadelphia. Mr. Cole went to Elmira in 1893 to construct the West Side Railroad, and upon its completion was made superintendent and general manager. Following the consolidation of the West Side and the Elmira & Horseheads Company, Mr. Cole became general manager, a position which he has since filled. Before becoming connected with the Elmira properties Mr. Cole was general manager of the Utica Belt Railway and prior to that was superintendent of the Allston division of the West End Street Railway, of Boston. He was also an expert with the Thomson-Houston Company. Mr. Cole is a member of the American Society of Civil Engineers, the American Institute of Electrical Engineers and the American Gas Institute. He expects to leave Elmira for Philadelphia about August 1.

#### OBITUARY

**Mr. Pierre Van Cortlandt Miller**, secretary and treasurer of the Butte (Mont.) Electric Railway, died at his home in Flushing, N. Y., last week. Mr. Miller was a director in the American Stone Company, Clark Coal Company, E. Spencer Hall & Company, Henry-Bonnard Bronze Company, the United Verde Copper Company, the Wacklark Realty Company and the Wacklark Wire Company.

#### NEW PUBLICATIONS

**Locomotive Catechism**, by Robert Grimshaw, M. E. Twenty-seventh edition, entirely revised, enlarged and reset. New York: Norman W. Henley Publishing Company, 1908; 817 pages with index; illustrated. Price, \$2.50.

Since this work first appeared in print in 1896, it has gone through new editions as fast as a popular novel and has become a standard work. The 1908 edition is really a new book as it contains nearly twice as much data as the preceding issues. While written in the form of a catechism, the matter is arranged in a logical and readable way to cover the design, construction, running and repair of modern steam locomotives. The book is particularly suited for examiners and applicants for the locomotive engineer licenses.

**Locomotive Breakdowns**. By Geo. L. Fowler, revised by W. W. Wood. New York: Norman W. Henley Publishing Company; 1908 edition; 266 pages, including index; illustrated. Price, \$1.

This is the fifth dress of this staunch friend of the locomotive engineer. The construction of the steam locomotive is so complex, and the progress in its improvement so rapid, that those who operate it cannot do their best without some manual of this character. The book is got up in the question and answer form with a comprehensive index to make immediate reference possible to any of the 400 subjects treated. The principal features of the new edition are the pointers on the Walschaerts valve gear, electric headlights, and a more extended treatment of the air brake chapter. The contents are printed in large type on pages  $4\frac{3}{8}$  in. x  $6\frac{3}{4}$  in. in size, and are bound in durable, flexible cloth, so that the engineer can make the book his pocket companion.

Charles Thompson, a stockholder of the Toledo & Western Railway, has obtained from the Common Pleas Court, at Toledo, permission to amend a petition filed about a year ago to prevent the sale of the property to the Toledo & Western Railway. A demurrer to this petition has been filed by Attorney U. G. Denman which states that Mr. Thompson has no right to attack the outcome of the case because he took no steps to prevent the sale while the litigation was pending in the United States Court. The amended petition, Mr. Thompson says, will show why he failed to take such action.

## Electric Railway Patents

UNITED STATES PATENTS ISSUED MAY 26, 1908.

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

**Railway Signal System**, 888,483; Elihu E. Gabbart, Kingsland, Tex. App. filed Oct. 16, 1907. Relates particularly to a system designed for use on curves where it is desirable to indicate at one end of the curve when a train enters the opposite end. Employs tappets closing circuits at the entrance to the section, and actuating signals at the other end.

**System of Electrical Control**, 888,557; Hermon L. Van Valkenburg, Pittsburg, Pa. App. filed Sept. 2, 1904. Provides for effecting step-by-step operation of the unit switches by successive operation of a manually controlled master switch. Designed to simplify and lighten the control apparatus.

**Air Brake**, 888,566; John B. Wright, Greensboro, N. C. App. filed Oct. 9, 1907. Comprises a train pipe opening valve and a pair of independently operable truck actuated mechanisms, each including a valve engaging member arranged to move the valve to open position independent of the other member.

**Automatic Car Fender**, 888,578; Henry W. Bodendieck, St. Louis, Mo. App. filed Aug. 30, 1907. Arranged in combination with an ordinary front fender is a horizontal fender which will automatically make contact with the track and be advanced forwardly underneath the front fender whenever an object comes in contact therewith.

**Safety Device for Street Cars at Drawbridges**, 888,588; Joseph W. Collins, Cleveland, Ohio. App. filed March 3, 1908. Details.

**Electric Railway Signaling System**, 888,613; Edward B. Howell, Butte, Mont. App. filed Aug. 22, 1907. A railway signal system which makes it possible for engineers to transmit to, and receive signals from, other trains and a station.

**Electrical Appliance for Controlling Air Brakes**, 888,648; James G. Pearce and William H. Pearce, Oakland, Cal. App. filed Sept. 25, 1907. Details.

**Trolley**, 888,677; Charles M. Whitcomb, Portland, Ore. App. filed April 9, 1906. The trolley wheel has spiral grooves on each side to guide the trolley wire into the central or normal running groove. The wheel may be readily taken apart.

**Track Clearer**, 888,730; George A. Parmenter, Cambridgeport, Mass. App. filed Sept. 28, 1907. The car truck has a transverse bar at the front end to which a pair of spring levers carrying cleaner blades at their outer end are pivotally secured.

**Automatic Electric Railway Switching Device**, 888,929; Francis M. Rice, Dows, and Arthur W. Hill, Belmond, Iowa. App. filed Sept. 19, 1907. The car is provided with two reversely moving electromagnets in close proximity to the rails, means for moving them transversely to the car and for connecting them for simultaneous movement in opposite directions successively to open and close a switch tongue.

**Railway Signal**, 888,959; Edgar M. Cain, Wilmington, Del. App. filed Jan. 17, 1908. Details of construction of a semaphore signal having in addition a whistle operated by an electromagnet.

**Rail-bond**, 888,980; Axel H. Englung, Philadelphia, Pa. App. filed June 16, 1904. The bond is provided with a recess having a wall which extends entirely around the same, so that when the bond is applied to a rail the recess is closed on all sides.

**Trolley**, 889,015; Albert S. Janin, New York, N. Y. App. filed Nov. 16, 1906. A support for trolley rollers of the kind used by electric locomotives. Makes use of a toggle or link support depressible in a vertical direction.

**Electric Heater**, 889,040; Edwin F. Porter, Boston, Mass. App. filed Jan. 29, 1906. Effects the ventilation of the car by taking in fresh air from out of doors over the heat generating resistances.

**Car Heating and Ventilating Apparatus**, 889,041; Edwin F. Porter, Boston, Mass. App. filed Aug. 19, 1907. Relates to modifications of the above.

**Registering Apparatus**, 889,079; Paul Winsor, Weston, Mass. App. filed March 15, 1907. A register by which a record may be obtained of the number of fares registered by the conductor in a given time without such record being made known to the conductor.



## Construction News

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

### FRANCHISES

**Los Angeles, Cal.**—A. St. Clair Perry has applied for a franchise for a street railway up Avenue Forty-three to Mount Washington.

**Stockton, Cal.**—The Central California Traction Company has applied for an electric railway franchise in Stockton.

**Springfield, Mass.**—A franchise has been granted to the Springfield Street Railway for double tracks on Sumner Avenue and Long Hill Street from the present terminus of the double tracks on Sumner Avenue to Cherryvale Avenue on Long Hill Street. The company was also granted a franchise for building a line in East Street in Chicopee Falls.

**Babylon, N. Y.**—The South Shore Traction Company has been granted a franchise on Main Street, between Deer Park Avenue and Cooper Street, and northerly on Cooper Street to John Street, and thence easterly over and along John Street to the village limits. The company was also granted a 99-year franchise to build its line through Rockville Centre.

**Portland, Ore.**—The Portland Railway, Light & Power Company is reported to have applied to the City Council for a franchise to build and operate electric railways on 40 separate streets in the city.

**Cheyenne, Wyo.**—Thomas A. Cosgriff has been granted a franchise for an electric railway in Cheyenne. It is planned to begin construction work immediately. The road is also to be extended to Fort Russell and Frontier Park.

### RECENT INCORPORATIONS

**Idaho & Nevada Southern Railway, Boise, Idaho.**—Incorporated in Idaho to build an electric railway from Twin Falls to Wells, Nev., a distance of about 114 miles. General office, Boise. Officers: H. L. Hollister, president; I. B. Perrine, vice-president and general manager; R. M. McCollum, secretary and treasurer; S. Hays, attorney. These officers, with C. B. Hurtt, will constitute the board of directors. Capital stock, \$250,000. [S. R. J., Dec. 21, '07.]

**Terre Haute & Northern Traction Company, Indianapolis, Ind.**—Incorporated in Indiana to construct and operate street railways in Terre Haute and Marke. Burnet, Fontenet, Coal Bluff, Perth, Diamond and Bridgeton, in Vigo, Clay and Parke counties and an interurban railroad between and connecting these cities. The company also proposes to build and operate power plants. Capital stock, \$100,000. Headquarters, Terre Haute. Directors: W. S. Philips, A. J. Stein, D. Russ, Woods and F. C. McKeen.

**Vincennes & Washington Transit Company, Monroe City, Ind.**—Incorporated in Indiana to construct and operate an electric railway from, between and connecting Monroe City, Linton, Washington and Bloomington, in Knox, Sullivan, Daviess and Monroe counties. Capital stock, \$60,000. Directors: J. J. Burns, W. S. Hassette, W. W. Claycomb and M. A. Peoples. [E. R. J., June 6, '08.]

**Des Moines & Sioux City Railroad, Des Moines, Iowa.**—Incorporated in Iowa to build an electric railway from Des Moines to Lake City via Perry, Jefferson, Lake City and Sioux City. Capital stock, \$20,000. Officers: S. M. Elwood, Sioux City, president; H. M. Miller, Fort Dodge, vice-president; A. O. Anderson, Lake City, secretary; E. N. Bailey, Sioux City, treasurer. The board of directors includes: J. H. LaGrange, W. C. Edson, A. G. Martin, C. S. Hopper, M. A. Miller, H. H. Feige and S. M. Elwood. Offices, Lake City. Arrangements are being made in all the important towns along the line for the organization of similar companies. [S. R. J., Feb. 8, '08.]

**Hillsboro, Cynthiana & Bainbridge Traction Company, Cynthiana, Ohio.**—Incorporated in Ohio, with a capital stock of \$10,000, by Oliver E. Eylar and others.

**Oklahoma City Belt Line Railway, Oklahoma City, Okla.**—W. W. Bierce writes that this company will build a steam and not an electric railway. [S. R. J., May 23, '08.]

**Vancouver (Wash.) Traction Company.**—Incorporated in Washington to construct an electric railway from Vancouver to Washougal and Fisher. Incorporators: E. M. Rands, Vancouver; W. J. Patterson, Baker City, and

A. Welch, Portland. This company takes over the Washington Railway & Power Company, which was formed by W. H. Moore and his associates, and its object is to finish construction of the work already started, and then to extend the line through Clark County. The board of trustees of the new company is composed of Harrison Allen, Bert Yates, W. J. Patterson, A. Welch and E. M. Rands.

### TRACK AND ROADWAY

**Alabama Railway & Electric Company, Opelika, Ala.**—J. C. Chapman writes that it is intended to start construction work on this line at once. The road is to be built from Opelika to Eufala, Ala., Dothan and Lafayette, Ala., and will be operated by electricity. Officers: A. M. Buchanan, Opelika, president; J. C. Chapman, 223 Century Building, Atlanta, Ga., vice-president and purchasing agent; J. M. Shelly, Atlanta, secretary and treasurer; S. A. Wardlaw, Atlanta, superintendent. [S. R. J., May 16, '08.]

**Little Rock & Hot Springs Electric Railway, Little Rock, Ark.**—C. J. Kramer, president of this company, is said to have announced that actual construction will begin on the line within 60 days. This company contemplates the construction of an electric railway from Little Rock to Hot Springs. [S. R. J., Apr. 18, '08.]

**British Columbia Electric Railway, New Westminster, B. C.**—This company is reported to have awarded a contract to Boyd & Craig, Vancouver, B. C., for the construction of the section between New Westminster and Cloverdale, a distance of 12 miles. It is said that contracts for other sections will be awarded shortly and as soon as one section is completed it will be put in operation; in fact, traffic will follow closely on the overhead gang. The above section, which is to be built presently, is part of an extension which the company is building from New Westminster to Chilliwac, 60 miles. D. J. McQuarril, manager.

**Sacramento Electric Gas & Railway Company, Sacramento, Cal.**—John A. Britton, president, writes that this company proposes to add 1 mile of single track to its system this year.

**Ventura (Cal.) Terminal Railway.**—This company is said to be making preliminary arrangements toward the building of its line from Ventura to Nordhoff. About 25 miles of track are to be built. Julian P. Jones, manager. [S. R. J., Dec. 21, '07.]

**Kansas-Colorado Power & Railway Company, La Junta, Colo.**—The directors of this company met on May 27 and formed two companies, the first to be known as the Kansas-Colorado Electric Transmission Company, capital stock, \$3,500,000, and the second, the Kansas-Colorado Railway Company, capitalized at \$5,000,000. The companies are formed for the purpose of putting into operation the plans of A. B. Hulet, of Madison, Wis., to build power plants, transmission lines and an electric railway from Canon City, Colo., to Dodge City and Scott City, Kan., connecting the principal towns in the Arkansas Valley. The officers for both companies are: S. H. Atwater, Canon City, president; J. A. Lockhart, Rocky Ford, vice-president; Robert W. Patterson, La Junta, second vice-president; A. H. Warner, Garden City, secretary, and Andrew Russell, Dodge City, Kan., treasurer. Directors: S. H. Atwater, J. A. Lockhart, R. W. Patterson, Andrew Russell, Alva Adams and A. M. McClelland, of Pueblo, Colo.; J. O. McDonald, of Florence, Colo.; J. N. Beatty, of Colorado Springs; W. P. Humphreys, of Syracuse, Kan., and W. O. Bournier, of Scott City, Kan.; J. W. Warner, Garden City; W. A. Gould, Lamar; Samuel McIntyre, Las Animas.

**New London & East Lyme Street Railway, New London, Conn.**—It is stated that this company has a force of men at work on the roadbed between Niantic and Flanders. The entire length of the road is to be put in first-class order for the summer traffic. L. S. Rudd, superintendent.

**Atlanta, Ga.**—President W. J. Masee, of the Atlanta, Griffin & Macon Electric Railway, and the Macon, Americus & Albany Electric Railway, which proposes to build interurban lines connecting the various Georgia cities named, is reported as saying that construction will be started on both lines immediately, as the Railroad Commission has approved the plans for the financing of the roads. The president applied for permission to issue \$5,000,000 of common stock and \$5,000,000 in bonds for each of the two companies, and the charters are to be amended for that purpose. Mr. Masee is further quoted as saying that upon the completion of the line cars will run between Atlanta and Macon on a two-hour schedule, with current furnished from the plants of the Central Georgia Power



Company, which are now being built on the Okmulgee River and the Flint River. The two roads will have about 200 miles of track. [*S. R. J.*, Nov. 2, '07.]

**Illinois & Indiana Electric Railway, Springfield, Ill.**—The State Board of Railroad & Warehouse Commissioners on June 2 granted the petition of this company for leave to cross the tracks of the Southern Railway at Fourth Street and Railway Avenue and at Market Avenue and Eighth Street, both in East St. Louis, and of the Illinois Transfer Company at Piggot Avenue and Twenty-third Street, East St. Louis. The company was also granted permission to cross the tracks of the East St. Louis Railway at three places at grade.

**Indianapolis, Frankfort, Delphi & Chicago Traction Company, Frankfort, Ind.**—J. R. Brown writes that this company is taking up the deeds for the right of way on options heretofore taken and will soon be ready to begin construction on its line between Frankfort and Delphi. This company is the successor to the Frankfort, Delphi & Northern Traction Company and has been reorganized with the following officers: A. S. Straus, Chicago, Ill., president; W. H. Cohee, Frankfort, Ind., vice-president; Bert Wills, Frankfort, Ind., secretary; Chas. E. Hyman, Chicago, Ill., treasurer. [*S. R. J.*, May 2, '08.]

**Indianapolis, Cloverdale & Terre Haute Traction Company, Indianapolis, Ind.**—E. M. Bowman, president of this company, states that a corps of surveyors have been locating and staking the road during the past week. It is the intention of this company to build an electric railway connecting Indianapolis, West Newton, Mooresville, Gassburg, Monrovia, Hall, Cloverdale, Polen, Asheville, Brazil and Terre Haute. [*S. R. J.*, Apr. 18, '08.]

**Vera Cruz, Ind.**—It is reported that J. Berger and P. Neuschwander are interested in a proposition to construct an electric railway from Bluffton to Celina, Ohio, by way of Berne.

**Red Oak & Northeastern Interurban Promotion Company, Red Oak, Ia.**—M. N. Spencer writes that no definite construction date has been decided upon. It is the intention of the promoters to construct an electric railway which will start at Red Oak and will pass through Milford, Fontanelle, Greenfield, Stuart, Redfield, Adel, Waukee and thence into Des Moines. Capital, \$10,000. Officers: B. P. Clark, Red Oak, president; G. W. Curtis, Redfield, vice-president; M. N. Spencer, Red Oak, secretary; Thos. Griffith, treasurer. [*S. R. J.*, May 9, '08.]

**St. Tammany & New Orleans Railway & Ferry Company, Covington, La.**—This company is reported to be making rapid progress on the construction of its line to connect Covington, Abita Springs and Mandeville, La. 18 miles. Nearly all the right of way has been secured, and grading is well advanced. A bridge about 500 ft. long has been built at Ponchitoawa, and several smaller bridges between there and the Abita River are to be erected, besides a bridge over the Bogue Falaya. It is expected to complete the line from Covington to Mandeville by Aug. 1 and to operate fast boats to New Orleans. Clay Riggs, president; Preston Herndon, Covington, La., chief engineer.

**Boston (Mass.) Elevated Railway.**—This company is stated to have petitioned the railroad commission for approval of a location for double tracks from Boylston Street through Hereford and Newbury Streets to Massachusetts Avenue. The petition specifies that the location is to be only temporary.

**Shelburne Falls & Colrain Street Railway, Shelburne Falls, Mass.**—It is stated that this company will build a concrete bridge across the Deerfield River from River Street to connect with the Boston & Maine station. The bridge will be 400 ft. in length. Fred T. Ley & Company, of Springfield, are to construct the bridge, work to begin as soon as possible.

**Minnesota Construction Company, Minneapolis, Minn.**—This company is reported to have been organized, with a capital stock of \$100,000, to build an electric railway from Minneapolis to Medicine Lake, Minn., which is to be extended later to Montevideo, via Wayzata, Long Lake, Stubbs Bay and Winsted. It is said that the right of way has been obtained for the first section, which will be 6 miles long. John Blichfeldt, president, Temple Court, Minneapolis; W. W. Bardwell, Loan & Trust Building, Minneapolis, secretary-treasurer.

**Kansas City, Ozarks & Southern Railway, Springfield, Mo.**—J. B. Quigley, of Sedalia, states that this company intends to begin constructing its line between Mansfield and

Ava this year. The preliminary surveys for the road were made Dec. 29, 1907. The city of Ava has raised a \$30,000 bonus for the road, and main offices and repair shops will be located there. [*S. R. J.*, May 2, '08.]

**Rochester, Scottsville & Caledonia Electric Railway, Warsaw, N. Y.**—David C. Salyerds, president, is reported as saying that the company has secured all rights and franchises required for the road from Rochester through to Portage and that the contract for a considerable part of the construction work will be let in the near future. [*S. R. J.*, Mar. 28, '08.]

**Monterey (N. L., Mex.) Street Railway, Light & Power Company.**—It is reported that this company contemplates extending its Obispado line along Morelos Street to Cruz Verde. The running of the line on Reforma Street from the Golfo station to the old International station is also contemplated. L. Lukes, general manager.

**Dayton (Ohio) Street Railway.**—It is reported that this company has started construction work on its line in Dayton. The company has in contemplation the construction of a new city route to be about 14 miles in length. Work was begun at Salem and Neal Avenues and tracks will be laid north from this point. C. H. Bosler, Dayton, purchasing agent.

**Toledo & Michigan Electric Railway, Toledo, Ohio.**—It is announced officially that this company will begin construction work on its line as soon as \$300,000 has been subscribed. The company proposes to build an electric railway connecting Adrian, Clayton, Hudson, Pittsford, Osseo, Hillsdale, Janesville and Coldwater. Capital, \$1,500,000. P. P. Duket, 462 Spitzer Building, Toledo, president. [*S. R. J.*, May 9, '08.]

**Beulah Street Car & Electric Company, Doxey, Okla.**—It is reported that this company will start work before long on its proposed electric railway. The company is said to be asking prices on electric railway equipment. Wm. Jones, Doxey, Okla., president.

**Oklahoma City, Shawnee & El Reno Rapid Transit Railway, Oklahoma City, Okla.**—John W. Burchinal writes that this company intends to start constructing its line as soon as the rights of way have been secured, possibly by Sept. 15. The road will be about 70 miles in length and will extend from Shawnee to Oklahoma City, Spencer, Yukon and El Reno. The overhead trolley system will be installed. General office, 108½ Grand Avenue, Oklahoma City, Okla. Capital stock, \$1,400,000. Officers: W. M. Sawyer, president; J. A. Niblo, vice-president; C. A. Huber, secretary, and S. L. Niblo, treasurer. [*S. R. J.*, May 23, '08.]

**Coos Bay Railway & Terminal Company, Marshfield, Ore.**—It is announced that this company has started construction work on its proposed electric railway between Marshfield and North Bend. Seymour H. Bell, manager.

**Sunbury & Selinsgrove Electric Street Railway, Sunbury, Pa.**—It is announced that this company will begin operating its system on June 24. A large force of men is employed at both the Sunbury and Selinsgrove ends of the line. The foundations for the new car house at Hummel's Wharf have been completed and the steel superstructure will be placed as rapidly as possible. Work has also been started on the company's office building near Hummel's Wharf. One car is already on the ground and another on the way. W. H. Lyons, Sunbury, president. [*S. R. J.*, Apr. 25, '08.]

**Mount Holly & Gettysburg Street Railway, Carlisle, Pa.**—T. M. Nelson has announced that this company has just made a survey, but no plans for construction work have been made up to the present time. Mr. Nelson states that the company does not expect to do any work this year. [*E. R. J.*, June 6, '08.]

**Virginia Passenger & Power Company, Richmond, Va.**—It is reported that this company within the next two weeks will begin the work of laying new steel rails on Main Street, from Seventh Street to Twelfth Street.

**Seattle, Snohomish & Everett Railway, Seattle, Wash.**—Charles W. Kimball writes that this company has almost completed the surveys and will be ready to proceed with the construction work as soon as the route is established. It is to be a standard-gage electric road and it is planned to connect Seattle, Bothwell, Snohomish and Everett. The overhead trolley system will be installed. The company proposes to rent its power from the Seattle Electric Company. Capital, \$500,000. Headquarters, 443 New York Block, Seattle. Officers: Clyde C. Chittenden, Seattle, president; J. R. McLaughlin, Seattle, vice-president; Charles



W. Kimball, Seattle, secretary and general manager. [S. R. J., May 9, '08.]

**Pacific Traction Company, Tacoma, Wash.**—It is reported that this company is completing the survey of a line to extend from the terminus of the company's line at American Lake to Olympia. It is stated that the line will probably be built during the next eight months. E. J. Felt, Tacoma, vice-president.

**Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.**—This company is said to have made preliminary surveys for building a line from Lowell to Coal Run and Beverly, Ohio, 10 miles, under charter granted to the Muskingum River Traction Company. The right of way and capital have not been secured yet. No steps have been taken toward letting contracts. C. H. Shattuck, president, Parkersburg.

**Sparta & Melrose Electric Railway & Power Company, Sparta, Wis.**—This company is reported to have commenced construction of its proposed railway, which will run from Sparta to Melrose, about 28 miles. Capital stock, \$300,000. Officers: President, Charles Newland; vice-president, James Cole; secretary, Howard Teasdale; treasurer, W. A. Sholes. [S. R. J., May 4, '07.]

### POWER HOUSES AND SUBSTATIONS

**Los Angeles (Cal.) Railway.**—Howard E. Huntington, general manager of this company, writes that it is intended to purchase during the next six weeks the following apparatus: Two 1000-kw motor generators; one 600-kw motor generator and nine transformers.

**Monterey (N. L., Mex.) Street Railway, Light & Power Company** has installed in its power station a new 500-hp engine.

### SHOPS AND BUILDINGS

**Columbus, Delaware & Marion Railway, Columbus, Ohio.**—This company is reported to have a building on West Gay Street, Columbus, Ohio, which it is remodeling for a passenger and freight station. The new station will contain waiting rooms for passengers and will furnish ample facilities for handling the freight of the company. It will probably be placed in service July 1.

**Columbus (Ohio) Railway & Light Company.**—It is stated that this company has completed its new car house and repair shops at Columbus which will be used to house and repair the cars of the Central Market system, now operated by the company.

A decree to enjoin the New York, New Haven & Hartford Railroad Company from holding further stock in electric railway companies of western Massachusetts was offered in the Supreme Judicial Court June 9 by Attorney-General Dana Malone. The decree was based upon the recent decision of that court in a suit brought by the Attorney-General against the New York, New Haven & Hartford Company, to the effect that the stock in the street railways was held by the company contrary to the laws of Massachusetts. The court took the decree under advisement. The street railway corporations involved are the Worcester & Southbridge Street Railway, Worcester & Blackstone Valley Street Railway, Worcester & Webster, Webster & Dudley, Berkshire Street Railway and the Springfield Street Railway.

The annual convention of the Incorporated Municipal Electrical Association will this year be held from June 30 to July 3 at Nottingham, where H. Talbot, the president, is city electrical engineer. The following preliminary program has been arranged, but it is subject to alteration: First day, Tuesday, June 30—Morning, reception of the members by the Mayor; presidential address; reading and discussion of papers; luncheon given by the chairman and members of the electricity committee. Afternoon, visits to works. Second day, Wednesday, July 1—Whole day excursion to Dovedale. Third day, Thursday, July 2—Morning, annual general meeting. Afternoon, visits to electricity and other works. Evening, members' annual dinner. Fourth day, Friday, July 3—Morning, reading and discussion of papers. The following are some of the subjects to be discussed during the convention: "Experiences of a Governor in Establishing an Electrical Undertaking," "The Equipment of a Testing Department," "A. C. Accumulator Substations," "The Designing of Electrical Generating Stations," "Overhead Equipment."

## Manufactures & Supplies

### ROLLING STOCK

**Milwaukee Northern Railway, Milwaukee, Wis.,** is having two 51-ft. interurban cars similar to the present equipment of this road built by the Niles Car Manufacturing Company.

**Western Railways & Light Company, Ottawa, Ill.**—This company is reported to have ordered six double-truck trailers for electric railway service from the Danville Car Company.

**New York, New Haven & Hartford Railroad Company, New Haven, Conn.**—This company has just received six new electric locomotives from the Westinghouse Electric & Manufacturing Company. This makes 41 electric locomotives in all which the company has for its suburban service out of New York.

**Chicago Railways Company, Chicago, Ill.,** has increased its order with the Pullman Company from 300 to 600 pay-as-you-enter cars, and is reported to have placed an additional order for 50 steel cars with the Pressed Steel Car Company. The cars ordered from the Pullman Company are to be 49 ft. 2 in. over all, 8 ft. 9 in. wide and 11 ft. 8 in. high. The heaters and push buttons will be supplied by the Consolidated Car Heating Company, Albany; the brakes by the National Brake & Electric Company, Milwaukee, Wis.; the journal boxes by McCord & Company, Chicago, and the electrical equipment by the General Electric Company, Schenectady, N. Y.

### TRADE NOTES

**Belmont Iron Works, Philadelphia,** has changed the address of its New York office from 21 Park Row to 1 West Thirty-fourth Street.

**Forsyth Brothers Company, Chicago, Ill.,** announces the opening of its New York office, Hudson Terminal, Fulton Building, 50 Church Street. A. L. Whipple is sales manager at the New York office.

**Standard Roller Bearing Company, Philadelphia,** has recently installed a thoroughly equipped testing laboratory at its factory in charge of Walter H. Hart, a chemist formerly connected with the Alan Wood Iron & Steel Company.

**Warner Engineering Company, London, England,** has issued a pamphlet in regard to its radial trucks for electric cars, which have been in use on the West Ham Corporation Tramways, the Metropolitan Electric Railways, of Middlesex, and elsewhere in England.

**Schutte & Koerting Company, Philadelphia, Pa.,** manufacturers of steam and engineering specialties for power plant, chemical and other industries, has opened a branch sales office in the Keenan Building, Pittsburg, Pa., where it is represented by E. A. Knowlton.

**Summers Steel Car Company, Pittsburg, Pa.,** has been granted a charter by the State Department at Harrisburg. The company is capitalized at \$800,000 to manufacture steel cars for steam and electric railways. The directors are: J. R. D. Huston, president; Wm. Lindsay, F. P. Patterson and A. M. Neefer.

**R. D. Nuttall Company, Pittsburg, Pa.,** has added to its list of gears and pinions, the Titan brand of manganese steel gears and pinions, having arranged with the Atha Steel Casting Company for their exclusive sale. This places the Nuttall Company in a position to furnish practically everything in the way of gears and pinions for electric railway service.

**Fixler Trolley Stand Company, Delta, Ohio,** recently incorporated, with a capital stock of \$25,000, is arranging to open a factory at Delta for the manufacture of a new trolley stand. The officers of the company are: C. R. P. Waltz, president; Dr. A. M. Wilkins, vice-president; J. M. Longnecker, treasurer; J. H. Gehring, secretary; D. H. Lavenberg, general manager.

**Arthur S. Partridge, St. Louis, Mo.,** under date of June 8 has issued Schedule No. 21 of his offerings. There is a list of generators, motors, converters, transformers, engines and boilers and some car bargains. Among the cars for sale are ten 8-bench open cars, a 12-bench Brill open car, two 10-bench Brill open cars, a construction car and a combination baggage and passenger motor car entirely overhauled and repainted.

**Joseph T. Ryerson & Son, Chicago, Ill.,** have completed their new general offices and warehouses at Sixteenth and Rockwell Streets, Chicago, where they will be pleased to have patrons call and inspect the increased facilities which the new location affords. The Milwaukee Avenue and Lake



Street offices were discontinued June 1, but downtown branch offices are maintained at the Commercial National Bank Building.

**Joseph Dixon Crucible Company, Jersey City, N. J.**, at its annual meeting elected as directors Edward F. C. Young, George T. Smith, George E. Long, Harry Dailey, William Murray, Edward L. Young and William H. Corbin. The officers were re-elected as follows: Edward F. C. Young, president; George T. Smith, vice-president; George E. Long, treasurer, and Harry Dailey, secretary.

**W. J. A. London** has recently accepted the position of chief engineer of the Terry Steam Turbine Company, Hartford, Conn., succeeding C. E. Terry, recently deceased. Mr. London's experience in the turbine industry has been extensive, dating from his early connection with the C. A. Parsons Company, Newcastle, Eng., and about 15 years later with Brown-Boveri Company, Baden, Germany, and the British and American Westinghouse companies. His work has taken him into the field not only of land turbines, turbo-generators and condensers, but also that of marine propulsion.

**Hadaway Electric Heating & Engineering Company**, which was some time since acquired by the Westinghouse Electric & Manufacturing Company, has removed its offices from 238 West Broadway, New York, to the Westinghouse works at East Pittsburg. This change will permit the business to be carried on upon a much larger scale than formerly and all the standard appliances for hatters, confectioners, printers and other manufacturers will be turned out in larger quantities. Special attention will be given to the manufacture of the sad irons, glue pots and similar appliances that have recently become so popular. A New York office will be maintained on the twenty-second floor of the City Investing Building, 165 Broadway.

**Massachusetts Chemical Company, Walpole, Mass.**, operating the Walpole Rubber Works and Walpole Varnish Works, calls attention to a change in name of one of its products formerly known as field coil cushions, which from now on will be known as field coil pads. These pads are used to take up play between the field coils and adjacent parts, thereby doing away with chafing and grounds through the field pieces. Heretofore canvas sheets have been cut to fit over the field pieces and several sheets have been stuck together, making an unyielding washer which wore out quickly. The rubber field coil pads yield sufficiently to prevent any looseness caused by expansion and contraction. They are applied easily.

**Electric Railway Improvement Company, Cleveland, Ohio**, which manufactures bonds and cars for installing brazed and copper welded bonds, reports the following among recent orders: The Los Angeles-Pacific Company has leased a bonding car and ordered 32,600 bonds. The Toronto Railway, which leased a car some time ago, has leased a second car and ordered 30,000 bonds. The Pacific Electric Railway, of Los Angeles, has leased a car and ordered 5000 bonds. The Municipal Traction Company, of Cleveland, has leased a second car. The Illinois Traction System has leased a car. The Ft. Wayne & Wabash Traction Company, for which the Electric Railway Improvement Company installed a large number of bonds last year, has taken a car on lease and will install its own bonds in the future.

**Danville Car Company, Danville, Ill.**, recently entertained the Mayor of Gary, Ind., and the members of the Gary Commercial Club, at Danville, the occasion being the inspection and trial of the cars built for the Gary Interurban Railway. Members of the Commercial Club of Danville met the members of the Gary club and after lunch a trial run was made to the works of the Danville Car Company. Later a trip was made over the interurban lines. The plant of the Danville Car Company is connected with the Illinois Traction System so that all new cars can be taken on a trial run of 300 miles if necessary. The cars for the Gary Interurban Railway are of semi-steel, semi-convertible type. They measure 42 ft. over all and have 30-ft. bodies. The finish is in mahogany. The trucks are Brill 27-G. The Commercial Club of Gary has invited the officers of the Danville Car Company and the members of the Commercial Club of Danville to attend the opening of the Gary Interurban Railway.

**Westinghouse Electric & Manufacturing Company, Pittsburg, Pa.**, for the convenience of draftsmen has developed a motor-driven eraser. The eraser proper is connected to a small Westinghouse motor by a Coates flexible shaft, permitting the motor to remain fixed near the edge of the table from which any spot on the drawing can be reached. If desired the motor may be carried from table to table, or it may be fixed permanently to a special table and all work to be corrected done on one table. The motor is supplied for either direct or alternating current, 1/12 hp or 1/8 hp. Its high speed gives the eraser the speed required to remove

any line desired with light pressure. Heavy pressure results in overheating the paper and in injury to the drawing. With a little practice any one may learn readily to use the eraser rapidly and accurately. The complete outfit is supplied by the Coates Clipper Manufacturing Company, Worcester, Mass.

**Brady Brass Company Wins Suit.**—The United States Supreme Court has confirmed the decision in favor of the Brady Brass Company in the long litigation it has had with the Ajax Metal Company for an alleged infringement of a patent. The original decision in this case was reported in the *STREET RAILWAY JOURNAL* for March 14, 1908. Usually in cases involving the validity of a patent, the decision of the United States Circuit Court of Appeals is by statute made final, and no appeal therefrom to the United States Supreme Court is permissible. The statute does, however, give a defeated party the right in such cases to apply to the court of last resort for a writ of certiorari to review the decision of the Circuit Court of Appeals. This was done in this case on the ground that the decision of the Circuit Court applied only to the circuit territory in which Judge Gray has jurisdiction. The United States Supreme Court has not concurred in this view because it has denied the application.

**Gould & Eberhardt, of Newark, N. J.**, have still further improved their stepped style of stocking cutter for roughing out the teeth of coarse pitch gearing before finishing with a standard finishing cutter and have recently brought out and patented the new "Stepped Style" of stocking cutter. In the new cutter the tops of the cutting teeth are recessed so that each tooth practically takes out about half as much as the old-style cutter. The new cutter also finishes the bottom of the tooth space, thereby relieving the finishing cutter of this duty and having the latter where it usually wears most rapidly. The cutting edges, being staggered, are more thoroughly lubricated while cutting and save the finishing cutters by removing the stock where the ordinary saw cutter leaves large corners at the points of the gear teeth. They are considerably wider through the hubs than a saw or slotting cutter, lessening the liability for keys shearing off, and permit faster feeds and speeds and lessen the strains on the machine itself.

**Edwards & Zook, New York**, consulting and civil engineers, having made the physical and real estate valuation of the steam railroad and converted electric railway properties of the New York, New Haven & Hartford Railroad for John F. Stevens, are prepared to engage in this class of work and offer the benefits of their experience and organization to those interested. Mr. Zook is a graduate of Pennsylvania Polytechnic College with the degree C.E. and is a member of the American Society of Civil Engineers. He has been connected with the Norfolk & Western Railway, Pennsylvania Railroad, Louisville, New Albany & Chicago Railroad, Queen & Crescent System, Louisville, Evansville & St. Louis Railroad, Central Railroad of New Jersey, Peabody Coal Company, J. G. White & Company and the New York, New Haven & Hartford Railroad. Mr. Edwards is also a graduate of Pennsylvania Polytechnic College with the degree C.E. and is a member of the American Society of Civil Engineers. He has been connected with the Pennsylvania Railroad, Pittsburg & Western Railroad, Great Northern Railway, Chihuahua & Pacific Railroad and the New York, New Haven & Hartford Railroad and has practised as an independent consulting engineer.

#### ADVERTISING LITERATURE

**Hess-Bright Manufacturing Company, Philadelphia, Pa.**—"Thrust (Collar) Bearings with Cage" and "Mounting Directions" are the subjects of the company's latest sheets in its series on ball bearings and their correct use. In "Mounting Directions" advice is given regarding old bearings and wear, loose bearings and bearing repairs.

**Scott Electrical Company, Newark, N. J.**—This company describes its line of flaming arc lamps in a little folder introduced with the slogan, "We Have No Limit as to Candle Power." The flaming arc is especially adapted to outside illumination and the folder should appeal to all companies operating parks and pleasure resorts.

**Schutte & Koerting Company, Philadelphia, Pa.**—This company is distributing a new catalog in three sections. One section pertains to apparatus for the chemical industry; one to apparatus for use in power plants, etc., and a general catalog is given illustrating and describing the company's entire line. The publication will be sent on request to those interested.

**Pathe Freres, Chicago, Ill.**—The Bulletin of *Pathé Frères* for the week of June 8 contains announcements of the following moving-picture films: Tracked by the Police Dog, Messenger's Mistake, Joyous Surprise, The Ragpicker's



Daughter, Drama in the Tyrol, Misadventures of a Sheriff, Music and Poetry, Dynamite Ducl, A Tiresome Play and Brazil—The Cascades.

**American Engineering Company, Indianapolis, Ind.**—This company has issued another edition of the pamphlet containing the special article on interurban railways written by President Chas. N. Wilson, of the company, for *The Tradesman*. The company has also reprinted from *The Interurban Railway Journal* the 49 reasons given by Mr. Wilson for the failure of new railways.

**Joseph Dixon Crucible Company, Jersey City, N. J.**, in *Graphite* for June gives valuable advice regarding the use of its products. The second installment is printed of W. H. Wakeman's article entitled "Preventing Corrosion of Steam Machinery," in which especial attention is called to the care of dash pots and the valve gear. The article is illustrated with four line engravings. The publication is enlivened with the usual number of stories about men and things.

**Sprague Electric Company, of New York.**—A series of attractive blotters has been issued by the company to advertise its electric fans. This company has a line of excellent direct- and alternating-current fans adapted for all requirements. Catalogue No. 317 describes the fans and may be obtained by addressing the company. The company is also sending out Folder No. 431 describing its new stamped steel octagon box No. 6250, which is a departure from former practices.

**Carbolineum Wood Preserving Company, New York, N. Y.**—Bulletin 28 of this company, entitled "The Boat Industry," discusses the application of Avenarius Carbolineum to the boat industry. The general subjects discussed are as follows: History, teredos, mold, wood preservative, joints, hulls, barges, piers, application. References given include the New York Central & Hudson River Railroad, Old Dominion Steamship Company and others. Sample specifications show references to the use by the United States Government of Avenarius Carbolineum for important harbor and river improvements. The bulletin is of general interest on account of the severe conditions imposed where wood is continually subjected to the action of water.

**General Compressed Air & Vacuum Machinery Company, St. Louis, Mo.**—This company, which manufactures compressed-air and vacuum-cleaning plants and acts as engineer and contractor for complete plants of that character, describes its system and application thereof in a circular entitled "We Harness the Winds." The principal subject discussed is the application of the apparatus to domestic uses. The portable car-cleaning device of the company is, however, illustrated and described. The truck is especially designed for use in cleaning railroad coaches and sleeping cars and interurban and electric cars. The truck may be hauled to any part of the yard and two lines of vacuum hose run to the car for cleaning.

**Crane Company, Chicago, Ill.**—In *The Valve World* for May R. T. Crane continues his article, "Some Fallacies of Education." An interesting article appears on the first installation of Crane steel electrically operated valves in a refrigerating plant. "How Superheated Steam Affects Cast Iron" is another interesting contribution to the evidence already gathered on this subject. Speaking of one of the fittings under test, the Crane Company says: "It is altogether probable that had the fitting been strong enough to resist expansion strains for a longer period than one year at a temperature of 588 deg., the loss in tensile strength would have been greater, for all evidence pointed toward a slow, permanent, volumetric expansion of the metal and a consequently weakened molecular structure."

**Goldschmidt Thermit Company, New York, N. Y.**—This company has issued its publication, "Reactions," for the second quarter of 1908. Announcement is made of the opening by the company of a Canadian branch at 103 Richmond Street, West, Toronto, which will carry a complete supply of thermit and appliances for welding rails in paved streets, welding heavy sections such as stern posts of steamships and for the repair of small castings in shops. A very interesting account is printed of the welding of rails with thermit under New York City traffic conditions. Illustrations are presented of motor case and truck repair work done for the Public Service Corporation, Washington Railway & Electric Company, Indiana Union Traction Company, Union Railway of New York and Chicago City Railway.

**Cutler-Hammer Manufacturing Company, Milwaukee, Wis.**—This company has issued a 16-page pamphlet descriptive of its "Wirt Type" dynamo brush, designed for use with low-tension, direct-current motors and generators, alternat-

ing-current generators, plating dynamos, exciters, etc. The pamphlet states that in designing a dynamo brush two conditions must be met in order to insure satisfactory operation. The brush must be elastic so that it will make good contact with the commutator under slight pressure, disregard of this condition resulting in undue heating and rapid deterioration of both brush and commutator, due to friction. The brush must be so designed as to oppose a high resistance to the wasteful and destructive current that is generated when adjoining commutator bars are short circuited by the brush. The statement is made that the construction of the "Wirt Type" brush is such that these conditions are fully met. Elasticity is secured by constructing the brush of laminated strips of metal, while the desirable feature of high resistance is obtained by combining with the copper laminations, strips of a high-resistance metal through which the wasteful current to which reference is made is compelled to pass in completing the circuit from one commutator bar to another. In addition to the purely descriptive matter and price list, the pamphlet contains useful information on the care of commutators and brushes, the importance of correct lap, etc.

**General Electric Company, Schenectady, N. Y.**—Bulletin No. 4588, just issued by this company, describes the GE-202 railway motor, which is similar in design and construction to the latest standard GE railway motors, containing all their improvements and, in addition, being provided with commutating poles. The characteristics of the commutating-pole motor allow the overload to be considerably increased and at the same time a more rugged form of motor is obtained which will withstand the most severe service conditions and is less likely to be injured by misuse. The motor is, therefore, especially adapted for operation on heavy grades or with equipments geared for high-speed work which have to start and stop frequently in city service. The details of construction are given at some length in the bulletin, and an interesting article on rating with suggestions for the proper selection is included. Dimension diagrams, characteristic curves and a service data sheet for use in ordering, complete the pamphlet. The company in Bulletin No. 4595 describes the Form I arrester, which is being placed on the market. The arrester consists of a "stack" of concentric inverted aluminum cones, insulated from each other and placed in a tank of oil. Before being placed in the oil the space between the cones is partially filled with a special electrolyte. The critical value at which the electrolyte breaks down is 420 volts for any two adjacent cones. When this potential is reached a large amount of current is allowed to flow during discharge. In Bulletin No. 4586 the company describes a new G. O. flaming arc lamp which contains many novel mechanical features and is of simple construction. The lamp is only 31 in. from top to bottom and is intended for operation either in series or in multiple.

**Allis-Chalmers Company, Milwaukee, Wis.**—This company in a special publication has taken occasion to review its works and products. The result no doubt will startle even those who thought themselves fairly familiar with the extent of the company's operations. Any one of several of the company's departments would make a large industrial undertaking by itself; combining them a gigantic organization results. Besides its power machinery, including prime movers of every description, electric generators and auxiliary apparatus, the company also is a leader in the manufacture of pumping machinery, sawmill equipments, flour mill, crushing, cement making, mining and ore reducing machinery, electrically operated air brakes, etc., etc. The seven shops have approximately 74 acres of floor space and the works cover nearly 250 acres. The work of the company is carried on by the following departments: Electrical, Steam Turbine, Steam Engine, Gas Engine, Crushing and Cement Machinery, Saw Mill, Flour Mill and Air Brake. The company has its own line of 100-ton cars for transporting its products. The story is related of the entrance of the company into the electrical field through the purchase a few years ago of the Bullock Manufacturing Company. Notable installations are cited of Allis-Chalmers electrical and steam machinery in the railway and lighting fields and for general power purposes. Among the installations of dynamos to which attention is directed are the 12,000-hp machines installed for the Boston Elevated Railway. Under reciprocating steam engines reference is made to the large installations of the Interborough Rapid Transit Company, of New York; Brooklyn Rapid Transit Company; Metropolitan West Side Elevated Railway, of Chicago, and the Milwaukee Electric Railway & Light Company. The turbine also receives attention and a long list of users of the company's products is given. In conclusion the booklet tells the purpose of the graduate student course of the company.