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### Preparations for the Fourth

While the traffic manager is making preparations for handling traffic on the Fourth of July the special danger of fire should not be forgotten. It is the universal rule of the fire departments to test their hose, put their engines and hook and ladder wagons in good condition; in short, to make every preparation to be in readiness for fire which may be started from crackers, pyrotechnics or other ways of celebrating the day. Many householders do the same,

and it is a wise precaution for electric railway companies to be prepared for emergencies of this kind. During the next week there is ample time to see that the hose is tested and the fire pails filled and ready for use in case they are needed.

### Gas Engine Development

No subject in dynamic engineering possesses greater interest to the student, the inventor and the man of affairs than the gas engine. With a slower development as a commercial machine than the turbine, the gas engine for a long time was considered as suitable for small powers only. Its entry into larger fields has come within the last few years and has been accompanied by extended discussions on the subject before practically all of the engineering societies. The recent report that the British Admiralty will equip its latest battleship, the *St. Vincent*, of 19,500 tons, with gas engines, if true, marks an epoch in gas engine development, hence is of interest to stationary power users as well as marine engineers. Although the plan seems revolutionary, it is interesting to note that it has been endorsed by some of the best known naval designers in this country.

### Atlantic City Selected for the Convention

The important announcement is made this week that the committee on convention of the American Street & Interurban Railway Association, acting with a similar committee of the American Street & Interurban Railway Manufacturers' Association, has selected Atlantic City for the convention next October. The delay in the announcement of the meeting place has been caused by the difficulty of reaching a decision this year. As readers of this paper know, a very cordial invitation was received from Denver and there were many reasons which urged the committee toward accepting it, in spite of the fact that it was far west of the center of membership of the association. After very careful consideration of all the circumstances, however, it was considered unwise to make the Denver trip this year so that the associations will visit Atlantic City next autumn. Those who attended the convention of the Master Car Builders' and Master Mechanics' associations this year at Atlantic City will realize that the conditions are better for convention purposes this year than last. The new Million Dollar Pier is superior as a place for the exhibits to the old steel pier. In the first place, it is entirely enclosed so that the exhibits are protected from the weather in case of storm. In the second place, it is very much wider than the steel pier so that the exhibits can be arranged much more satisfactorily and conveniently for inspection. Finally, it has plenty of floor space, sufficient even without crowding, for the exhibits of the electric railway convention. All in all, the choice of Atlantic City seems a wise one for this year's meeting of the association.

### Transfer Privileges in New York

In discussing the transfer situation, the *New York Times* states that "it is a clear case of ciphering to prove that the people are gainers by the transit monopoly, as they plainly perceive upon the prospect of loss of the transfer privilege." The Public Service Commission, First District, realizes this and is endeavoring to prevent the disintegration of the surface properties and consequent curtailment of transfers. That the people have gained from the combination of transportation facilities in the past is, however, no reason why an unprofitable exchange of transfers should be perpetuated after its unwisdom has been demonstrated, as is the fact in New York. Whatever else the commission may determine, it cannot deny the owners of the individual properties a fair return on their investment. It is doubtful if the courts would uphold the authority of the commission to require the continuation of transfers between independent companies at a loss, because a lessee of the properties has become insolvent while attempting to carry out a similar transfer arrangement. To place this interpretation upon the law would be to say that any money once invested in public service utilities must thereafter be, in effect, the property of the State, subject to such return as the State might permit, or to virtual confiscation if the property was so located as to be readily adaptable to a comprehensive scheme of inter-relationship conceived by the public authorities in the interest of the people.

### The Importance of the Resistance Grid.

The experience which some of the larger operating companies are having in reducing motor troubles by overhauling resistance grids proves that no part of the car equipment deserves more careful scrutiny in the interest of low maintenance expenses. The problem is so readily solved in practice by the use of an ordinary ammeter and a watch with a second hand in charge of two observers or by a recording ammeter in cases where the company's means will permit its purchase, that it will pay any company now troubled by motor flashes or irregularities in acceleration under proper handling of the controller to find out by actual test on the cars in service how evenly the current consumption of the cars runs during the period when the controller is being notched up.

Irregular accelerations caused by improper connections of the grids produce severe strains upon the electrical equipment as well as annoying jars to the passengers, and abnormal current consumption follows, leading to overheating and possible insulation strains through flashing. The trouble may reach the point of requiring the car to be run into the shop during a busy period of traffic, and when broken, burned out or wrongly adjusted grids are allowed to remain upon the wiring circuit, the repairs are certain to be greater than necessary, especially where many scores or hundreds of cars are involved. Given an ammeter record of the current variations while the control is passing over the resistance notches, it is quickly possible to detect any notch which has too low or too high a resistance. With the recording instrument the curve of current variation as the controller handle is turned is automatically drawn and the whole story is immediately at hand. With an ordinary ammeter and a watch a number of observations can quickly

be taken of the value reached by the current per motor or per car at different points of the control, preferably in starting up from rest. A little care in this simple testing of the grids throughout all cars in doubt as to their condition will pay heavy returns in the line of decreased service troubles and reduced occasion for repairs. Too much care cannot be taken to see that car-house repairmen use the proper grids in their work.

### Uniform Rules in Indiana

The rules adopted to govern the operation of interurban roads in Indiana, published elsewhere in this issue, were framed through the co-operation of representatives of the railways and of the Railroad Commission of Indiana. The preparation of these rules was undertaken at the request of the Indiana commission, following a conference at the State House, Indianapolis, on Feb. 18. Managers of the electric lines and inspectors of the commission who have had practical experience with steam railways have given their time liberally to the task of formulating these rules, and the result of their efforts, as now made public, has been adopted by nearly all of the interurban electric roads in Indiana. The Indiana rules acquire additional importance from the fact that they may be adopted, either as a whole or without substantial modification, in other Northern Central States. If the rules should be approved by roads in several more of the States represented at the meeting of railroad commissioners in Chicago on June 12 and 13 it seems probable that they will be adopted as a whole in Michigan, as the commission of that State has taken up the subject of uniform rules with the interurban lines.

At the meeting at which the advisability of such rules was suggested the chairman of the Indiana commission, Union B. Hunt, stated that the inspectors of the commission had found a variety of systems in effect to govern the movement of trains and to control employees in various departments. The keynote of Mr. Hunt's address was the wisdom of joint action by the representatives of the public and the companies in order that conditions might be improved. As this attitude actuated the commission in calling the meeting, so it has continued to influence the representatives of the State in the subsequent committee meetings at which the details of the rules deemed advisable were worked out.

Under the first plan it was proposed to have two separate books of rules; one relating to the operation of trains, the other to the maintenance of way department. During the conferences of the committees, however, it was thought best to combine the rules in one book, partly for convenience and in part to increase a general knowledge of all the employees concerning the conditions under which the entire property is operated. The wisdom of this decision is evident.

The rules as finally adopted and published in this issue of the *ELECTRIC RAILWAY JOURNAL* differ in certain material factors from those which have been framed heretofore by the three railway associations that have adopted uniform rules—the American Street & Interurban Railway Association, the Central Electric Railway Association and the Street Railway Association of the State of New York.

The resolution passed by the preliminary conference at Indianapolis provided that the committee which was to draft the operating train rules should use as a basis the standard code adopted by the Central Electric Railway Association.

Forty rules are given in the book for the track and road-way department. The importance of this feature of the subject was discussed at the initial meeting by Alexander Shane, chief inspector for the Indiana commission, who was formerly superintendent of roadway and track of the Toledo, St. Louis & Western Railroad, a steam line. These rules should be studied with profit because they are the outcome of careful thought by a number of experienced, successful men in both steam and electric railways.

The rules relating to maintenance of overhead line contain practical suggestions which will contribute to the satisfactory government of employees in that department. In addition to the 12 rules in this section valuable directions are given which will aid in saving people from death by electric shock. The book is concluded with copies of sections of the Indiana criminal code applicable to employees of interurban roads. It is the belief of the members of the Indiana commission that a law should be passed prescribing a penalty for employees of interurban railways who neglect the observance of rules.

### **Master Car Builders' and Master Mechanics' Conventions**

The 42d annual convention of the Master Car Builders' Association, held last week at Atlantic City, N. J., was remarkable in many ways. The number of members and guests in attendance was larger than ever before, perhaps because of the stagnation in railroad business, and the interest taken in the proceedings of the meeting has seldom been equaled. This was largely due to the vital importance of many of the subjects investigated during the past year by special and standing committees and reported to the association at this time. So much delay was caused by the prolonged discussions of these reports that none of the topical discussions down on the program was reached in the three days' sessions. In another column this week we print abstracts of four of the committee reports which contain points of special interest to electric railway officers. These are Brake-shoe Tests, Cast-iron Wheels, Center Plates and Side Bearings and Steel Passenger Cars.

The conclusions of the committee on brake-shoe tests as regards wearing qualities of brake shoes are worth close study. Two points are brought out—first, that there is a wide variation in wearing qualities of different types of shoes under the same conditions, and, second, that the wear of shoes on steel-tired wheels is twice as rapid as on cast-iron wheels. The effect of the brake shoes on the wearing qualities of the wheel is a question recommended for investigation in the near future. It is possible that the inverse ratio of wear on the wheel does not hold good. This matter of relative wear on brake shoe and wheel is of particular importance to electric railways, where the total kinetic energy to be absorbed daily by the brake shoes in making frequent stops from fairly high speeds is many times greater than on steam roads.

One suggestion of the committee on cast-iron wheels if followed may lead to a solution of a difficulty which, per-

haps, has not yet confronted the electric roads in such an alarming manner as the steam roads, but which, nevertheless, exists in both fields. This is that an attempt be made to standardize foundry practice and composition of cast-iron wheels among all of the manufacturers so that a uniform product can be secured by every road. This is important in the case of the steam roads which interchange freight cars and repair foreign as well as home cars. If a road originally buys good wheels for its cars and they are replaced while on another road with wheels of an inferior quality there is no redress. Standardization of wheel foundry practice and composition of metal used would undoubtedly result in raising the quality of all wheels and in this the electric railways of the country would benefit.

The report on center plates and side bearings endorses the use of anti-friction devices for this purpose on the ground that they prevent derailments on curves and reduce flange wear. The committee also recommends oiling at frequent intervals for ordinary cast center plates.

Steel passenger cars have passed the stage of theorizing as to their advantages and disadvantages and are now being built in increasing numbers, although the experimental stage is by no means past and standardization of details of construction is still far away. This is the gist of the committee's report which contains few definite recommendations. It is, however, a valuable summary of progress to date and contains in its entirety many drawings of cars recently built. The table of steel motor cars given in the report is by no means complete, omitting such cars as the West Jersey & Seashore and a number of other less important types, but it gives some idea of the extent to which steel construction has already progressed. An interesting feature of the report is the low weight recorded for some of the recent cars. At one time it was alleged that noise and weight would be insuperable obstacles to the use of steel cars. The former objection has been overcome, and the latest steel cars weigh little if any more than the same designs in wood. Of course, the steel car is peculiarly adapted to tunnel operation, hence is of especial interest to the electric railway engineer. But its demonstrated strength and putative durability are merits which commend the steel car for general service as well.

Following the meeting of the Master Car Builders' Association came that of the Master Mechanics' Association. For a long time these two bodies have met at the same place, one following the other, so that the exhibits answer for both. The meeting of the Master Mechanics' Association was devoted almost entirely to steam railroad practice so that no especial comment is required here except to refer to the report on apprenticeship system. This was of interest on account of the suggestion of a similar plan for electric railways at the meeting at Atlantic City last October.

A summary of the work of the convention would not be complete without making some reference to the numerous and elaborate exhibits of rolling stock devices and equipment displayed by the supplying companies on the pier where the meetings were held. In spite of the business depression and hard times there were more exhibitors than ever before. Many new and improved devices were shown for the first time, indicating that development work has not ceased with contractions of sales.

## THE ROMA CIVITTA CASTELLANA SINGLE-PHASE RAILWAY

Until quite recently the fertile region lying to the north of Rome between that city and Civitta Castellana lacked adequate means of transportation. The produce, consisting of wool, wine, olive oil, cereals, building stone, pottery, etc., was carried into Rome by carts generally drawn by

laying the railway track. There are 15 stations along the line and the time required for the complete journey from starting point to terminus is about 2 hours 50 minutes. This slow schedule is due to the numerous steep grades and sharp curves.

### TRACK AND TRANSMISSION LINE.

The line runs for about 13 km (8.1 miles) along the shores of the Tiber, practically on a level, then follows a continuous grade up to a height of 260 m. (854 ft.) for 15 km (9.3 miles) to Castle Nuovo. The road then drops continually till near its end where a stiff grade occurs just before reaching Civitta Castellana, which is situated on an isolated mountain. The grades vary between 1.5 per cent and 4 per cent, and the maximum is of 7.2 per cent for about 500 m (1558 ft.), entering Civitta Castellana. This last grade has a curve of about 16 m (52 ft. 6 in.) radius.

The line is meter gage. In the suburban part the rails are of T-section weighing 42 lb. per yard, and in the city section girder rails weighing 50 lb. per yard are employed. On the former section one rail only is bonded, but on the latter both rails are bonded and in addition are cross-bonded every 50 m

(162 ft.). Several track views are presented herewith.

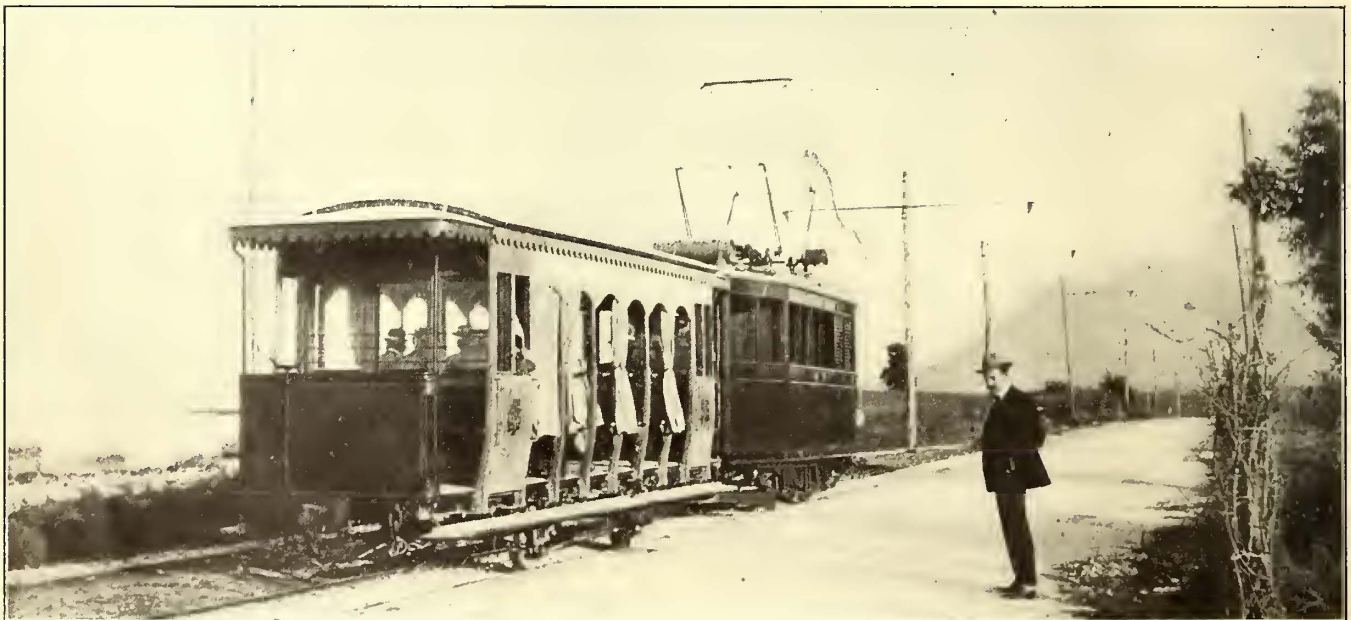
The line is divided into two distinct sections, viz., the city section on which a pressure of 600 volts a.c. has been adopted and the interurban section on which a pressure of 6600 volts obtains.



Rome Single-phase Railway—Opening Trip.

oxen, and travelers were conveyed in coaches which, though quaint and picturesque, were neither rapid, comfortable nor safe enough for modern requirements.

The tourist who may happen to revisit these parts after possibly the lapse of a few years will now find a remark-



Rome Single-phase Railway—Motor and Trail Car.

able change. The numerous towns and villages of this picturesque region have been connected by a single-phase electric railway recently laid down by the French Westinghouse Company. The railway, which at present is about 32 miles long, but is about to be extended, occupies one side of the public road, the well-known Flaminian Way. Parts of the old Roman road, built in 200 B.C., are still to be seen and in places the original Roman paving was taken up to permit

The high-tension line begins at the generating station 5 km (3.1 miles) from Rome and is continued to the end of the line at Civitta Castellana, a distance of 42 km (26 miles). The 600-volt section starts at the generating station and terminates at the Piazza della Liberta in Rome. There are no feeders at present, but one is to be provided in the early future on account of the rapid increase of the traffic.

HIGH-TENSION SECTION

The high-tension trolley line consists of a copper wire of 50 mm<sup>2</sup> (No. 0) section. No feeders are used because under the most unfavorable conditions or the starting of a train on the 7.2 per cent grade, the drop in voltage is only 11.5 per cent. With simultaneous running of two trains on the 4.7 per cent and 4.2 per cent grades the drop is 10 per cent.

The trolley wire is carried 6 m (19 ft. 7 in.) above the track, and is flexibly supported from brackets except that for a short distance before entering Civitta Castellana catenary construction has been adopted.

The trolley wire suspension is novel. The hanger is bolted to a flat iron bar which is doubly insulated at each end by porcelain strains from the pole bracket. Each insulator is threaded with a bolt so that the line cannot fall to the ground if an insulator breaks. Each insulator is designed to stand a pressure of 30,000 volts.

SAFETY DEVICES

In addition to the precautions already noted, provision has been made to prevent the overhead wire from falling in case of fracture of the hanger or hanger bolt. This consists of a short piece of cable, which is passed over the bracket and is clipped to the wire on each side of the bracket and 70 cm (2¾ in.) from it.

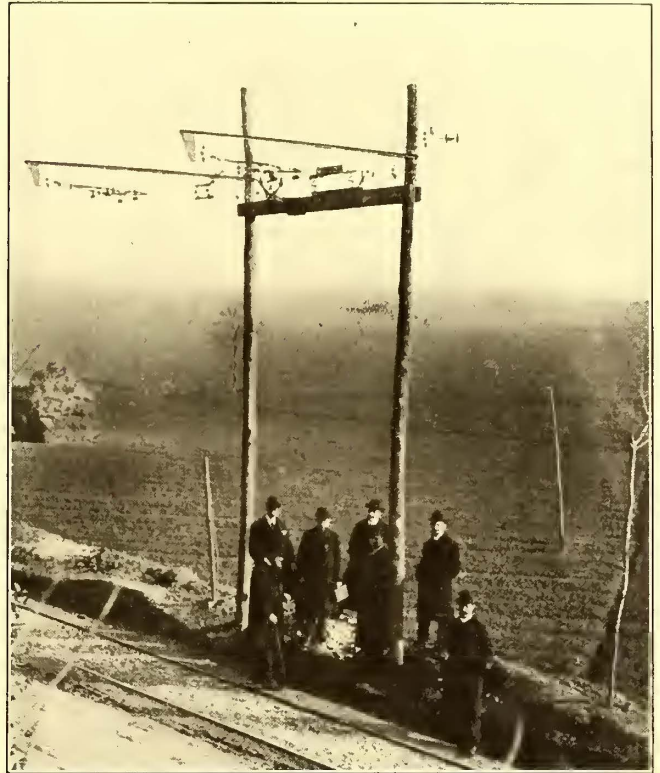
RELAY BREAKER

As an additional safety precaution a relay in the power station automatically opens the line breaker in case the trolley wire circuit is broken. This prevents a live wire from falling to the ground or hitting a passing car. The relay is operated by running a phosphor bronze pilot wire from the power station to the end of the line, where it is connected in series with the trolley wire. At the power station this pilot wire is connected in circuit with a mini-

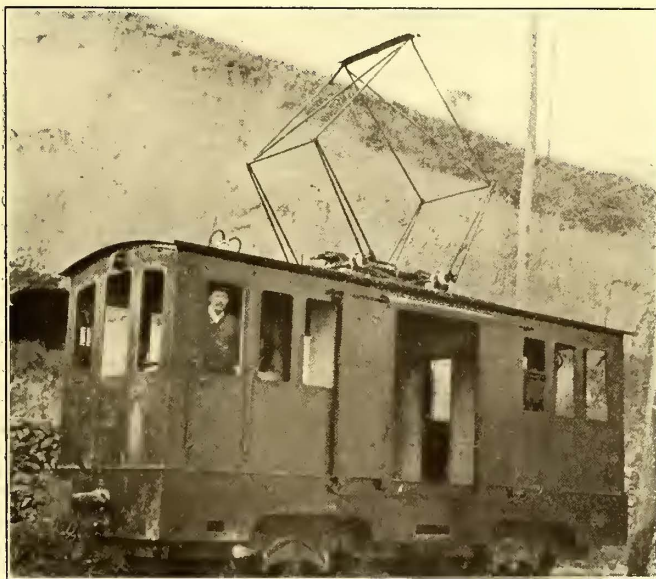
track, while an auxiliary cable connects the end of this wire with that over the other side of the turnout.

OVERHEAD CONSTRUCTION

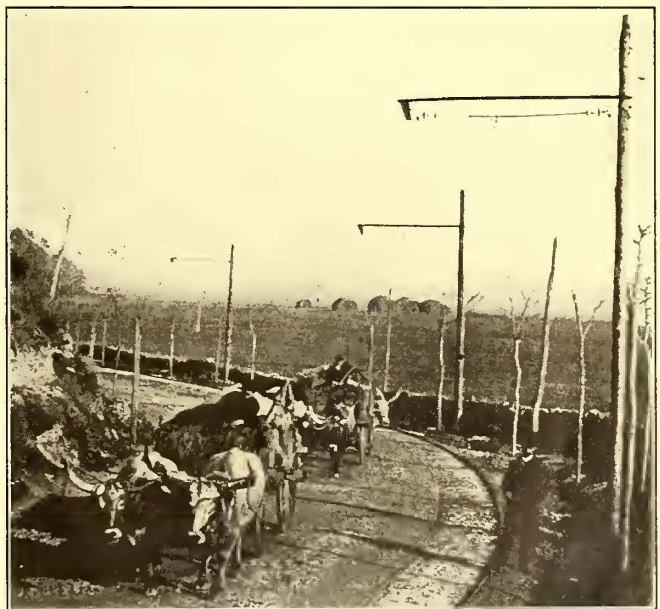
The trolley line is staggered to obtain an even wear of the current collectors and very little arcing has been experi-



Rome Single-phase Railway—Section Insulator and Switches.



Rome Single-phase Railway—Electric Locomotive on Grade.



Rome Single-phase Railway—Old Method of Transportation Along Electric Track.

mum relay which in the case of an open circuit caused by a break in the trolley wire will open the main breaker. The high-tension circuit only is thus protected, no such device is used on the low tension.

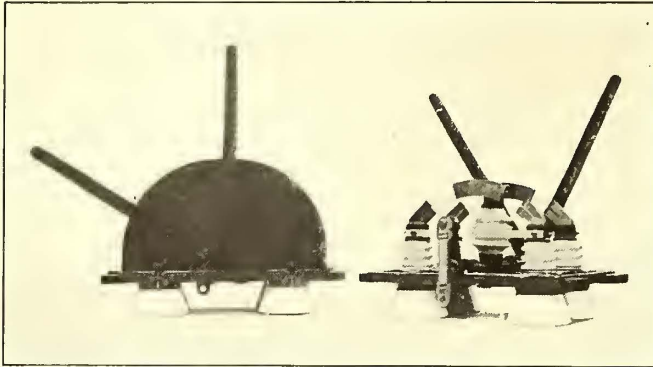
To make the device effective all parts of the trolley circuit should of course be in series. For this reason the trolley wires at a turnout are not connected in parallel. Instead, the main line is dead-ended after passing over one

ended. The sliding shoe is of aluminum and has grease-holding slots.

The line is sectioned in 10 places close to the stations and the various sections are electrically connected or disconnected by means of horn type switches. The incoming and outgoing wires are dead-ended by means of two heavy porcelain insulators and a rigid dead section 3 m long insures the passage of the sliding bow from one section to

the other. These section switches can be opened from the ground when desired by means of a long pole.

For the passage from the high to the low tension section the system is similar, but a special device automatically operates a switch on the roof of the car as the latter passes through the neutral section. This device consists of an arm which throws a change-over switch one terminal of



Rome Single-phase Railway—Throw-over Switch for Changing from A. C. to D. C. and Vice Versa.

which is connected to the pantograph trolley, and two other terminals are connected respectively to the 6600-volt and 600-volt terminals of the auto-transformer. In this way the transformer of the equipment is always connected



Rome Single-phase Railway—Wiring at Turnout.

for the tension of the section it enters and danger of burning the apparatus when passing from the low to the high-tension is avoided. It is not necessary to stop the car or to lower the trolley.

Each section is protected by a horn type lightning arrester connected to the earth through a liquid resistance.

The telephone line is carried on the trolley line poles, the wires being crossed vertically and horizontally between every three poles. The service is very good and the telephone is used for all train dispatching.

#### LOW-TENSION SECTION

In the city of Rome the voltage is 600 and the trolley wire is 60 m m<sup>2</sup> section (about No. 00). A 500-volt direct-current trolley is crossed at three points by the low-tension a.c. line. At these places the d.c. trolley is carried in an inverted trough which is wide enough to allow the wheel to pass freely, but is at such an angle that the pantograph goes over without opening the circuit and cannot possibly touch the d.c. wire.

#### ROLLING STOCK

There are at present seven motor cars and two locomotives. The locomotives, one for freight service, are equipped with four Westinghouse single-phase motors, with the Westinghouse system of multiple unit control. Each locomotive weighs 20 tons. The auto-transformer, air cooled by means of a blower, the air compressor outfit and the controlling devices are placed inside the locomotive used for freight traffic only.

The motor cars are 7 m (22 ft.) long and seat 18 passengers, while each platform affords standing room for 10 persons. They are mounted on single trucks and each is equipped with two 40-hp single-phase series motors, 260 volts, 25 periods. The weight of the motor cars loaded is about 12 tons. Each will haul a trailer weighing 8 tons carrying an equal number of passengers, making a total of 20 tons, at a speed of 30 km (18½ miles) per hour, this speed being the maximum allowed by Italian law on public roads. At full load the motors operate at 630 r.p.m. and the gear ratio is 14:76.

The cars are equipped with Westinghouse air brakes with motor compressor.

Since the opening of the line the traffic has increased very considerably and the road is to be extended to Viterbo, 40 km to the north of Civitta Castellana.

#### COMMITTEE ON WOOD PRESERVATION ORGANIZED

The committee of 17 appointed by the American Railway Engineering & Maintenance of Way Association to investigate and report upon the subject of wood preservation met in Chicago recently and organized. A. L. Kuehn, engineer of track and roadway of the Cleveland, Cincinnati, Chicago & St. Louis Railway, was elected chairman of the committee, and C. G. Crawford, specialist in wood preservation for the United States Forest Service, was elected vice-president. The committee was divided into four subcommittees as follows: Statistics and Economics, O. Chaunte, consulting engineer, Chicago, Ill., chairman; Preservatives and Specifications, H. von Shrenk, consulting timber engineer, St. Louis, Mo., chairman; Adaptability of Woods and Their Preparation, W. K. Hatt, civil engineer, Forest Service, Lafayette, Ind., chairman; Treating Processes, C. G. Crawford, specialist in wood preservation, Forest Service, Washington, D. C., chairman.

The Camaguey Electric Company, which controls all of the electric lighting business in Camaguey, Cuba, a city of 50,000 inhabitants, has recently constructed a tramway in that city which was opened for operation May 1. The property is owned by a Canadian company, with offices at 179 St. James Street, Montreal. W. B. Ross, K.C., of Halifax, Nova Scotia, is president.

## MERIT AND DEMERIT SYSTEM OF THE ROCHESTER RAILWAY

The method of government of trainmen by the merit and demerit system of discipline is in successful operation on the Rochester Railway, of Rochester, N. Y., and the Rochester & Sodus Bay Railway, a leased interurban road, connecting the two points, the names of which are included in its title. The total mileage operated by the companies is 106.55 miles. The merit and demerit system became effective on May 1, 1906. Before that date trainmen were disciplined by being deprived of employment for a certain number of days, placed at the bottom of the extra list, or compelled to learn their duties again without wages, working hardships to the employees and their families. Under the new system trainmen are not obliged to give up employment unless they are discharged, and the employees therefore like the arrangement.

In asking for employment as trainman, an applicant is obliged to fill out a blank stating the main facts concerning his life. He must also submit to a medical examination at an expense to him of \$1; must agree to return upon demand or on severing connection with the railway all the company's property then in his possession; and whenever requested, must make an affidavit "containing a full and truthful statement of any and all accidents, rejections, refusals of transfers and assaults" of which he may have knowledge. He also agrees to deposit with the company a stipulated sum in cash, the amount of which is determined in each individual instance, as security for performance of his agreements. The applicant also agrees to work under instruction, on trial, without pay, for at least seven days, and such additional time as the company may deem necessary. Attention is called in the blank form of application for employment to the section of the penal code which provides that a person who obtains employment through false statement, forged letter or certificate of recommendation, or false statement in writing as to his name, residence, previous employment or qualifications, is guilty of a misdemeanor. Affidavit must be made that the statements in the application are true and that the applicant has read the copy of the section of the penal code to which reference is made.

Following acceptance by the company, the applicant is given a book of rules. In his receipt he authorizes the deduction of 50 cents from his wages should he fail to return the book upon leaving the service. A record is kept on a card of runs made by a new employee with instructors. The employee also receives instructions from the claim adjuster and his work must be approved by the division superintendent. The new trainman is then given a card to a division superintendent and his name is placed on the extra list at one station.

As soon as actual service begins the employee is subject to the operation of the merit and demerit system of discipline. Different merit and demerit marks are provided for the city and the interurban systems. The general plan of application of these marks on the city and interurban lines is similar except so far as differences are necessary because of the varying conditions on the two systems. The following general rules and merit and demerit marks are provided for trainmen on the city lines:

### MERIT AND DEMERIT SYSTEM

Sixty demerit marks, after deducting credit marks, dismissal from the service. Credit marks will be given for any act deserving special recognition. The number of marks

awarded for acts not specified herein to be determined by the general superintendent of transportation.

Where punishment or credit is governed by time limit, such limit is to be determined by consecutive months and not between any arbitrary or set months.

Any motorman or conductor may inspect his individual record while in the employ of the company.

All appeals to be made to division superintendents and within 10 days after delivery of notice of punishment.

### CREDIT MARKS

Ten credit marks for first six months without demerit marks.

Fifteen credit marks for each succeeding six months without demerit marks.

Five credit marks for removing obstructions and clearing blockade.

Five credit marks for tying up trolley wire.

Five credit marks for making exceptionally good stop, thereby preventing accident.

Five credit marks for securing names of witnesses or information valuable to claim department when off duty.

Five credit marks for removing trolley wire from track.

Five credit marks for exceptionally good work in placing cars on track.

Five credit marks for six months' neatness in appearance of person and car.

Three credit marks for assisting in placing car on track.

Three credit marks for recovering and turning in lost pass books and badges.

Three credit marks for using good judgment in avoiding blockade, by changing route of car.

Three credit marks for repairing parts of car, avoiding turning car in and avoiding blockade.

Three credit marks for finding and returning company's property, such as signs, train numbers, parts of car, including base ball signs, circus and race signs.

Three credit marks for tying up guy or span wire.

Three credit marks for watching broken wire.

### DEMERIT MARKS—REPORTING LATE FOR RUN

First offense within 6 months when reporting less than 1 hour late, 1 mark.

Second offense within 6 months when reporting less than 1 hour late, 5 marks.

Third offense within 6 months when reporting less than 1 hour late, 10 marks.

Fourth offense within 6 months when reporting less than 1 hour late, 15 marks.

Fifth offense within 6 months when reporting less than 1 hour late, 20 marks.

For each succeeding offense an increase of 5 demerit marks.

When reporting more than 1 hour late, 5 demerit marks to be added to this punishment for each hour in excess of 1 hour.

### WARNING

Not punching transfers properly.

Pulling in car house ahead of time.

Reporting for duty without full uniform.

Allowing passengers to block rear passageway.

Neglecting to collect fares promptly.

Abuse of power.

Not properly ventilating car.

Neglecting to hold trolley when passing under special work.

Running over circuit breaker with power turned on.

Missing fares.

Front door and gate open.

Neglecting to deliver messages.

Notching controller with brakes set.

Using profane language while on duty.

Making out time sheets incorrectly.

Not punching tickets in presence of passenger.

Not making relief at proper relief point.

Starting car on one bell.

Neglecting to call names of streets.

Accepting transfers on wrong date.

Neglecting to have right hand vestibule door or gate open between North Avenue and Fitzhugh Street on Main Street.

Having electric heaters turned on before authorized.

Neglecting to have front window open wherever a traffic officer is stationed.

Neglecting to have car under control and sound gong when approaching crossings.

Carrying passengers by their destination when notified.

Not making out motor and repair cards properly.

Electric headlight not lighted on front end.

When motormen meet (that is, run within 100 ft. of each other before one turns) on single track between switches.

Conductors allowing pressure gage on heater to run over 5 lb.

Motormen leaving front door open when cars are heated. Not making out turn back cards; both motormen and conductors.

Five warning marks equal to one demerit.

#### ONE DEMERIT MARK

Failing to leave car house on schedule time without good excuse.

Reporting for duty without full uniform. (After warning.)

Making out time sheets incorrectly. (After warning.)

Not punching tickets in presence of passenger. (After warning.)

Not making relief at proper relief point. (After warning.)

Starting car on one bell. (After warning.)

Neglecting to call streets. (After warning.)

Neglecting to read bulletin notices.

Giving incorrect information to passengers regarding tickets, time tables, etc.

Allowing fire to go out.

Neglecting to turn trolley in car house.

Accepting transfers on wrong date. (After warning.)

Neglecting to re-set register.

Neglecting to make junction stop.

Punching transfers wrong.

Not making out motor and repair cards properly. (After warning.)

Carrying passengers by their destination when notified. (After warning.)

Neglecting to stay with car while on duty without permission to leave.

#### TWO DEMERIT MARKS

Copying schedule incorrectly.

Running at an excessive rate of speed (faster than 6 miles per hour) past "Slow up" sign.

Running at an excessive rate of speed around curves, through switches, or over special work (4 miles per hour).

Neglecting to carry or display proper sign: Front sign, motorman, two demerits. Rear sign, conductor, two demerits.

Pulling out of barn or running with front trolley up.

Running by passenger, provided passenger is at proper designated place, except when car going to same destination is following within a block.

Running ahead of schedule time.

Running late without reasonable excuse.

Conductors allowing pressure gage on heater to run over 5 lb. (After warning.)

Motormen leaving front door open when cars are heated and in motion. (After warning.)

Not making out turn back cards, both motormen and conductors. (After warning.)

Neglecting to have front window open wherever a traffic officer is stationed. (After warning.)

Neglecting to have right hand vestibule door or gate open between North Avenue and Fitzhugh Street on Main Street. (After warning.)

#### THREE DEMERIT MARKS

Allowing passenger to smoke inside of car, except rear seats of open cars.

Motorman stopping car for passenger at a point not a regular stopping place.

Reading newspaper on duty.

Sitting down in car while on duty when car is in motion.

Not leaving end of line on time.

Not stopping at specified stops.

Running switches.

Neglecting to turn in transfers, trip sheets, time sheets, etc.

Turning in defective car and not reporting same.

Smoking while on duty.

Neglecting to turn in money within reasonable time.

Pulling in crippled car without cutting out motors.

#### FIVE DEMERIT MARKS

Running car, on pull-in trip, in car house ahead of schedule time. (After warning.)

Carrying packages without proper way-bills, except newspapers, United States mail and company business.

Conductor starting car before passenger is safely on or off.

Conductor starting car from inside at end of line.

Conductor standing in front door, holding conversation with motorman, while car is in motion.

Motorman holding conversation with conductor while car is in motion.

Removing train numbers on pull-in trip before arriving at car barn.

Having electric heaters turned on before same is authorized. (After warning.)

Motorman running with front life guard up.

Neglecting to have car under control and sound gong when approaching crossings. (After warning.)

Running into open switch. No damage to person or equipment.

Leaving an unused switch open.

When motorman refuses to back up without delay when meeting between switches.

Not properly making out accident reports.

Motorman and conductor not signing both signatures to any report calling for signature of each.

Running against facing switch when car is approaching or standing on opposite track.

Electric headlight not lighted. (After warning.)

Employee occupying seat when paying passengers are standing.

Turning switch with sign.

Failing to hook up scrapers when changing ends at end of line.

Not keeping steps and floor clean and free from ice.

#### TEN DEMERIT MARKS

Motorman allowing conductor to run car.

Conductor operating front end of car.

Allowing passengers to ride in front vestibule.

Abuse of power after being warned.

For carrying dogs on car.

For carrying bulky bundles or open cans of paint or oil on car.

Neglecting to keep rear left hand door or gate closed.

Failing to throw signals properly.

#### TWENTY DEMERIT MARKS

Motorman running car with both hands off controller and brake, lounging on platform or not facing direction of motion of car.

Motorman starting or backing car without signal.

Entering saloon in uniform except in case of emergency.

Rear end collision on Main Street between Caledonia Avenue and North Street; on State Street between Main Street and Central Avenue, or Exchange Street between Main Street and Canal Bridge, when damage is slight to person or property.

Abusive language to passengers.

Running over end of line; no damage to person or equipment.

Conductor giving signal to back car from inside of same.

#### TWENTY-FIVE DEMERIT MARKS

Not stopping car on three bells.

#### THIRTY DEMERIT MARKS

Not stopping at Canal Bridge during navigation; no damage to person or equipment.

#### FORTY DEMERIT MARKS OR DISMISSAL

Rear end collision outside of district on Main, State and Exchange Streets, bounded by Central Avenue, Erie Canal,



Caledonia Avenue and North Street, when damage is slight to person or property.

DISMISSAL

- Insubordination.
- Refusing to take run.
- Neglecting to come to a stop before crossing steam railroad tracks.
- Not properly patrolling steam railroad.
- Failing to report accident until demanded.
- Entering saloon while on duty, except in case of emergency.
- Intoxicated while on duty.
- Reporting for duty under influence of liquor.
- Intoxicated in uniform.
- Prevarication.
- Making false report.
- Not reporting for run within six hours without reasonable excuse.
- Head-on collision.
- Rear end collision when damage is heavy to person or property.
- Issuing transfers to letter carriers riding upon uniform and with pouches, or others who did not pay fare.
- Running over end of line; damage to person or equipment.
- Missing fares. (After warning.)
- Not stopping at Canal Bridge during navigation; with damage to person or equipment.
- General lack of ability in first six months' service.
- Neglecting to turn in lost articles within twenty-four hours.
- Running into open switch, with damage to person or property.
- Motorman sitting down on car while operating same within city limits.
- Motorman sitting down on car while operating same when not equipped with air.
- Repeated violation of rules or orders.
- Smoking on closed car while in uniform.
- Throwing signals for any other employee.

The motormen and conductors on the Rochester Railway are union men and the union asked that the merit and demerit system be used in order to do away with the practice under the old system of compelling men to serve time for infringement of rules. The men like the present merit and demerit system and the majority work very hard to obtain merits.

Under the rules governing the application of the system notice is given to every employee each time merits or demerits affecting him are recorded. The notice shows the entrance of credits or demerits and the balance standing against the name of the employee. The receipt of letters of this character must be acknowledged by an employee. When notice of demerits is received the employee may appeal. The appeal is referred by the division superintendent to the general superintendent, who acts with full knowledge of the circumstances. The system includes provision for a "Warning Advice," which is made out in the following form:

WARNING ADVICE

- You are hereby notified that warning mark has been placed against your record for offense underscored below:
- Pulling into car house ahead of schedule time.
  - Reporting for duty without full uniform.
  - Having trouble with passenger.
  - Allowing passengers to block rear passageway.
  - Neglecting to shade arc headlight in city.
  - Missing fares.
  - Neglecting to collect fares promptly.
  - Carrying express (not perishable) beyond destination when properly billed (interurban line).
  - Leaving key in Ohmer register.
  - Running within yard limit at excessive rate of speed (interurban line).
  - Abuse of power.
  - Not properly ventilating car.

Neglecting to hold trolley when passing under special work.

- Neglecting to deliver messages.
- Notching brake controller with brake set.
- Using profane language while on duty.
- Neglecting to put in turn-back card.

The employee may make application to the division superintendent for merit marks, stating the circumstances of the good conduct which in his opinion entitled him to special recognition. If approved by the division superintendent credit marks are allowed.

A full record of each employee is kept in envelopes in the office of the superintendent of transportation. On a large sheet which is among the records in these envelopes entries are made of warnings and demerit and merit marks and of the results of checks by inspectors of the collection of fares by conductors.

Bulletins are issued each month and posted at the different car houses, showing the number of acts and employees

<b>EIGHTEEN CREDITS.</b>	Three motormen and two conductors—Clear record past year and neatness of person and car past six months.
<b>THIRTEEN CREDITS.</b>	Seven motormen and three conductors—Clear record and neatness of person and car past six months.
<b>FIVE CREDITS.</b>	Five motormen and four conductors—Tying up trolley wires. Two motormen and one conductor—Helping tie up trolley wires. Four conductors—Securing information valuable to claim department.
<b>THREE CREDITS.</b>	Seven motormen and seven conductors—Neatness of person and car past six months. Two motormen—Watching broken trolley wires. Seventeen motormen and two conductors—Finding and turning in company's property. One motorman—Changing route of car and filling in gap. Two motormen and one conductor—Helping remove horse from track. One motorman and one conductor—Helping place car on track. One motorman and two conductors—Lighting switch lamp at Glen Haven Junction. One motorman—Coupling cars together, avoiding blockade. Two motormen—Splicing ground wire. One motorman and conductor—Helping remove wagon from track. One motorman—Helping crew get car to start when grounded. One motorman—Pushing crippled car to bain. One motorman—Repairing motor wire. One motorman—Connecting feed wire. One conductor—Removing obstruction from track.
<b>ONE DEMERIT.</b>	Eleven motormen and 30 conductors—Failing to report for run on time. Six conductors—Turning car over to relief with fire out. Six conductors—Allowing fire to go out. Three conductors—Not having car properly ventilated. Two motormen—Not making junction stop. One motorman—Not sounding gong when passing streets. One motorman—Running into open switch.
<b>TWO DEMERITS.</b>	One conductor—Not having car properly ventilated. Five motormen—Not having car properly signed. Twelve motormen—Running ahead of schedule time. One motorman—Running fast over special work.

Rochester Merit and Demerit System—Sample Page for Monthly Bulletin.

participating therein on account of which merits or demerits were given. No names, however, are divulged. A sample page from one of these bulletins is published herewith. Trainmen watch eagerly for the bulletins at the end of each month. In practically every month credits have been given for neatness of person and car during the preceding six months.

The foregoing information has been furnished by W. R. W. Griffin, general superintendent of transportation.

PHILADELPHIA LOAN ASSOCIATION'S PROGRESS

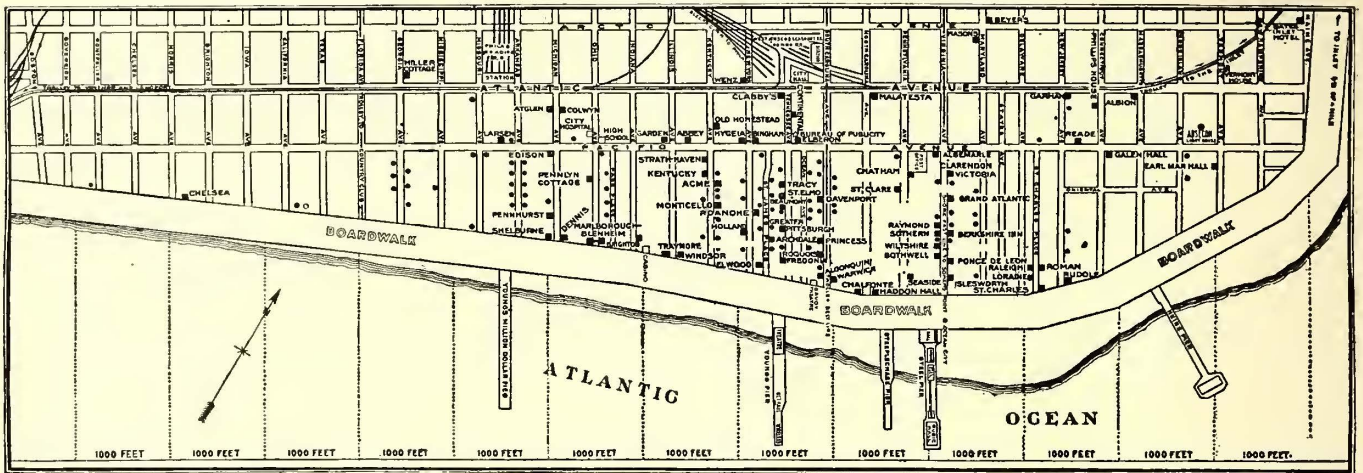
The Philadelphia Rapid Transit Building & Loan Association, composed of employees of the Philadelphia Rapid Transit Company, is now in its second year. The first year's business showed earnings of about 5 per cent, and much better results are expected as it goes on, on account of the increased business which will be done while the expenses will remain practically the same. During the first year \$12,000 was invested by the association in real estate mortgages.

**ATLANTIC CITY SELECTED FOR THE CONVENTION**

Formal announcement has been made that the American Street & Interurban Railway Association and its affiliated organizations will hold their annual meetings at Atlantic City, N. J., during the week beginning Oct. 12, 1908. The increasing importance and value of these associations to the member companies will be made plain in the program which will be issued later for this 27th annual meeting.

Although the meeting place will be the same as that se-

lected for the successful conventions of last year, the work of the different associations will be changed in some respects. Owing to the opportunity afforded by the organization of the American Street & Interurban Railway Transportation & Traffic Association, which will hold its first meeting this fall, the sessions of the parent association will be executive. At meetings in the past no specific provision has been made for sessions at which questions of public re-

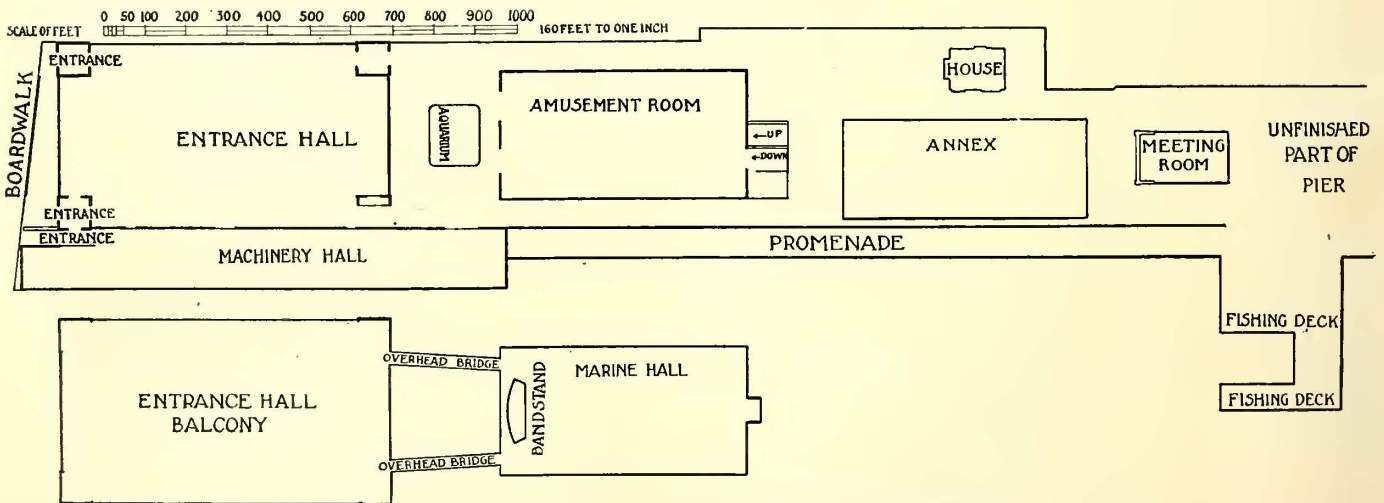


Atlantic City Convention—Plan of Boardwalk and Vicinity, Showing Location of Hotels and Piers.

lected for the successful conventions of last year, the work of the different associations will be changed in some respects. Owing to the opportunity afforded by the organization of the American Street & Interurban Railway Transportation & Traffic Association, which will hold its first meeting this fall, the sessions of the parent association will be executive. At meetings in the past no specific provision has been made for sessions at which questions of public re-

problems have arisen which can be discussed with advantage.

The Transportation & Traffic Association should be as valuable as a means for consideration of operating problems as the parent organization has been in the past. It should also bring together officials who heretofore have not been directly represented in meetings of the association. Traffic officials are recognized by the association because



Atlantic City Convention—Plan of Million-Dollar Steel Pier.

lations or problems of similar importance to the chief executive officers of the companies could be discussed. It is the intention now to have the meetings of the American Street & Interurban Railway Association wholly executive in order that matters pertaining solely to duties of the executive officials may be discussed without interference with the consideration of operating problems. At the same time other problems of a technical character have been transferred to the accounting, engineering or claim associations.

With the growth in mileage and earnings of both urban

of the increase in the number of such officers in electric railways.

The Engineering Association has before it the questions of standardizing car equipment, of determining the most economical means of maintenance and of reaching bases for proper construction of track and of car houses, repair shops and other buildings necessary in electric railway work. All this is in addition to the engineering problems connected with the development of the industry such as improvements in power equipment, transmission apparatus and methods of

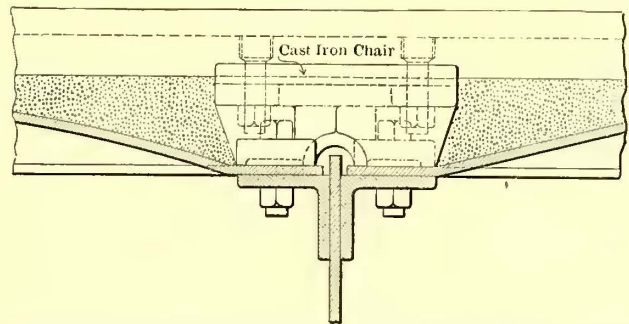
utilizing the power at the axle of the car. This subject, under the new plan, will be considered by the Engineering Association in the future, and not by the parent body.

The Accountants' Association will have before it the results of the work done during the year by its committee and the committee of the American association in preparation of the uniform accounting scheme. No announcement has been made concerning the work of the Claim Agents' Association at the coming convention, but its successful meetings in the past will undoubtedly be followed by another gathering which will assist in strengthening the organization and will aid the companies in their endeavors to resist fraudulent claims.

The exhibits will be held on the new Million Dollar Pier, which is south of the pier occupied last year by the American Street & Interurban Railway Manufacturers' Association. The pier to be used this year has recently been completed and in many respects is much better for exhibition purposes than that occupied at the last convention. The pier is built of reinforced concrete and steel, extends 1800 ft. from Atlantic City's beach front line, and has an average width of 98 ft. The buildings on the pier comprise an auditorium, convention hall, marine hall, and a cottage used

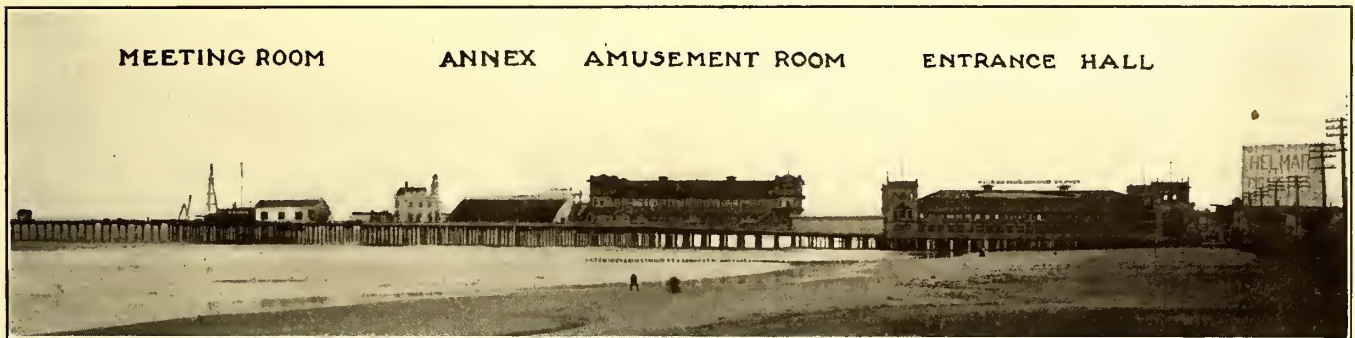
### A UNIQUE APPLICATION OF THERMIT WELDING ON SHALLOW RAIL

The Union Railway Company, of New York, operates principally in the Borough of the Bronx, but has a number of lines connecting with the Borough of Manhattan via several bridges over the Harlem River. One of the latter,



Thermit Rail Welding—Section of Bridge Roadway, Showing Chair for Rail

known as Macomb's Dam or Central Bridge, at West 155th Street and Sedgwick Avenue, is part of a long asphalted via-



Atlantic City Convention—View of the New Million-Dollar Convention Pier

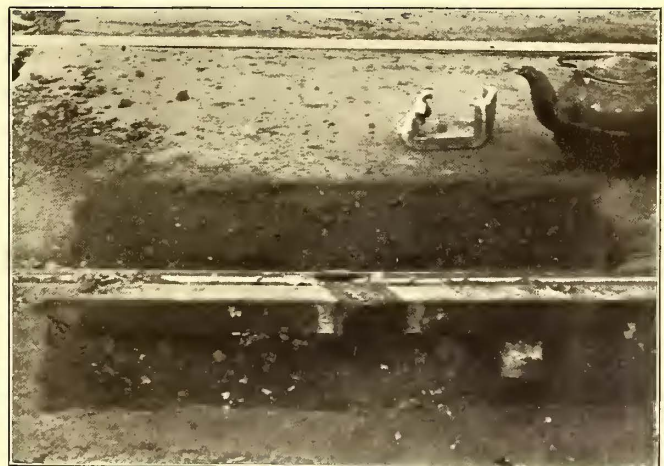
by Captain John L. Young, president of the Associated Realities Company, which built the pier. The new meeting place is at the foot of Arkansas Avenue, nearer the Marlboro-Blenheim and Dennis hotels than the steel pier where the exhibits were shown last year and close to the Atlantic City station of the Philadelphia & Reading Railroad. It is also the pier at which the exhibits and convention of the Master Car Builders' and Master Mechanics' associations were held last week and this week.

### SUPREME COURT BOYCOTT DECISION

The Supreme Court of the United States has recently decided that conspiracies to boycott interstate commerce are offenses against the Sherman Act and that service corporations upon which confiscatory rates are imposed by State statutes are entitled to relief by injunction against State administrative officers attempting to enforce the oppressive laws. The highest Federal tribunal has of late made other determinations in the same general line—that is, to the end of upholding equality before the law, whether the interested parties be corporations or individuals.

The Terre Haute, Indianapolis & Eastern Traction Company, of Indianapolis, Ind., has commenced operation of a limited freight service, in addition to the local freight service. The Fort Wayne & Wabash Valley Traction Company has put on a new freight schedule, adding an additional a. m. car out of Fort Wayne to all points west.

duct which was never intended to carry electric railway tracks. The asphalt is laid over a thin coating of cement concrete on the arched buckle plates of the bridge, and the



Thermit Rail Welding—Portion of Welded Rail with Brass Mold and Kettle for Pouring Wax

greatest depth formed by the adjoining arches is about 3½ in. Permission to lay track over this viaduct was secured in 1903, and after conference with the municipal authorities it was decided to use the Lorain Steel Company's section 94, No. 327, which was already employed on the Brooklyn Bridge. This rail is only 2½ in. high, has an overall width

of  $4\frac{1}{2}$  in. on tangents ( $5\frac{1}{2}$  in. on curves), with a groove  $1\frac{9}{16}$  in. wide on tangents ( $1\frac{23}{32}$  in. on curves) and  $1\frac{1}{16}$  in. deep. As the usual forms of mechanical joints were out of the question because of the shallowness of the rail, it was necessary to bolt the track to chairs placed in the depressions between adjoining buckle plates. These chairs were only  $\frac{7}{8}$  in. thick at the base and were bolted directly to the bridge plates at intervals of about 14 ft. 9 in. on straight track and at lesser distances elsewhere, in ac-

which has succeeded in solving it mechanically and electrically by a novel application of the thermit process.

Owing to the shallowness of the rail it was determined to make a complete weld, similar to the accompanying view of the trial joint. The original rails had been cut at an angle of 45 deg., so to allow space for sufficient welding composition it was necessary to saw out about 2 in. of metal on each side of the joint; likewise the chairs were remodeled to allow a recess for the thermit collar on the bases of the rail

and flanges were left for a bolt on each side of the weld.

Hitherto thermit rail welding has been accomplished with dry sand molds made on patterns and then applied to the rail for the weld, but an important departure was made in this case by using a wax matrix to insure a more accurate cast and absolutely to prevent any molten metal from escaping and burning its way through the bridge buckle plates. After an old chair is removed and the rail cut for the weld a three-piece brass mold especially designed for this section is applied to the rail and lined with clay on the sides and bottom. The mold is then ready for the hot wax, which is poured in and allowed to harden to the exact shape required. After this the brass mold is replaced by a sheet-iron box. This box is filled with a mixture of clay and sand, which is tamped solidly around the wax except that a riser and a hole in which to pour the thermit are made in the mold over the top of the rail, and a third hole is provided near the bottom of one side of the box. The last hole serves as a passage for the flame from a gasoline compressed-air torch or preheater, which melts out the wax and in from 15 to 18 minutes brings that por-



**Thermit Rail Welding—Shear for Cutting Off Riser and Compressed-Air Equipment for the Shear and Preheater**

cordance with the degree of curvature. The rail was cut at an angle of 45 deg. to minimize the shocks at the joints. Four holes were drilled at each joint, two being for the bolts and two for the bonds. Originally the bonds were placed at the base of the rail, but this method proved unsatisfactory, so it was superseded by the use of pin bonds, which were secured through holes drilled in the side of the rail.

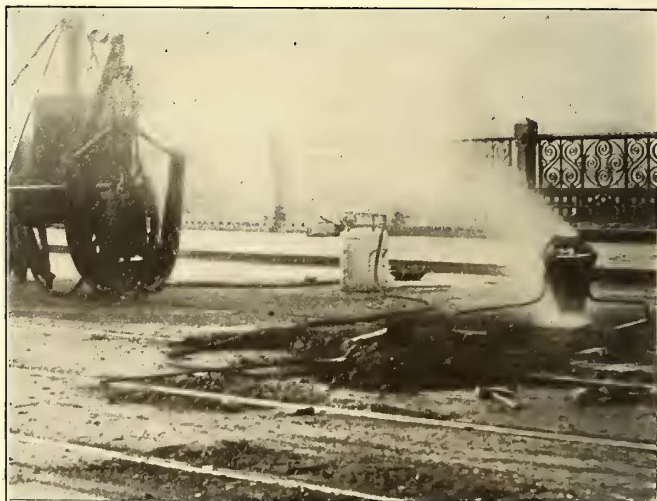
As the chairs had been placed on a curved foundation, it

ture of clay and sand, which is tamped solidly around the wax except that a riser and a hole in which to pour the thermit are made in the mold over the top of the rail, and a third hole is provided near the bottom of one side of the box. The last hole serves as a passage for the flame from a gasoline compressed-air torch or preheater, which melts out the wax and in from 15 to 18 minutes brings that por-



**Thermit Rail Welding—Melting Out the Wax with Gasoline from Preheater**

was soon found that the shocks at the joints were causing them to move up and down, thereby inducing a teetering of the rails. This broke up the asphalt so rapidly that in many cases expensive repairs were necessary every two or three weeks. Since the installation of a high girder rail was impossible without reconstructing the bridge, the railway company found itself in a serious dilemma. Finally the problem was put before the Goldschmidt Thermit Company,

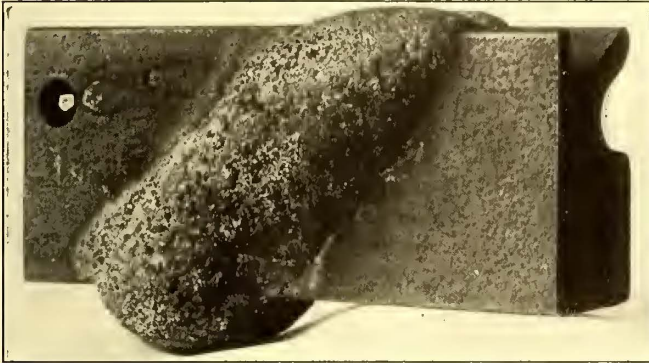


**Thermit Rail Welding—View of Weld Under Way and of the Gasoline Preheater and Shear**

tion of the rails inside the mold to the red heat necessary for the weld. During this time an iron plate covers the greater part of the riser to apply the heat more uniformly to the body of the rails. The gasoline torch preheater is operated at about 20 lb. pressure.

Before the crucible is placed over the mold the exposed bridge plates and the rails for 3 ft. to 4 ft. on each side are covered with sand to prevent the adherence of slag and iron.

The preheating hole is then plugged and everything is ready for the application of the ignition powder. After the welding, the sheet iron mold box is removed as soon as it has had a chance to cool and the slag is knocked off with a small sledge hammer. The next step is to take care of the riser, which is cut off by the novel toggle shear shown in one of the accompanying illustrations. This shear is lowered and raised by a Yale & Towne ½-ton duplex chain hoist, while the power for the cut is supplied through an 80-lb.

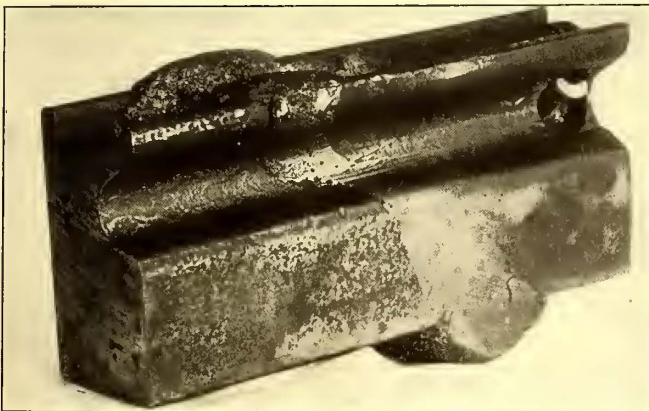


Thermit Rail Welding—Diagonal Weld on Base of Sample Rail

pressure air line from a National portable type air compressor mounted on a wagon. The air is controlled by a four-way cock on the shear so that it may be applied at either the top or bottom of the shear cylinder. The shear knives, which exert a pressure of about 50,000 lb. when the cut starts, are removable and as they wear down are kept in place by inserting steel liners behind them. These blades, of course, are not allowed to come into contact.

The welding job proper is completed by grinding off the rail with a Stow flexible shaft carrying an emery wheel. The motor driving this shaft is enclosed and has a fish-pole connection to secure power from the trolley. The starting panel is mounted outside the motor box.

The total length of track welded is 1600 ft. and the num-



Thermit Rail Welding—Sample Rail Placed on Edge to Show Weld on Top and Sides

ber of welds is 125. The amount of thermit used per joint is 20 lb., which is somewhat larger than the normal rail-welding portion because of the unusually wide rail section and the manner in which the latter is cut. The welding is carried on at night on one of the two viaduct tracks, but during the day traffic is not disturbed at all. The gang consists of five men, who average about one joint every 45 minutes. Time is saved by having one man prepare the mold at one place while the pouring is going on at another.

The fact that so little equipment is required in thermit welding is particularly advantageous in this case as there are no facilities nearby for the storage of appliances.

The scheme of welding the entire rail as applied in the Macomb's Dam work shows how readily thermit welding can be adapted for difficult situations. The use of a wax matrix makes it possible to weld wornout rails perfectly, no matter how badly and variously pounded they may be at the ends.

#### BRIDGE GUIDES.

In connection with other improvements on this viaduct, the railway company is installing Lorain cast steel bridge guides at the span approaches. Under the old scheme of using ordinary rail throughout, a car in passing from the viaduct to the draw was likely to plow up a lot of asphalt before the wheels were running properly on the track. The space between the viaduct and draw is spanned by hinged rails (one on the viaduct and one on the draw) which are lifted back by a hook inserted in a hole in the rail groove.

#### AIR CYLINDERS FOR RAISING CAR BODIES

A part of the truck repair work on the trailer cars of the Northwestern Elevated Railroad, Chicago, is done on tracks immediately under the elevated storage yards. Recently a pair of air cylinders has been hung from the elevated structure over the repair track so that compressed air from the shop mains may be used for raising the car bodies when trailer trucks are to be removed or replaced.

The steel elevated track structure immediately over the repair track offers a substantial support for the lifting cylinders. Each of the two cylinders used is 12 in. in diameter and has a 4-ft. lift. With the 100-lb. pressure from the shop mains and the 113 sq. in. of piston area, a lifting force of about 11,000 lb. is available at each cylinder. Fastened to the lower ends of the pistons are long iron bars terminating in stirrups which can easily be hooked under the platform sills of the cars; and when the air pressure is put on the cylinders these stirrups, by reason of their having a shape to conform with the underframing of the car, need no special fastening. Car bodies are thus lifted from the trucks without requiring any blocking at the opposite side. If wheels are to be changed on trucks having inside-hung brakes, sections of rail are passed through the truck under the top frame and the air cylinders serve to lift the truck with the car body, leaving the wheels and journals free, so that they may easily be rolled out from under the car and replaced with new ones.

The report of the Birmingham & Midland Tramways for the year 1907 states that the total revenue for the year from all sources amounted to \$419,185, compared with \$462,910 for the preceding year, but the latter figure included the receipts for the first six months of the year of the Dudley Road Tramway in Birmingham, which has since passed into the hands of the corporation. The expenses for the year amounted to \$193,260, compared with \$224,755 for 1906. After providing for all expenses chargeable to revenue, including rents, repairs and maintenance, placing \$7,500 to depreciation and renewals accounts, and adding the \$2,760 brought forward from the last accounts, there remains \$221,180. The directors propose to place to the debenture redemption fund \$17,750, to pay a dividend on the preferred ordinary shares at the rate of 4 per cent for the year ended Dec. 31, 1907 (less tax), and to carry to next account \$415. The total expenditure on capital account during the year amounted to \$124,100.

## COMMUNICATIONS

### INTERSTATE COMMERCE CLASSIFICATION

MICHIGAN RAILROAD COMMISSION  
LANSING, Mich., June 15, 1908.

To the Editors:

At a recent conference between the officers of the various electric railways and this commission, the proposed uniform classification of accounts in its modified form, as offered by the Interstate Commerce Commission, was approved by all the representatives of the companies present as the best that could be expected at this time. The classification will be placed in effect in Michigan by this commission for the fiscal year beginning July 1, 1908. The question of depreciation accounts was left open for further consideration.

LOUIS CRAMTON, Secretary.

PENNSYLVANIA STATE RAILROAD COMMISSION  
HARRISBURG, Pa., June 19, 1908.

To the Editors:

With regard to electric railways engaged in interstate traffic, the act creating this commission limits the commission to securing copies of the annual reports filed by such companies with the Interstate Commerce Commission. Respecting electric street railway companies not engaged in interstate business, the commission has the right to prescribe its own form of report. For the current year it is the intention of the commission to ask from all companies a report on the form used by the Interstate Commerce Commission. The commission desires to have its act amended by the Legislature at its next session so that it may require reports on forms prescribed by itself as to all electric railway companies, and to this end has engaged an expert accountant.

HARRY S. CALVERT, Secretary.

### MEETING OF STATE COMMISSIONERS

MICHIGAN RAILROAD COMMISSION  
LANSING, Mich., June 17, 1908.

To the Editors:

At the meeting of commissioners of various States, held recently in Chicago, possibly the most important subject considered was the matter of protection by means of the separation of grades, better protection at highway crossings, and the general sentiment that no grade crossings of one railroad line with another should be permitted. Indiana led with the confessed existence of a most lamentable condition of unprotected railroad crossings, to which about 100 lives a year are sacrificed. The State of Michigan law, as is the case in many other States, affords much better protection to its people than does Indiana.

The movement looking to the establishment of concerted action by the States of the Middle West was initiated by the Michigan commission, which found that nearly all of its larger railroad lines either traversed the length of the State and went into and through adjoining States, or traveled across the State from east and west through Indiana into Illinois, and through boat connections became interested in Wisconsin. We found that to a large extent the commissions in the several States have to use their individual judgment in the construction of the law of the respective States, and that in some instances the commissions would arrive at different conclusions. We thought that by a conference of these commissions and a thorough discussion of the most important subjects, some uniformity of action could be outlined, so that the commission of each of those States would know about what construction the other

commissions were giving to laws relative to certain conditions, and that this action would not only reinforce the action of any particular commission, but would relieve the railroads from the embarrassing condition of meeting with one ruling in one State and a different ruling on the same question in an adjoining State.

It was not understood by many of the commissioners just what benefits could be derived from such a meeting, but when the Michigan commission, through its chairman, outlined the purposes of the meeting and showed definitely the good results that might be obtained through co-operation and harmonious action, the other commissioners became so deeply interested that it was at once determined to start a permanent organization.

We have no doubt that at the next meeting it may be deemed advisable to ask some other States to join the list, notably States into which or through which the most important railroads radiate from Chicago. It is not intended, however, to enlarge upon the list to such an extent that it shall in any wise handicap the influence of the national organization, but to serve those interests which we believe are most largely represented in the States named and probably Iowa, Missouri and New York in addition. These meetings will be held as often at least as twice a year, and possibly more often, as conditions present themselves worthy of consideration.

The whole scheme is for the betterment alike of shippers and railroads, which we believe we have a right to assume is among our duties, and in their proper discharge to the public.

C. L. GLASGOW, Chairman.

### MANAGEMENT OF EXPRESS BUSINESS

ILLINOIS TRACTION SYSTEM  
SPRINGFIELD, Ill., June 9, 1908.

To the Editors:

The steam roads, with one or two exceptions, possibly, have refused to interchange business with us on the basis of through rates and divisions. We have made no legal effort to compel the steam lines to interchange business. Two or three suits have been brought by other interurban lines in this territory, however, which will probably decide this question. No decision has been rendered by the courts and we are simply waiting for their action.

The business on our refrigerator cars which operate from East St. Louis, Ill., where the packing houses are located, amounts to about 120,000 lb. per week in packing-house products, on which we obtain a revenue of about 20 cents per 100 lb. This is the less than car-load rate.

The operating expenses for the express business are rather complicated. The expenses of the motormen, conductors, messengers, station agents, express terminal expense, rent of buildings and other costs that are purely express are charged directly to this account. Costs of power, car repairs and other similar expenses are prorated to this account on the basis of car mileage. I believe that in the latter expenses the express account is charged an excessive amount because I think that it costs less to maintain express equipment than passenger equipment.

I have just made up my report of claims paid for the month of May to our general manager, which may possibly be of some interest to you. We handled in May 5975 pieces of baggage, with one piece damaged to the extent of \$65. We handled a little more than 33,000 individual less than car-load shipments of express matter, of which 31 shipments were lost and 24 damaged.

B. R. STEPHENS, General Traffic Manager.

## THE MASTER CAR BUILDERS' CONVENTION AT ATLANTIC CITY

The forty-second annual convention of the Master Car Builders' Association, which was held at Atlantic City, N. J., June 17-19, attracted a large number of railroad members and supply men. The exhibits this year were arranged on the new Million Dollar Pier and occupied a total space of 62,000 sq. ft. The exhibit space on the pier included the Entrance Hall, the Amusement Room, the Marine Hall, the Annex (built especially for the occasion between the meeting room and the Amusement Room), and Machinery Hall, on the south side of the Entrance Hall. All of the exhibits were under cover and protected from the weather which, fortunately, was ideal throughout the entire week.

The sessions of the Master Car Builders' Association were held in the Greek Temple or assembly room near the outer end of the pier. This room has windows on three sides and has a capacity for several hundred people. The officers elected for the ensuing year were: President, R. F. McKenna; first vice-president, F. H. Clark; second vice-president, T. H. Curtis; third vice-president, LeGrand Parish; executive committee, J. E. Muhlfield, C. E. Fuller, H. F. Taylor, J. F. Walsh, C. A. Schroyer. Five of the committee reports of especial interest to electric railway officers are abstracted elsewhere in this issue.

The entertainment committee provided a number of fine attractions during the week. Among them were Victor Herbert's orchestra on Friday evening, Vessala's band in daily concerts, a vaudeville performance on Monday night, and the two formal balls of the Master Car Builders' and the Master Mechanics' Associations on Thursday and Tuesday nights respectively.

The annual meeting of the Railway Supply Manufacturers' Association was held in the Greek Temple Saturday morning. After the presentation of addresses by the president and secretary, George A. Post, of the Standard Coupler Company, addressed the meeting. He referred to the fact that the exhibit this year was larger and better than ever before in spite of the business depression. The attendance of railway men could be attributed to the fact that the railways were not very busy and the officials were thus able more easily to visit Atlantic City. Mr. Post continued that one out of every twelve voters in the country was dependent, directly or indirectly, upon the railway business for his livelihood, yet it did not seem difficult for demagogues to create a feeling against transportation companies. The speaker believed that if those who were interested in the railroad business should stand up for their rights the talk against railroads would soon cease. The officers elected for the coming year were: President, Alexander Turner, Galena Signal Oil Company; vice-president, A. L. Whipple, Forsyth Bros. Company; treasurer, R. H. Weatherly, Scullin-Gallagher Iron & Steel Company. New members were elected to the executive committee from the third, fourth, fifth and sixth districts.

On Saturday afternoon the railroad delegates and the supply men attending the convention demonstrated their indefatigability and defied the heat by playing a vigorous and exciting game of baseball at the Inlet ball grounds. The railroad team had for their captain George W. Wildin, of the N. Y., N. H. & H. R. R., while S. W. Midgley, of the Curtain Supply Company, captained the supply men's team. The game resulted in a score of 25 to 18 in favor of the supply men. The march from the Marlboro-Blenheim to the ball grounds, with brass band accompaniment, attracted the crowds gathered on the boardwalk.

## CAST IRON WHEELS\*

The committee's attention was invited by Mr. Muhlfield (Balt. & Ohio) to the question of regulating foundry practice in the manufacture of cast iron wheels to promote uniformity of product in the different sections of the country in order that wheels applied under interchange rules, regardless of the place of manufacture, would have the same chemical characteristics as well as physical properties under the M. C. B. specifications. The importance of such action on the part of the M. C. B. Association, providing a harmonious and concerted action on the part of the wheelmakers can be secured, would greatly benefit interchange service between the railroads forming this association, particularly on account of the heavy capacity cars now in general use, but owing to the lateness of the hour at which this point was presented, and the impossibility of securing cooperation of the wheelmakers the committee does not feel that sufficient data regarding foundry practice in charging cupolas, with particular reference to the percentage of new pig iron, scrap wheels, etc., and the ladle analysis of the molten metal can be secured, unless a harmonious and concerted action on the part of the wheelmakers working jointly with your standing committee can be arranged; and their joint labors with this end in view would consume not less than one year in formulating a definite report. The committee has, therefore, no recommendations to make on this phase of the subject.

In concluding the report to the association in 1907, the committee recommended that a service record of the performance of the new wheels be maintained by the members of this association for a sufficient period of time to determine what the wheels would do under the increased wheel loads and mileage, so that, if it was desired by the association to adopt a guarantee, the actual performance of the wheels could be used in determining what the guarantee should be. After one year's experience with the new wheels, the committee is of the opinion that at least the leading railroads of this country have complied with this request and that there is now sufficient data in the hands of the individual members that can be used by the committee in framing a proposed guarantee, provided the association votes that one be framed.

## STEEL PASSENGER CARS\*

The committee appointed to report upon steel passenger cars was directed to investigate that subject and advise the association on the following five headings:

- (1) To consider the question generally, i. e., as to what is being done in this direction.
- (2) To recommend a standard sectional area for the center sills and cover plates.
- (3) To consider the relative merits of steel passenger cars with upper decks and those with a semi-elliptical section without an upper deck.
- (4) To consider the best construction of flooring.
- (5) To consider the relative merits of various materials for inside finish for fireproof construction.

While as early as 1854 designs of passenger cars were prepared by B. B. Lamothe, in which the superstructure was of metal but the ends and sills remained of wood, very little progress was made until about 1902, when the question of the use of metals was prominently brought forward, for various causes, among which may be mentioned as the most important:

- (a) The burning of wooden cars in wrecks, and frequent destruction of human life by fire.
- (b) The splintering of the large wooden sills, etc., when cars were wrecked, causing injury and death.
- (c) The scarcity of lumber suitable for sills, stringers, etc., and the threatened exhaustion of such material.

While these three conditions are the most important, there are other reasons for the use of steel which may be mentioned, as, for instance:

- (d) In collision with wooden freight cars the passenger equipment had some chance to escape from total destruction,

\*Abstract of a committee report presented at the annual convention of the Master Car Builders' Association, June 17-19.

but with the very large increase of steel freight cars this opportunity does not longer exist.

(c) Increased speeds, greater train length, and larger capacity of cars. Although the wooden cars have been improved by increasing the strength of parts affected, by the pulling and buffing stresses, by the use of metal platforms, the application of vestibule buffers, etc., yet these expedients are little better than makeshifts.

The report continues with descriptions of various composite and steel cars, including those of the Illinois Central (composite), the Pressed Steel Car Company (steel underframe and trucks), the Interborough Rapid Transit Company (all steel), Erie (all steel baggage), the New York Central (all steel motor car built by the American Car & Foundry Company), the Southern Railway (composite passenger coach built by the Pressed Steel Car Company), the Pennsylvania Railroad (all steel cars, 56½ feet and 70 feet in length), the Harriman lines (Southern Pacific and Union Pacific, all steel cars), the Long Island Railroad, the Santa Fé (postal car), the St. Louis and San Francisco (baggage, mail and express cars), the Union Pacific (motor cars), and the Pullman Company (sleeping car). Nine of these designs are illustrated by plates accompanying the report.

A general idea of the extent to which the all-steel principle is being applied to this class of equipment may be obtained from the following statement. This statement is not necessarily complete, but covers all the different motor type of cars of which the committee could learn:

TABLE NO. I.—LIST OF ROADS USING STEEL CARS.

Road	No. Cars.	Service.	Built.
Interborough Rapid Transit.....	300	Subway electric.....	1904
Long Island Railroad.....	134	Suburban electric.....	1905
New York Central.....	125	Suburban electric.....	1906
Hudson Terminal.....	50	Subway electric.....	1907
Rock Island.....	1	Motor for surface tracks.....	1907
Lackawanna.....	1	Motor for surface tracks.....	1907
Interborough Rapid Transit.....	50	Subway electric.....	1907
New York & Queens County.....	40	Trolley electric.....	1907
Union Pacific.....	20	Gasoline motor for surface tracks.....	1906-7
Boston Elevated.....	45	Electric elevated.....	1907
Philadelphia Elevated.....	80	Elevated and subway electric.....	1906
Union Pacific.....	22	Gasoline motor (Under construction).	

#### EUROPEAN STEEL CAR CONSTRUCTION.

While steel underframe cars have been in use in Europe for 40 or 50 years, or perhaps longer, there are very few passenger cars being built in any of the shops visited in the various countries enumerated, in which passenger cars were built, with steel upperframes as well as with steel underframes, the general practice being to place a wooden body on a steel underframe and covering the outside of the body with 1/16-in. steel plates, which gives the appearance of the steel car, these steel cover plates being secured with small screws to the wooden posts, sill and braces.

The underframe is constructed in numerous ways, some being of the fish-belly type, made either in pressed steel or of plates and angles, and the other types being usually I-beam or channel side sills held from deflection by means of truss rods in the way usual on wooden cars. The construction of these underframes is, however, of such nature, due to the quite different way in which the draft riggings are applied to European cars, that nothing of importance can be learned from them, the draft arrangements being of the continuous type and the buffing stresses being taken on side buffers.

A notable feature in connection with European cars is that all trucks, whether 4-wheel or 6-wheel, used on the latter equipment are made of steel, no wooden trucks being used. The steel trucks are of various constructions, but the majority are of pressed steel of either the Fox type or types resembling the Fox. A number of trucks are, however, in use in which the side framing and cross framing are composed of I-beams, channels and angle irons.

As far as could be learned by conversation with engineers and builders of railroad cars, no consideration or study is being given to the development of an all-metal passenger car, and no attempt is even being made to utilize the steel plates on the outside to carry part of the lading, the total load being carried on the underframe, regardless of the construction of the upper framing.

The development of a steel passenger car from what has been said in regard to what is being used abroad, may be considered an American innovation of the last few years. On account of the lack of available data the progress has necessarily been slow, and generally of what may be called an experimental nature.

The development in steel motor cars seems to have been more rapid than in steel railway cars. This is probably due to the fact that the service in which the motor equipment is used is such as to make protectionary measures against injury from fire of primary importance; whereas, with the steam cars the development seems to have been retarded for the same reasons which were advanced against the steel freight cars when they were first introduced—i. e., first cost, excessive weight, difficulties of repairs, corrosion, etc., limiting the life of the cars. These objections have, however, been—through the experience obtained with steel freight cars—practically eliminated; as, for instance, the cost, which was the feature given the most consideration, is now not so important as the question of providing a car sufficiently strong for the service regardless of a somewhat increased first cost.

The increased cost of a steel passenger car over a wooden car of the same general construction and size, and with the same specialties, should not be very great when a number of cars of the same design and general type are built. The few, of what might be called sample cars of steel, enumerated herein, which have been built in the past, have, of course, been very costly as compared with wooden cars, but this has been due to the great cost of getting up designs, appliances, etc., for their manufacture, all of which will be greatly reduced in the future, and especially on larger orders for cars. It should always be borne in mind when the use of steel cars is contemplated, that such cars may be obtained at very much less cost if some type of car is decided upon, of which cars have already been built, instead of making new designs, often embodying a number of changes more or less important, which in many instances could be dispensed with.

The question of weight of steel passenger cars was perhaps the next important consideration, but from what has already been accomplished the problem seems to have been solved, and if proper care is exercised in the design, so as to place the material in the car to the best advantage for strength, etc., there is no reason at all why the construction of cars containing all steel, or steel and partly non-inflammable material, can not be produced, which cars would be much stronger than wooden cars, and with practically no increase of weight per passenger as compared with the wooden cars of the same general type and capacity.

In Table No. II. is given a comparison between some typical wooden coaches with three of the all-steel design of coaches, and this comparison shows quite favorably for the steel car when the column giving weight per passenger is considered, and this is the only true basis for consideration. It is possible that still better results may be obtained in the future without the sacrificing of strength.

TABLE NO. II.—COMPARISON OF STEEL AND WOODEN CARS.

Class or No.	Road.	Material.	Length over body ft.	Seat capacity.	Weight.	Weight per passenger.	Weight per foot.
290-295	Lehigh Valley ..	Wood	70	77	118,000	1,530	1,685.7
1015-51	Frisco .....	"	70	80	106,200	1,327	1,517.1
P. L.	Pennsylvania ..	"	70	80	106,000	1,325	1,514.3
1st class	N. Y. C. Lines..	"	61	76	92,800	1,221	1,521.3
P. K.	Pennsylvania ..	"	53.75	62	85,000	1,373	1,581.5
Average.....			64.95	75	101,600	1,355.4	1,563.9
P-70	Pennsylvania ..	Steel	70.75	88	116,100*	1,319	1,652.6
Coach	Southern Pacific ..	"	60	70	107,000†	1,528	2,546.6
Coach	Union Pacific....	"	68	78	89,300†	1,145	1,313.2
Average.....			66.25	78.6	104,133	1,330.6	1,837.046

\*Includes storage batteries.

†Includes storage batteries and axle generator.

The life of steel passenger cars is yet to be determined, but judging from experience obtained abroad with steel underframes in passenger cars, which, as stated before, have been in use for some 40 or 50 years, and some of which have been in service for 25 to 30 years, as well as from the experience already obtained in this country with steel freight cars, some of which were placed in service as early as 1884 and are still in service, it would seem that a carefully designed and constructed steel passenger car, in which the tendency toward loose rivets will be reduced to a minimum, should last a great number of years, depending upon



how long a structure of this kind can be preserved with paint and other means of preventing corrosion. It is generally supposed that passenger cars of steel will receive better attention than freight cars; at least, such has been the experience with the wooden car equipment. The rivet work is, however, a feature which should receive special attention, for if the construction is such as to permit vibration or deflection, producing undue stresses not anticipated or provided for, trouble may be expected.

It is also felt that the rivet heads should not be considered as an objection when used in the exterior finish of the car, as they may be neatly arranged with respect to size of heads, location, etc., and, further, to countersink the rivets is objectionable in thin plates on account of decreased strength and liability to work loose; but, on the other hand, rivet heads have been found, in European practice at least, to gather around them a great deal of dirt, difficult to remove and maintain a good appearance on the exterior of the car. It would therefore be for the designer, as well as for the users of cars, to decide as to which is the most preferable. European practice seems to favor the use of the countersunk heads where practicable, and the ordinary rivet heads where less objectionable to the finish of the car and where they cannot be successfully avoided without increasing the material or other complications.

Mechanical officers of railroads differ greatly at present as to the best methods in design for overcoming the objectionable features of the wooden passenger cars. Varying local conditions existing on roads on which steel cars have been put in service also had much to do with the widely different forms of design and construction that have so far been made use of in this country.

In a general way, however, the steel equipment already in service can be identified under one of three forms:

(1) Cars with steel underframing and wooden superstructure somewhat similar to the methods employed in modern steel freight car construction, in which the underframing is of steel.

(2) Cars with steel underframing and steel upperframing, such as posts, braces and carlines; the rest of the material being of wood, or part fireproof material; or, in other words, a "composite" car, with perhaps steel on the outside in place of wooden siding.

(3) All-steel cars—that is, cars made up of steel or metal throughout, with the possible exception of small quantities of wood and fireproof material for filling blocks, insulation and interior finish, such as mouldings, etc.

A summary will show that the steel car equipment for steam railroads now in service or under construction, and coming within the scope of this report, is composed of about 380 units. Nine railroads and four or five car companies figure more or less in the operation and production of these cars. The greatest development is shown in the East, which is no doubt stimulated by the many tunnels in and around New York through which the cars of steam railroads will pass, and in the construction of which cars steel and fireproof materials are considered to be essential in order to insure safety.

#### STRENGTH OF FRAMING.

In collisions between passenger and freight cars the passenger cars should not be seriously damaged, which requires the passenger car center sill construction to be at least as strong as that of the strongest freight cars. For passenger cars it is advisable to use a higher factor of safety, therefore the center sill construction in passenger equipment cars, used in through trains should be capable of withstanding a shock of 150,000 pounds on the draft gear and 250,000 pounds on the buffers, making a total of 400,000 pounds compression, in which the combined stresses should be 12,500 pounds per square inch, and in no case exceed 15,000 pounds per square inch. For cars used strictly in suburban service—in comparatively short trains with coaches of the same size—the fiber stress might be increased to 20,000 pounds, but this figure should not be exceeded.

#### UPPER DECKS VERSUS SEMI-ELLIPTICAL ROOFS.

As there is such a radical difference of opinion in the committee as to the relative merits of steel passenger cars with upper decks, and those with semi-elliptical section without upper deck, it seems wise and proper to place before the association the claims of the advocates of each type of roof.

For purposes of discussion the subject naturally resolves itself into: (1) relative strength; (2) relative safety; (3) appearances—inside and out; (4) cost and economy; (5) ventilation.

A marked difference of opinion of prominent railroad mechanical men and designing engineers has been developed. Some have criticized the semi-elliptical roof on account of the lack of ventilation and inartistic appearance. Others are strongly in favor of this departure from the upper deck, on account of claimed superior strength, appearance, cheapness and economy of construction, and more particularly on account of its claim for having superior ventilating facilities.

The principal arguments for and against the present generally adopted form of upper-deck roofs on American railroad cars are so directly contradictory and at variance that your committee deems it difficult and unwise to attempt to draw conclusions, leaving it for time and public sentiment to bring about the survival of the fittest.

#### FLOORING.

A metal or metal and composite construction should be used for floors, particularly in cars of steel design, to eliminate, as far as possible, injury done by wheels or parts of trucks or any outside substance punching through same in case of an accident.

Many of the designers and builders to-day are using nothing but a plain or special corrugated steel or iron sheet extending from side to side of car. This, of course, affords but very little protection from outside interference in case of wreck. To this corrugated steel floor a plastic floor is applied, mostly composed of sawdust and magnesia cement.

Coverings called under various trade names, such as Monolith, Karbolith, Asbestolith, Acondolith, Flexolith and other mortarlike combinations of asbestos and cement, have been used in combination with steel plates, wire netting and rolled shapes.

The requirements for maximum insulative properties against sound and heat are probably met in most of these products equally well. These, however, are requirements that are most essential in passenger car work and too much stress cannot be laid upon them. It is expected, however, that their surfaces should be impervious to hot or cold water, and be frequently flushed and cleaned without deterioration of the material constituting the floor.

Your committee does not believe that it is within its province to recommend a standard floor construction, but suggests that the floor construction of a steel passenger car should embody elements to obtain the following results: Fireproof surfaces—outside and inside; resistance against loose brake gear, wheels, etc.; resistance against transverse and diagonal strains; resistance against breakage from vibration; non-conductor of heat; minimum of weight; non-conductor of sound; satisfactory walking and wearing surface.

#### MATERIALS FOR INSIDE FINISH FOR FIREPROOF CONSTRUCTION.

The committee considers that, as a general proposition, the most desirable materials for inside finish for steel passenger cars should have the maximum advantages as to durability, non-inflammability, insulating qualities, non-hygroscopic qualities, lightness, neatness of appearance and reasonable initial cost.

It is conceded that the material which meets most of these requirements is light sheet steel. This material is not always feasible for use in all locations. Artificial board, aluminum, and in some cases fireproofed wood or other material, are often better suited for interior finish above the window sills and for the head lining. Aluminum has the advantage of lightness, but it is comparatively expensive.

Interlocking sheet steel sheathing has been recommended for interior finish between floor and window sills.

Brass and copper might be used with good effect, but to most railroads the price is prohibitive.

For moldings, finishing pieces, etc., very serviceable and adequate material may be procured in drawn steel and aluminum.

There are many kinds of artificial boards on the market, more or less fireproof and all hygroscopic with the exception, possibly, of Transite. Unfortunately, with most of these the fireproof qualities are in inverse ratio to the hygroscopic qualities. These artificial boards are made up from different bases of asbestos, wood pulp, etc., combined

with cement and other ingredients. The artificial materials which have been mostly used are Transite, Durite, Fiberite, Uralite, Vitribestos, Indestructible fiber, composite board, service board and Agasote (impermeable mill board).

Fireproofed wood is not generally recommended for interior finish for the reason that the fireproofing chemicals are apt to exude and spoil the finish, and the process at present is not always permanent. To be properly fireproofed the weight of the wood should be materially increased by reason of the chemical treatment, and these chemicals also corrode any steel, wood screws, nails, etc., which come in contact with them.

One of the most important features for inside finish is insulation against heat and cold. Not only should an air space be provided between inside and outside finish, but any metallic substance used for inside finish should be backed up with some non-conductive material. Steel or Aluminum plates backed up with Ceilinite, an asbestos cloth, have been tried.

The whole question of material for inside finish from a standpoint of insulation against heat and cold, has not been thoroughly worked out, and is a subject to which manufacturers should give prompt attention, looking toward the speedy production of a serviceable product that is permanently fireproofed.

### SIDE BEARINGS AND CENTER PLATES\*

The committee reviewed and gave a synopsis of reports on side bearings and center plates made to the association in the past, since and including 1900.

The recommendations of the committee are as follows:

Friction should be reduced as much as possible, and as hardness and rigidity of form have a direct bearing on this, and ample strength being important, your committee recommends the use of cast steel center plates for large capacity cars and malleable iron or cast steel center plates for smaller capacity cars.

Your committee believes that it is desirable to lubricate ordinary center plates and recommends that this be done at frequent intervals.

Taking into consideration the information which we have received as to the durability of anti-friction center plates, your committee cannot now recommend their use as the standard practice of the association, but consider further investigation desirable.

While the resistance of the trucks to turning might perhaps be reduced by placing the side bearings nearer to the center plate than is the common practice, the tendency of the car to roll would be increased.

Your committee recommends adopting as standard for passenger cars:

A spread of 88½ inches center to center of side bearings on six-wheel passenger car trucks with outside bearings.

A spread of 60 inches center to center of side bearings on four-wheel passenger car trucks.

That side bearings on passenger cars be placed just in contact but carry no load.

The various designs of trucks and bolsters in use, and the tendency to use steel construction, make it impracticable to recommend standard heights of side bearings or their height relative to the height of the center plate on passenger cars.

The investigations of your committee warrant it in stating that the use of anti-friction side bearings will reduce flange wear and lessen the probability of derailment.

As it is not proper to recommend as a standard any specific patented device, your committee recommends only, for passenger and heavy capacity freight cars, the use of side bearings embodying the anti-friction principle in any form that insures simplicity and durability to the greatest possible extent.

There is evidence that derailments have in many instances resulted from the use of the side bearings carrying too great a proportion of the load when used with rigid underframes, and from the binding of improperly constructed center plates and side bearings, which causes the wheel flanges to crowd and climb the rail.

The greatest practical freedom of movement of the trucks

which allows of their adjusting themselves to curvature and inequality of track is believed by your committee to be of vital importance, not only because there is less probability of derailment, but also because wheel flange wear and the danger from broken wheels is diminished.

Your committee therefore calls the attention of members to the importance of this matter and recommends to the association that an appropriation be made for the purpose of conducting further tests, not only of various forms of common center plates and side bearings, but also of different types of anti-friction center plates and side bearings. Tests should be made for the purpose of determining the best location of side bearings.

Your committee urges that tests be made of both new center plates and side bearings and such as have been in service under various conditions for a considerable length of time, and further recommends that such tests be conducted at one of the engineering universities, under the direction of a committee appointed by the association.

### BRAKE SHOE TESTS\*

It will be remembered that the association has definite specifications covering the frictional qualities of brake shoes, and that the work of the committee, during recent years, has been confined to testing shoes under these specifications. The effect of this work has been to stimulate interest in the brake-shoe problem, and to make of record information concerning the action of shoes on both cast iron and steel wheels. The fact that your committee has reported that most shoes recently tested have met the requirements of the association's specifications, may be accepted as evidence that its work has been effective in improving the friction of shoes sold to railway companies. Two years ago your committee called attention to the need of information concerning the wearing qualities of brake shoes, and under authorization from the executive committee, initial steps were taken to establish tests which would serve as a measure of wear. Proceeding, your committee's report of last year was devoted almost exclusively to a discussion of methods and to the presentation of results obtained from fifteen different shoes when exposed to wear under a definite programme. The results, which were obtained by exposing the shoe to wear under a single set of conditions only, showed great variation in the wearing qualities of the several shoes tested. The purpose of your committee during the present year has been to throw light upon the wide variations noted last year. To this end arrangements were entered into with the authorities of Purdue University to extend the work along the lines of last year's investigations. Out of the fifteen shoes dealt with in last year's report, there were nine presenting sufficient material to serve under the programme of the present year.

Each of the nine shoes has been tested, both upon a cast iron wheel and upon a steel-tired wheel; first, when applied under a lighter pressure than that employed last year, and second, when applied under a heavier pressure than that employed last year. Also since the tests last year were upon cast iron wheels only, the programme of that year has been repeated upon the steel-tired wheel. In the actual working out of the programme, each shoe was tested under a normal pressure of 1080 lb. and 4152 lb. on a cast iron wheel, and under pressures of 1080, 2808, and 4152 lb. on a steel-tired wheel. The cycle, as controlled by gear B, was used for the tests under pressures of 1080 and 2808 lb., and that, as controlled by gear A, was used for the heaviest pressure, 4152 lb., this change being necessary to give the shoe sufficient time to cool between applications. When the cycle is controlled by gear A, the shoe is in contact with the wheel during 150 r.p.m., and is out of contact during the succeeding 1450 r.p.m., the shoe being applied once during each 1600 r.p.m. of the wheel. When the cycle is controlled by gear B, the shoe is in contact with the wheel during 190 r.p.m., and is out of contact during the succeeding 610 r.p.m., the shoe being applied once for each 800 r.p.m. of the wheel.

The speed in all cases was equivalent to 20 m.p.h.

\*Abstract of committee report presented at the annual convention of the Master Car Builders' Association, June 17-19.

\*Abstract of committee report presented at the annual convention of the Master Car Builders' Association, June 17-19.

WEAR OF BRAKE SHOES—M. C. B. STANDING COMMITTEE ON BRAKE SHOE TESTS—1908

Lab'y No. of Shoe	Railroad submitting shoe	Designating name of Shoe	Description of Shoe	Area of Shoe Face in Sq.in.	Percentage of Shoe Face			1908 report—1907 report		Comparative Durability		1907 report		Lab'y No. of shoe
					Insert	Chilled	Unchilled	Wear of Shoe in lbs. per Million ft. lbs. of work absorbed	Steel Tire	Chilled Wheel	Load on Shoe 2808 lb. Speed 20 miles per hour	Million foot-pounds of work absorbed per pound of shoe wear	Mean Coefficient of Friction	
200	L. S. & M. S.	Streeter	Cast Iron Body—white iron inserts.	45	37	0	63	0031	0032	0031	312.5	387.	22.7	200
163	A. T. & S. F.	U Diamond	—chilled ends and expanded steel inserts.	53	30	13	57	0028	0042	0044	238.1	350.1	21.7	163
158	Hocking Val	Streeter	—white iron inserts.	31	32	0	68	0034	0045	0052	222.1	407.2	22.5	158
194	L. S. & M. S.	Congdon	—oblong wrought steel inserts.	37	40	0	60	0027	0047	0059	212.4	554.6	26.5	194
161	Hocking Val	Streeter	—white iron inserts.	31	32	0	68	0043	0086	0194	116.3	146.6	21.8	161
172	A. T. & S. F.	Seaton	—circular wrought steel inserts.	42	12	0	88	0043	0100	0144	100.0	258.2	22.8	172
183	D. M. & N.	Pittsburgh	Pressed Steel Shell. Composition filling.	47	Shell 22 filling	0	78	0090	0100	0144	100.0	173.8	38.7	183
205	L. S. & M. S.	Pittsburgh	Unchilled Cast Iron.	47	Shell 30, filling	0	64	0090	0139	0162	71.9	92.0	23.5	205
179	W. & L. E.	Pittsburgh	Malleable Iron Shell. Composition filling.	44	Shell 30, filling	64	64	0130	0116	0232	86.2	114.3	20.0	179

CONCLUSIONS CONCERNING WEARING QUALITIES.

(a) The shoes tested present great variations in the wearing qualities, the ratio between the poorest and the best shoe being as great as 1 to 4.

(b) The relative resistance to wear exhibited by different shoes is somewhat affected by the severity of the application. Of a series of shoes, the one which suffers least from wear at light pressure may not be the one which suffers least under a heavy pressure. Variations of this sort are, however, of small value, and if standards of performance are not too minutely defined, they may be neglected.

(c) Within limits employed by the committee, whatever may be the pressure, the results clearly distinguish between the slow wearing and the rapid wearing shoe.

(d) All shoes tested wear more rapidly on a steel-tired wheel than on a cast-iron wheel. In general terms it may be said that for the absorption of a given amount of work, the wear upon steel-tired wheels is twice as rapid as upon cast-iron wheels.

(e) The results attest the value of the insert shoe. The work of this year was chiefly confined to shoes of this type because the solid shoes had been worn out by the tests to which the series had previously been subjected.

(f) It is noteworthy that the four shoes showing least wear, 158, 163, 194 and 200, on both steel and cast-iron wheels, are all insert shoes, and that all practically meet the association's specifications as to frictional qualities.

It is not the purpose of your committee to attempt at this time to frame a specification governing the wearing qualities of brake shoes, though the data presented seem to supply a satisfactory basis for such a procedure. We suggest, however, as a matter for further deliberation, the following qualifications:

(a) That tests designed to determine the wearing qualities of brake shoes be run under a constant brake-shoe pressure of 2808 lb.

(b) That the cycle of operation be 1600 r.p.m., 150 r.p.m. being with the shoe in contact with the wheel, and 1450 r.p.m. being with the shoe in release.

(c) That the peripheral speed of the test wheel be 20 miles an hour.

(d) That under the conditions stated, a shoe should develop for each pound of metal worn away, 350,000,000 ft.-lb. of work in contact with a cast-iron wheel, and 200,000,000 ft.-lb. of work in contact with a steel-tired wheel.

A specification framed along these lines would pass four out of the nine shoes tested for service on both cast-iron and steel-tired wheels.

Your committee believes that the work of the present year leaves two questions open which should be settled beyond doubt before a specification governing wearing qualities should be adopted. These are: (1) A confirmation of the general conclusions based upon the work of the present year; and (2) investigations which will disclose the effect of different brake shoes upon the wheel. With reference to the confirmation of the results of the present year, it would seem wise that not less than 15 newly selected representative shoes be tested, the program of operation being identical with that employed this year. The results of such tests added to those now available would give a volume of data sufficient to permit limits to be set defining performance, which would be safe and reasonable. The importance of determining the effect of the shoe upon the wheel becomes apparent when one considers the possibility of a shoe showing a high resistance to wear, which may, in fact, be protected at the expense of wear upon the wheels. In discussing this matter last year, your committee expressed its regret "that no measure has yet been made which will disclose the wear of the wheel under the influence of the shoe." To secure such a measure it will be necessary to have a balance of sufficient capacity to weigh a wheel of 700 lb. and of such delicacy as to indicate differences of weight as small as 1-500 part of a pound. No such balance is now available at the laboratory.

[The accompanying table has been compiled by F. W. Sargent, chief engineer of the American Brake Shoe & Foundry Company, and gives the principal results of the tests on steel wheels this year as well as the result on cast-iron wheels last year. A similar table compiled last year by Mr. Sargent was published in the STREET RAILWAY JOURNAL for Aug. 3, 1907.—Eds.]

RULES ADOPTED FOR INDIANA INTERURBAN ROADS

The Railroad Commission of Indiana and representatives of interurban electric railways of that State approved on June 5 a new code of rules formulated by committees of managers of the companies with the co-operation of inspectors of the commission. These rules are intended to govern the operation of the interurban electric roads in Indiana, and they comprise directions for the operation of trains, the track and roadway department and the maintenance of overhead lines. In preparing the rules for train operation the committee which had that feature of the book in charge used as a basis the code adopted by the Central Electric Railway Association. The territory of this association includes the State of Indiana, and in anticipation of the adoption of this revised code, a committee of members of the association, composed of managers of Ohio electric railways, was named to take up the subject on behalf of the lines in their State. This committee has not yet taken any action.

The rules adopted by the Street Railway Association of the State of New York were published in the ELECTRIC RAILWAY JOURNAL for Sept. 28, 1907. The Indiana rules follow in full:

RULES AND REGULATIONS FOR THE GOVERNMENT OF EMPLOYEES OF THE TRACTION COMPANY.

Rule book No. .... This book is the property of the ..... Company and is issued to ..... Name ..... Position ..... Division ..... Who hereby agrees to return it to the proper officer of the company when called for, or upon leaving the service.

GENERAL NOTICE.

To enter or remain in the service is an assurance of willingness to obey the rules. Obedience to the rules is essential to the safety of passengers and employees, and to the protection of property. The service demands the faithful, intelligent, and courteous discharge of duty. To obtain promotion, capacity must be shown for greater responsibility. Employees, in accepting employment, assume its risks. The rules herein set forth are for the government of the employees of the ..... Company, have the approval of the Railroad Commission of the State of Indiana, and become effective ..... superceding all previous rules and instructions where they conflict with the same. Special instructions may be issued from time to time by proper authority.

(Name) ..... (Title) .....

GENERAL RULES.

- Have copy of rules. 1. The head of each department must be conversant with these rules, supply copies of them to his subordinates, see that they are understood, enforce obedience to them, and report to the proper officer all violations thereof and the action taken thereon. 2. The reputation and success of this company depends greatly upon the care and promptness with which its business is conducted and the manner in which its patrons are treated by its employees. 3. In addition to these rules, bulletin orders and time tables will be issued from time to time, containing such special instructions as necessity demands. 4. .... will be the custodian of switch keys and will be held strictly responsible for their distribution, delivering them to such persons as are required to use them in the performance of their duty, and taking receipt therefor on forms provided for that purpose.

Switch keys. 4. .... will be the custodian of switch keys and will be held strictly responsible for their distribution, delivering them to such persons as are required to use them in the performance of their duty, and taking receipt therefor on forms provided for that purpose. Employees to whom switch keys have been delivered will be held responsible for their use and must report at once any loss of same. All employees must report at once in writing to their superior officer any misuse of a switch key, or any person having a switch key in his possession who is not so entitled, and it shall be the duty of such superior

- officer to see that any such switch key or keys are recovered and returned to ..... A deposit of \$..... will be required to guarantee the return of switch keys, badges, and rule book and other property of the company upon leaving the service. Importance of enforcement of rules. 5. It is imperative that all rules for the government of employees should be strictly enforced by the heads of departments, and obeyed by employees. 6. When an employee is discharged from the company's service, he shall not be re-employed without the approval of the general manager. Employees governed by rules. 7. All persons authorized to transact business or engaged in performing any service at stations or on trains are subject to the rules governing the employees of the company. Intoxicants. 8. The use of intoxicants while on duty is prohibited. Tobacco. 9. The objectionable use of tobacco by employees when on duty in or about stations, passenger or freight cars, is prohibited. Uniforms. 10. Employees on duty must wear the prescribed badge and uniform, and must be neat in appearance. Bulletins. 11. Employees are required to be familiar with the rules and with every order issued. Current time tables. 12. Employees engaged in the movement of trains must provide themselves with a copy of the current time table and always have same with them when on duty. Lost articles. 13. An employee finding a lost article in the cars, stations or on the property of this company will forward same to the proper officer. Packages. 14. Employees must not carry packages, letters, or newspapers, for any one not having business with the company, without an order from the proper authority. Authority at barns. 15. All trainmen will be under the direction and control of the ..... or his authorized agent when their cars are in or about the car house. Protect company's property. 16. In case of danger to the company's property, employees must unite to protect it. Safety of employees. 17. Each employee is expected and required to look after and be responsible for his own safety, as well as to exercise care to avoid injury to others. Gambling. 18. All forms of gambling, including bets, raffles, etc., are forbidden upon premises, or cars of the company. Reading on duty. 19. Reading newspapers, letters, or other matter when on duty, except to consult orders, rules, and time tables, is prohibited. Employees occupying seats. 20. Employees, when passengers on a train, must not occupy seats to the exclusion of other passengers. Report whatever affects interests of company. 21. Whenever it shall come to the knowledge of any official or employee of the company, by published notice or otherwise, that any work or improvement is proposed by any county, township, municipal or other authority, which in any way affects the company all information upon the subject must at once be sent to the superintendent, together with the notice, if any served, in the matter. Examinations. 22. All persons employed in any branch of the service involving the use of signals or the movement of cars or trains will be required to pass an examination by one of the authorized examiners of the company as to hearing, sight and ability to distinguish colors, and other required examinations. Department. 23. The use of boisterous, profane, or vulgar language by employees around or on the premises of the company is strictly forbidden. Resignation. 24. Employees on leaving the service of the company must sign receipt for their final pay, and return all the company's property with which they have been entrusted. Assignment of wages. 25. Assignment of wages by an employee is prohibited, and will be cause for dismissal. The attaching of an employee's wages by garnish-

ment process or proceedings in aid of execution, will be considered sufficient cause for dismissal unless a satisfactory explanation is given.

**Conduct toward public.**

26. In all matters not fully covered by these rules and regulations, employes must bear in mind that they are engaged in a public service, in which they are constantly called upon to exercise great patience, forbearance and self-control. Politeness and courtesy continually practised by employes will prevent controversy and complaint, and greatly benefit the service.

**Laws of Indiana.**

27. All laws of the State of Indiana governing common carriers and applicable to interurban operation must be observed. Extracts from important laws will be found in the back of this book.

**DEFINITIONS.**

**Train.**

28. A motor or more than one motor coupled with or without cars, displaying markers.

**Scheduled train.**

29. A train represented on the time table. It may consist of sections.

30. One of two or more trains running on the same schedule displaying signals, or for which signals are displayed.

**Extra train.**

31. A train not represented on the time table. It may be designated as:

- EXTRA—For any extra train except work extra.
- WORK EXTRA—For work train extra.

**Superior train.**

32. A train having precedence over other trains. A train may be made superior to another train by right or class.

RIGHT is conferred by train order; class by time table.

RIGHT is superior to class.

**Train of superior right.**

33. A train given precedence by train order.

**Train of superior class.**

34. A train given precedence by time table.

**Time table.**

35. The authority for the movement of scheduled trains subject to the rules. It contains the classified schedules of trains, with special instructions relating thereto.

**Schedule.**

36. That part of a time table which prescribes the class, direction, number and movement of a scheduled train.

**Main track.**

37. A principal track upon which trains are operated by time table, train orders, or block signals.

**Single track.**

38. A main track upon which trains are operated in both directions.

**Double track.**

39. Two main tracks, upon one of which the current of traffic is in a specified direction and upon the other in the opposite direction.

**Current of traffic.**

40. The direction in which trains will move on a main track, under the rules.

**Station.**

41. A place designated on the time table by name or number, at which a train may stop for traffic; or to enter or leave the main track; or from which fixed signals are operated.

**Siding.**

42. A track auxiliary to a main track for meeting or passing trains.

**Meeting point.**

43. A place where opposing trains, i. e., trains moving in opposite directions, meet by schedule or train order.

**Passing point.**

44. A place where trains moving in the same direction pass by schedule or train order.

**Fixed signal.**

45. A signal of fixed location, indicating a condition affecting the movement of a train.

"Fixed signals" cover such signals as whistle boards, slow boards, stop boards, yard limits, switches, blocks, semaphores, or other means for indicating whistle, stop, caution, or proceed.

**Yard.**

46. A system of tracks within defined limits provided for the making up of trains, storing cars, and other purposes, over which movements not authorized by time table or by train order may be made, subject to prescribed signals and regulations.

**Yard motor.**

47. A motor or motors consigned to yard service and working within yard limits.

**Pilot.**

48. A person assigned to a train when the motorman or conductor, or both, are not fully acquainted with the physical characteristics, or running rules of a road, or portion of a road over which the train is to be moved. The responsibility of the pilot is the same as that of a motorman or a conductor.

**Automatic block system.**

49. A block system in which the signals are operated by electric, pneumatic or other agency actuated by a train, or by certain conditions affecting the use of a block.

**Home signal.**

50. A fixed signal controlling the entrance to a block or governing movements over switches at interlockings.

**Distant signal.**

51. A fixed signal used in connection with home signals to regulate the approach to the home signal.

**Advance signal.**

52. A fixed signal placed in advance of the home signal or switches at an interlocking to control the entrance to the block ahead.

**Dwarf signal.**

53. A low fixed signal with small semaphore arm.

**Pot signal.**

54. A revolving fixed signal.

**STANDARD TIME.**

**Standard time.**

55. Nintieth meridian or central standard time is the standard time of this company.

**Reliable Watches.**

56. Watches that have been examined and certified to by a designated inspector must be used by dispatchers, station masters, conductors, motormen, flagmen, yardmen, section foremen, and line foremen.

**Form of certificate.**

57. (Name) ..... Company  
This is to certify that on ..... 19.....  
the watch of .....  
employed as .....  
was examined by me.

It is correct and reliable, and in my judgment will, with proper care, run within a variation of 30 seconds per week.

Name of maker ..... Brand .....  
No. of movement ..... Metal of case .....  
Stem or key wind .....  
Open or hunting case .....  
Old or new .....  
If rejected, state reasons.....

Signed.....  
Watch inspector.

Address.....

**Comparing time and registering.**

58. Motormen and conductors must call for and receive standard time from the train dispatcher before taking their runs and must compare their watches before starting on each portion of their day's run, with each other, and register their names, the time at which they compared their watches, and note any variation on the daily registration sheet.

**Variation allowed.**

59. If the variation be in excess of thirty (30) seconds per week, they must report the fact immediately to the superintendent.

**Standard clocks.**

60. The clock in the dispatcher's office, at..... and such others as may be hereafter designated, are standard clocks.

**Station clocks.**

61. When station clocks are provided, station agents must see that they show correct time; but trainmen must not take time from such clocks unless they are designated as standard clocks.

**TIME TABLES.**

**Receipt of time tables.**

62. Copies of time tables will be furnished to trainmen, yard and road masters, and all others concerned. Receipt of same must be acknowledged to the superintendent on the prescribed form before the time table takes effect. These receipts will be filed in the superintendent's office. Proposed change of time table will be hulletined at last twenty-four (24) hours in advance.

**Supersedeure of time tables.**

63. Each time table, from the moment it takes effect, supersedes the preceding time table and all special instructions relating thereto, or conflicting therewith, and trains shall be run as directed thereby subject to the rules.

**Forfeiture of right and class.**

64. A train of the preceding time table thereupon loses both right and class, and can thereafter proceed only by train order.

**Arriving and leaving times.**

65. Not more than two times are given for a train at any station; where one is given, it is, unless otherwise indicated, the leaving time; where two, they are the arriving and leaving times.

**Where time applies.**

66. Unless otherwise indicated, the time applies to the siding; where there is no siding, it applies to the place from which fixed signals are operated; where there is neither siding nor fixed signals, it applies to the place where traffic is received or discharged.

**Scheduled meeting points.**

67. Scheduled meeting or passing points are indicated by figures in full-faced type; the number or numbers of trains they are to meet or pass are shown in small type above or below the full-faced type.

**Indication of meeting and passing times.**

68. Both the arriving and leaving times of a train are in full-faced type when both are meeting or passing times or when one or more trains are to meet or pass between those times.

**Stops not indicated.**

69. On the employees' time table, the figures given at intermediate stations shall not be taken as indicating that trains will stop, unless the rules require it.

**Designation of trains.**

70. Trains are designated by numbers and their class is indicated on the time table.

**SIGNAL RULES.**

**Who must have signals.**

71. Employees whose duties may require them to give signals, must provide themselves with the proper appliances, keep them in good order, and ready for immediate use.

**Flags and lamps.**

72. Flags of the prescribed color must be used by day, and lamps of the prescribed color by night.

Night signals.

73. Night signals are to be displayed from sunset to sunrise. When weather or other conditions obscure day signals, night signals must be used in addition.

VISIBLE SIGNALS.

Color signals.

Color.	Indication.
(a) Red.	Danger. Stop.
(b) Yellow.	Caution. Proceed under perfect control, and for other uses prescribed by the rules.
(c) Green.	Safety. Proceed, and for other uses prescribed by the rules.
(d) Blue.	See rule 97.

Fusee.

75. A fusee on or near the track burning red must not be passed until turned out, and train must then proceed with caution until assured that track is clear.

Hand, flag and lamp signals.

Manner of using.	Indication.
(a) Swung across the track.	Stop.
(b) Raised and lowered vertically.	Go ahead.
(c) Swung vertically in a circle across the track when the train is standing.	Back.
(d) Swung vertically in a circle at arm's length across the track, when the train is running.	Train has parted.
(e) Swung horizontally in a circle, when the train is standing.	Apply air brakes.
(f) Held at arm's length above the head when train is standing.	Release air brakes.

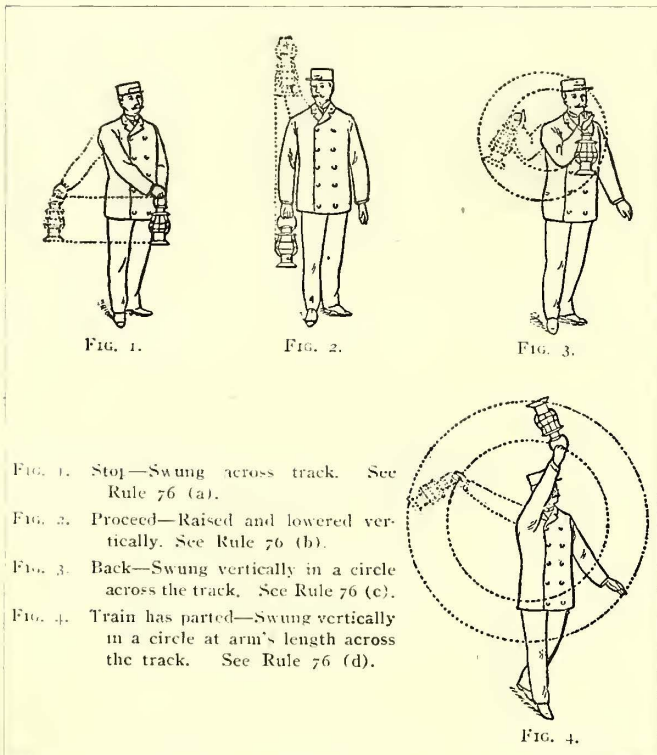


FIG. 1. Stop—Swung across track. See Rule 76 (a).  
 FIG. 2. Proceed—Raised and lowered vertically. See Rule 76 (b).  
 FIG. 3. Back—Swung vertically in a circle across the track. See Rule 76 (c).  
 FIG. 4. Train has parted—Swung vertically in a circle at arm's length across the track. See Rule 76 (d).

Violent signals.

77. Any object waved violently by anyone on or near the tracks signifies danger. Motormen must bring their train under full control and proceed at slow speed until they are sure the track is clear and that it is safe to proceed.

AUDIBLE SIGNALS.

Whistle signals.

78. Air whistle signals must always be given at places and under the circumstances indicated below. When the blowing of the whistle is forbidden by law, ordinance or rule, the sounding of the gong must be substituted.

Sound.	Indication.
(a) One short.	Stop. Apply brakes.
(b) Two long.	Release brakes. Start.
(c) One long and three short.	Flagman go back and protect rear of train.
(d) Four long.	Flagman return from the west or south.
(e) Five long.	Flagman return from the east or north.
(f) Three long.	When running, train parted; to be repeated until answered by the signal prescribed by rule 76 (d).
(g) Two short.	Answer to any signal not otherwise provided for.
(h) Three short.	When train is standing, back.
(i) Four short.	Call for signals.
(j) One long and two short.	To call attention of opposing trains, section men, bridge men and others interested, to signals displayed for a following section. To be answered by:—
(k) Two short and one long.	Answer to signal of train displaying signals for a following section.
(l) Two long and two short.	Approaching public road crossings and at all road crossings whistle signs.
(m) One long.	Approaching stations, junctions, railroad crossings at grade, and dangerous or obstructed curves.

Alarm.

79. A succession of short blasts of the whistle is an alarm for persons or cattle on the track, and calls the attention of trainmen to danger ahead.

Torpedo signals.

80. The explosion of one torpedo is a signal to stop; the explosion of two torpedoes not more than two hundred (200) feet apart is a signal to reduce speed and look out for danger or a danger signal.

Accident on railroad crossing.

81. In case of accident on a steam road crossing the conductor and motorman must both attend to protecting their car, by one going in each direction at least three-quarters of a mile on the steam road tracks, and placing two torpedoes, one on each rail immediately opposite each other. Any responsible employee or other person may take the place of the motorman in flagging, in order that he may attend to getting his car off of the crossing. When car is clear of crossing the flagmen may be recalled by whistle signal as provided in rule 78, but the flagmen must remain at their posts and signal any approaching train to stop until recalled by whistle signal, using a red flag by day and red fusee at night, in addition to their lanterns. It is the duty of the conductor to first notify his passengers to leave the car.

Bell or whistle cord signals.

Sound.	Indication.
(a) One bell, or whistle cord signal.	Conductor to motorman. When train is running, stop at next station.
(b) Two bells, or whistle cord signals.	When train is standing, start forward.
(c) Three bells, or whistle cord signals.	When train is standing, back the train.
(d) Three bells, or whistle cord signals.	When train is running, stop at once, emergency.
(e) Four bells, or whistle cord signals.	When train is running, reduce speed to four (4) miles per hour until two (2) taps of the bell or two whistle cord signals are given, when the train will proceed at scheduled speed.

Motorman to Conductor.

(a) One bell.	Come forward.
(b) Two bells.	Watch trolley.
(c) Three bells.	By motorman is signal to conductor that he wishes to back train and must be answered by conductor before train is backed.
(d) Four bells.	Set rear brakes.
(e) Five bells.	Pull trolley down to roof.

Sound gong.

84. The gong or whistle must in all cases be sounded before the train is put in motion and also when approaching and crossing streets of towns or cities.

Starting signals.

85. Motormen must not start their trains without first receiving proper signal from the conductor and never start without the signal being correct.

Answer signals.

86. The motorman should always answer the conductor's signal to stop or to go forward or to back train, either using the foot gong or the whistle in answering the signal.

TRAIN SIGNALS.

Headlights.

87. Headlights will be displayed on the front of every train at night. A headlight displayed on a train standing at a siding, either on main track or sidetrack, will be regarded as a danger signal by opposing trains.

Headlights out of order.

88. When a headlight is out of order and will not light, and another cannot be procured, a white light must be displayed in the place of the headlight.

Yard motor lights.

89. Yard motors will display the headlight on the front and rear by night. When not provided with a headlight at the rear, two white lights must be displayed. Yard motors will not display markers.

Rear end signals.

90. Two green flags by day and two or more red lights at night, will be displayed on the rear of every train.

Signals for sections.

91. Two green flags by day or two green lights by night displayed on the front of a train, denote that the train is being followed by another running on the same schedule and entitled to the same schedule rights as the train carrying the signals.

All sections except last, display signals.

92. All sections of a train, except the last, will display two green flags by day or two green lights at night, on the front of the train in places provided for that purpose.

Signals for extra trains.

93. All extra trains will display two white flags by day or two white lights at night, on the front of the train in places provided for that purpose.

Leading motor, displays signals.

94. When two or more motors are coupled, the leading motor only shall display signals as prescribed by rules 91, 92 and 93.

Proper signals required.

95. One flag or light displayed, where in rules 90, 91, 92 and 93 two are prescribed, will indicate the same as two; but the proper display of all train signals is required.

Cars being pushed.

96. When cars are pushed by motor (except when shifting or making up trains in yards), a white light must be displayed on the front of the leading car by night.

## Car repairmen's signals.

97. A blue flag by day and a blue light by night, displayed at one or both ends of a car or train, indicate that workmen are under or about it. When thus protected it must not be coupled or moved. Workmen, before placing themselves in a dangerous position in or about a car, must display a blue signal, and the same workmen are alone authorized to remove such signals.

## FIXED SIGNALS.

## Location of fixed signals.

98. Fixed signals are placed at drawbridges, railroad crossings, junctions, stations, and at other points, as required.

## SEMAPHORE SIGNALS.

## Location of semaphore signals at interlocking towers.

99. Semaphore signals such as at interlocking towers, except train order signals, will be supported on a separate mast for each track. So far as practicable, they will be placed either over or upon the right of and adjoining the track to which they refer and in the same order, whether supported by a signal bridge over the tracks, by putting a bracket and two or more masts on one post, or by using separate masts from the ground.

If there be more than one arm on a mast, the upper will govern the main line, or fast-running route; the second arm will govern the diverging or slow-speed route.

## Indications of semaphore signals.

100. The governing arm is displayed to the right of the signal mast, as seen from an approaching train, and the indications are given by positions.

(a) An arm with square end, in a horizontal position, indicates STOP.

(b) An arm with forked end, in a horizontal position, indicates CAUTION—proceed under control.

(c) An arm inclined at an angle of 60 degrees or more below the horizontal indicates PROCEED.

(d) At night, the indication of signals will, in addition, be shown by colored lights:

RED—STOP.  
YELLOW—CAUTION.  
GREEN—PROCEED.

## Dwarf signals.

101. Dwarf semaphore signals govern the slow movements only, the indications being the same as for the high signals.

## Train order signals.

102. Semaphore signals used for train orders may be located at telephone stations. The arms have square ends, and are attached to the same mast for trains in both directions.

## USE OF SIGNALS.

## Imperfect signals.

103. A signal imperfectly displayed, or the absence of a signal at a place where a signal is usually shown, must be regarded as a stop signal, and the fact reported to the superintendent.

## Flag station signals.

104. The combined green and white signal is to be used only to stop a train at flag stations where station agents are employed. When it is necessary to stop a train at a point that is not a stopping point for that train a red signal must be used.

## Answer signals.

105. When a signal (except a fixed signal) is given to stop a train, it must be acknowledged by two (2) short blasts of the whistle.

Signals for following section must be observed.

106. Failure to answer a signal from trains carrying green signals must be understood to indicate that signals displayed have not been observed, and the train must be stopped, and not proceed until certain that signals are observed and understood.

## Signals at switches.

107. After a regular schedule train clears the main track, and switches are properly set for main track, the conductor must step to the side of the track opposite the switch stand until after the opposing train has passed, keeping his hand lantern at night in full view of the approaching train.

## Whistle at road crossings.

108. The regular road crossing whistle signal must be sounded on approaching all public road crossings (see section 673 of State law, page 90) and at all road crossings whistle posts.

## Unnecessary use of whistle or gong.

109. The unnecessary use of whistle or foot gong is prohibited. They will be used as prescribed by rule or law, or to prevent accident.

## Watchmen at road crossings.

110. Watchmen stationed at public road and street crossings must use red signals only when necessary to stop trains.

## CLASSIFICATION OF TRAINS.

## Scheduled trains.

111. Scheduled trains in either direction have no superior rights over trains of the same class in opposite direction, but will meet trains as per time-table, unless otherwise ordered by the superintendent or other designated authority.

All regular trains are classified on the time-table with regard to their priority of right to the track; trains of the first class being superior to those of the second and all succeeding classes and so on indefinitely.

## Extra trains.

112. Extra trains are of inferior class to all scheduled trains of whatever class, and have no rights except those conferred upon them by train order.

## MOVEMENT OF TRAINS.

## Trains leaving initial station.

113. A train must not leave its initial station on any division, or a junction, or pass from double to single track, without orders or clearance, and until it has ascertained whether all trains due have arrived or departed. If in such case the motorman or conductor cannot reach the dispatcher, the train will proceed on time-table rights, then call from all succeeding telephone stations until he has succeeded in reaching the dispatcher.

## Trains leaving station or siding.

114. No train must leave a station or siding before the time set for it, nor without proper signal from the conductor.

## Trains of inferior class.

115. A train of inferior class must in all cases keep out of the way of trains of a superior class, and must clear the time of scheduled trains five minutes unless a meeting or passing order has been given. Scheduled trains have equal rights to meeting points.

Scheduled trains have equal rights in meeting points.

116. All scheduled trains of the same class, or sections of scheduled trains, have equal rights to scheduled meeting points.

## Set switches for opposing trains.

117. At meeting points between trains, either by schedule or train order, should the train that is to occupy the main track arrive first, it will be the duty of the conductor of such train to promptly set the switch for the siding, so that the train to be met can take the siding with the least possible delay.

## Extra trains—clearing time of regular trains.

118. All extra trains must keep out of the way of regular scheduled trains and clear their time at least five minutes, unless they have been given a meeting or passing order, or other order relieving them from this necessity.

## Distance required between following trains.

119. Trains running in the same direction must keep not less than two thousand (2,000) feet apart (20 poles) except in closing up at stations or meeting points. When on city tracks a distance of one hundred (100) feet must be maintained between trains moving in the same direction. When the view is obscured by curves, fog, storms or other cause they must be kept under such control that they may be stopped within the range of vision.

## Signals for sections to be authorized.

120. A train must not display signals for a following section, nor an extra train be run without orders from the superintendent, except as provided for in rules 121 and 122.

## Defective telephone.

121. When unable to reach dispatcher on account of defective telephone, all extra trains will immediately lose their rights as extra trains and will become sections of regular scheduled trains as provided in rule 122.

## Arrangements for sections when telephone defective.

122. When telephone line is out of order, any scheduled train when requested by conductor of any train, may carry signals for such, as a section following, without first obtaining orders from superintendent. Scheduled trains, after such arrangements, will immediately display signals, and extra trains must not follow the regular train until it is certain that signals are so displayed.

## Taking down signals for following section.

123. When signals displayed for a section are taken down at any point before that section arrives, the conductor will notify all opposing trains of the same or inferior class leaving such point, that the section for which the signals are displayed has not arrived. If impossible for the conductor to notify the opposing trains as provided herein, then the train displaying the signals shall await the arrival of the section for which signals are displayed before taking such signals down, unless relieved from such duty by order of the superintendent.

## Instructions in writing.

124. Messages or instructions respecting the movement of train or the condition of track or bridges, must be in writing.

## Working limits—extra trains.

125. Where extra trains are assigned working limits, such trains must move within these limits with the current of traffic unless train orders otherwise direct.

## Places of approach under control.

126. Trains must approach the end of double track, junctions, railroad crossing at grade, and all drawbridges, prepared to stop, unless the switches and signals are right and the track is clear. Where required by law, trains must stop.

## Trains not to stop at obscured points.

127. If possible to avoid it, a train must not be allowed to stand on, or be obscured by a curve between stations.

## Protect train when stopped.

128. When a train stops or is delayed under circumstances under which it may be overtaken by another train, the CONDUCTOR OR FLAGMAN MUST GO BACK IMMEDIATELY WITH RED SIGNALS A SUFFICIENT DISTANCE TO INSURE FULL PROTECTION. When recalled, he may return to his train, first placing two torpedoes on the rail when the conditions require it. The front of a train must be protected in the same way when necessary, by the motorman. The duty herein required of the conductor or motorman may be performed by the other where desirable for any reason.

## Pushing cars.

129. When cars are pushed by a motor (except when shifting and making up trains in yards) the conductor or flagman must take a conspicuous position on front of leading car and signal the motorman in case of need.

## Yard limits.

130. Yard limits marked by proper boards may be established and within such limits trains will run according to special instructions.

## Responsibility for switches.

131. Switches must be left in proper position after having been used. Conductors are responsible for the position of switches used by them and their trainmen, except where switch tenders are stationed.

## Setting switches for following trains.

132. A switch must not be left open for a following train unless in charge of a trainman of such train.

## Responsibility for safety of trains.

133. Both motorman and conductor are responsible for the safety of their train and the proper fulfillment of all running orders received by them, either from operators or direct from the dispatcher, governing the operation of their train, and under conditions not provided for by the rules must take every precaution for their protection.

Crossing other railroads at grade.

134. Every train must be brought to a full stop before crossing the tracks of any railroad at grade, at a distance of not less than fifty (50) feet from the railroad track, except when such crossing is provided with interlocking apparatus, or other system of signals which has the approval of the Railroad Commission of the State of Indiana; and must not proceed until proper signal is received from the conductor, and crossing is seen to be clear and no train approaching and about to pass over the crossing. Conductor must have in front vestibule, for immediate use in case of necessity, a red flag by day and a red light by night. This order strictly prohibits the motorman from taking a signal or order from anyone else but his own conductor, and conductors must not permit anyone else to perform their duties at these crossings unless authority has been conferred upon another employee by the superintendent.

Entering or leaving siding.

135. A train about to enter or leave a siding must approach the switch under full control.

136. A train meeting another train at a siding must approach the switch under full control.

Trains meeting at double end sidings.

136. A train meeting another train at a siding open at both ends must enter at the nearest end and under no circumstances run by and back in without special orders from the superintendent.

Running over tongue switches.

137. Tongue switches, wherever located, must be approached with train under full control and must not be run over or through unless the tongue is known to be properly set. Motormen and conductors will be held equally responsible for the proper setting of switches used by them, and they must take every precaution for the protection of their trains, even if not provided by the rules.

Delayed trains.

138. Whenever a train cannot reach a scheduled meeting point within the time limit prescribed by rule or time table, it will stop at the nearest siding or telephone box, when the motorman or conductor will call up the dispatcher, giving his train number, name and location, and ask for orders.

Rights of delayed trains.

139. A train which is delayed, and falls back on the time of another train of the same class, does not thereby lose its rights.

Care passing other cars at stations.

140. Every care must be taken by trainmen in passing a station where any train is taking on or letting off passengers. Both motorman and conductor are responsible for the safety of their train and passengers and must use every precaution at all times.

Approaching meeting points.

141. All trains must approach meeting or passing points under full control, cutting off power at least one thousand (1,000) feet from the siding at which the trains are to meet or pass, and must not attempt to pass until switches and signals are seen to be right and the train to be met or passed is clear of the main track.

Trains unable to keep off of the time of following trains.

142. A train unable to keep off of the time or out of the way of a following train of the same class, which is running on a faster schedule, must report to the train dispatcher for orders.

Cases of doubt.

143. IN ALL CASES OF DOUBT OR UNCERTAINTY, TAKE THE SAFE COURSE AND RUN NO RISKS.

TRAIN ORDERS.

Train orders.

144. For movements of trains not provided for by time table, train orders will be issued by authority and over the signature of the superintendent or other designated authority. Train orders must contain neither information nor instructions not essential to such movements.

Must be in writing.

145. Train orders must be brief and clear, and in the prescribed form, when applicable, without erasure, alteration, or interlineation, and must be reduced to writing.

Must be same words.

146. Each train order given for the control of two or more trains as to any matter must be addressed to the different trains and given to each in exactly the same words.

Number consecutively.

147. Train orders will be numbered consecutively each day, beginning with No. 1 at midnight.

How addressed.

148. Train orders must be addressed to those who are to execute them, designating the place at which each is to receive his copy. They must be addressed to the conductor and motorman, and also to anyone who acts as pilot. A copy for each person addressed must be supplied by the person taking the order.

Dispatcher's record of orders.

149. Each train order must be written in full by the dispatcher, in a book or record provided for the purpose, before or at the time of giving the order to the train crews. With it must be recorded the names of those who have signed for the order, the time, and from what station the order was repeated, and the train dispatcher's initials, underscoring each word and number as repeated. These records must be made at once, and never from memory or memoranda.

Designation of trains.

150. Scheduled trains will be designated in train orders by their numbers, as "No. 10," or "2nd No. 10," adding car numbers; extra trains by car numbers, as "Extra 798," with the direction, as "East" or "West."

How to obtain orders.

151. To obtain orders at telephone stations, the motorman or conductor, whichever is most convenient, will call the dispatcher, who will give such orders as are necessary, whereupon he will write the same plainly and without abbreviation, on the blank, with carbon copies provided for that purpose, and when he has finished writing the order he will repeat it to the train dispatcher, who will "Complete" same if correct. He will thereupon sign his name upon the order. The dispatcher will then complete the order by giving the initials of the superintendent or other designated authority, and the time of completion, which initials and time shall be

promptly written on the order. When the order has been properly completed he will then sign his name to the order, after which it will be in full force and effect. The one who has not taken the order will then read it aloud and sign his name to it, taking one copy for his use until the order is fulfilled. If, for any reason, the line should fail before the dispatcher completes the order, it is of no effect and must be treated as if it had not been given.

151 b. If desired to have both motorman and conductor "Complete" the order the train dispatcher will signify "O. K." instead of "Complete" after the first reading. The one taking the order will indicate such "O. K." upon the order by signing his name to it.

The one who has not taken the order will then repeat the train order, without abbreviation, to the dispatcher, who will then complete the order by giving the initials of the superintendent or other designated authority, and the time of completion, which initials and the time shall be promptly written on the order. When the order has been properly completed he will then sign his name to the order, after which the order will be in full force and effect. If, for any reason, the line should fail before the dispatcher completes the order, it is of no effect and must then be treated as if it had not been given.

Issuing orders at stations.

152. To issue orders at stations where there are operators or agents, the dispatcher will instruct the agent or operator to display a stop signal for the motorman and conductor to call for orders. The motorman and conductor must not pass a station where such signals are displayed without reporting to the train dispatcher, and until such signals have been taken down, removed or cleared.

When in doubt ask dispatcher.

153. If the agent, or one, or both of the crew, or any of them do not understand the order, or have any doubt concerning its meaning, the dispatcher shall be notified. In no case shall any of them attempt to influence the decision of the others as to the meaning of an order.

Stay on siding until orders are received.

154. In no case shall a train leave a siding and run out onto the main track without complete orders when same are necessary.

Call dispatcher if opposing train has not arrived.

155. When any train reaches a meeting point and finds that the train or trains to be met have not arrived, the motorman or conductor shall immediately call the dispatcher for orders, as provided in rule No. 151.

Manifold copies of train orders.

156. The person receiving a train order must write it in manifold during transmission, and if they cannot at one writing make the requisite number of copies, must trace others from one of the copies first made.

Exchange and explain orders when changing off.

157. In case motormen or conductors change off before the completion of their trip, they must carefully exchange all orders that may have, and each must know that his orders are perfectly understood by the other. Changes of this kind, however, must never be made without permission from the superintendent, unless regularly provided for in the assignment of runs.

Train orders delivered by dispatcher.

158. For train orders delivered by the train dispatcher in person, the requirements as to the record and delivery are the same as at other offices.

169. FORM OF TRAIN ORDER BLANK

TRAIN ORDER NO. .... COMPANY

TO CONDUCTOR & MOTORMAN: .....190..

TRAIN NO. .... CAR NO. .... AT .....

TRAIN NO. .... CAR NO. .... AT .....

TRAIN NO. .... CAR NO. .... AT .....

TRAIN NO. .... CAR NO. .... AND TRAIN NO. .... CAR NO. .... WILL MEET AT .....

TRAIN NO. .... CAR NO. .... AND TRAIN NO. .... CAR NO. .... WILL MEET AT .....

TRAIN NO. .... CAR NO. .... AND TRAIN NO. .... CAR NO. .... WILL MEET AT .....

TRAIN NO. .... CAR NO. .... WILL REPORT AT .....

TRAIN NO. .... CAR NO. .... WILL REPORT AT .....

TRAIN NO. .... CAR NO. .... WILL REPORT AT .....

TRAIN NO. .... CAR NO. .... AND TRAIN NO. .... CAR NO. .... WILL MEET AT .....

TRAIN NO. .... CAR NO. .... AND TRAIN NO. .... CAR NO. .... WILL MEET AT .....

MOTORMAN	CONDUCTOR	TRAIN NO.	COMPLETE	TIME

Sections included in train order.

159. When a train is named in a train order, all its sections are included unless particular sections are specified, and each section included must have copies addressed and delivered to it.

Be sure specified train is being passed.

160. Trainmen must know before meeting or passing trains against which they have orders, that the train met or passed is the one specified in the order.

Train orders in effect.

161. Train orders once in effect continue so until fulfilled, superseded or annulled.

Rights to be restricted first.

162. When trains running in opposite directions are to be moved toward each other by train orders, the train whose rights are to be restricted must first receive the order and the complete before the order is given to the train to be moved against it or toward it.

Time of trains to be reported.

163. Agents or operators when so directed will promptly record and report to the train dispatcher the time of departure of all trains and the direction of extra trains. Agents and operators in such cases must have the proper appliances for signalling for immediate use, if required.

Use of telephone for train orders has precedence.

164. Trainmen wanting the telephone line to get the dispatcher for train orders must be given precedence. Any other use of the line for conversation must be stopped immediately when it is necessary to ask for train orders.



How to use telephone.

165. When desiring to use the telephone, first put the receiver to your ear and listen to find out if others are using the line. If the line is not occupied it may be used, under proper restriction for company business only.

Meeting orders not to be given at meeting point.

166. Meeting orders must not be sent for delivery to trains at the meeting point if it can be avoided. When it cannot be avoided, special precaution must be taken by the train dispatcher and operators to insure safety. There should be, if possible, at least one siding between the points at which opposing trains receive meeting orders.

Trains governed strictly by orders.

167. A train, or any section of a train, must be governed strictly by the terms of orders addressed to it and must not assume rights not conferred by such order. In all other respects it must be governed by the train rules and time table.

Second sections must have orders.

168. Trains running as sections of any train must report when the opposing train is to be at a point other than the scheduled meeting point or at a meeting point made by order, and must not attempt to follow preceding section without an order from the dispatcher to do so.

Signs and abbreviations.

170. The following signs and abbreviations may be used:  
 C&M—for conductor and motorman.  
 O K—as provided in these rules.  
 Min—for minutes.  
 Junc—for junction.  
 Frt—for freight.  
 No—for number.  
 Eng—for engine.  
 Sec—for section.  
 Opr—for operator.  
 9—to clear the line for train orders and for motorman and conductors to ask for train orders.  
 The usual abbreviations for the names of the months.

FORMS OF TRAIN ORDERS.

Form A—Fixing meeting point for opposing trains.

171. Train No. .... Car No. .... and Train No. ....  
 Car No. .... will meet at .....

EXAMPLES.

- Train No. 1, car 201 and train No. 2, car 202 will meet at siding 51.  
 Train No. 3, car 203 and 2nd No. 4, car 204, will meet at siding 54.  
 Train No. 5, car 205 and extra east, car 95, will meet at siding 55.  
 Extra car 652 north and extra car 231 south, will meet at siding 62.

Trains receiving this order will, with respect to each other, run to the designated point and having arrived there will meet in the manner provided by the rules.

Form B—Authorizing a train to run ahead of or pass another train running in the same direction.

172. (1) Train No. .... car .... will pass train No. ....  
 car .... at .....

(2) Train No. .... car .... will run ahead of train No. ....  
 car .... from ..... to .....

EXAMPLES.

- (1) Train No. 1, car 201 will pass train No. 3, car 203 at siding 9.  
 (2) Train No. 4, car 204 will run ahead of train No. 6, car 206 from siding 9 to siding 15.

When under this order a train is to pass another, both trains will run according to rule to the designated point and there arrange for the rear train to pass promptly.

Form C—Time orders.

173. (1) Train No. .... car .... will run ..... late  
 ..... from ..... to .....

(2) Train No. .... car .... will wait at ..... until .....  
 for train No. .... car .....

EXAMPLES.

- (1) Train No. 1, car 201, will run 20 minutes late from siding 2 to siding 15.  
 (2) Train No. 1, car 201, will wait at siding 15 until 10 a. m. for train No. 2, car 202.

Form (1) makes the schedule time of the train named, between the points mentioned, as much later as the time stated in the order, and any other train receiving the order is required to run with respect to this later time, the same as before required to run with respect to the regular schedule time. The time in the order should be such as can be easily added to the schedule time.

Under form (2) the train of superior right must not pass the designated point before the time given, unless the other train has arrived. The train of inferior right is required to run with respect to the time specified, the same as before required to run with respect to the regular schedule time of the train of superior right.

Form D.—For sections of regular trains.

174. Train No. .... car No. .... will display signals .....  
 to ..... for car No. ....

EXAMPLES.

- (1) Train No. 1, car No. 201, will display signals siding 10 to siding 15 for car No. 51.  
 (2) 2nd No. 1, car 51, will display signals siding 15 to siding 20 for car 20.

This may be modified as follows:

(3) Car 201, car 51 and car 20 will run as 1st, 2nd and 3rd sections of train No. 1 from siding 10 to siding 20.

To annul a section:

(4) Car 51 is annulled as 3rd section of train No. 1, siding 10 to siding 15.

If there are other sections following add:

(5) Following sections will change numbers accordingly.

The character of train for which signals are carried may be stated. Each section affected by the order must have copies, and must arrange signals accordingly.

Form E.—For arranging a schedule for an extra train.

175. Car .... will run extra, leaving ..... an ..... on the following schedule, and will have right of track over all trains:

Leave .....  
 Leave .....  
 Arrive .....

EXAMPLES.

Car 402 will run extra, leaving Turin on Thursday, February 17th, on the following schedule, and will have the right of track over all trains:  
 Leave Turin 11:30 p. m.  
 Leave Pekin 12:25 a. m.  
 Leave Canton 1:47 a. m.  
 Arrive Rome 2:22 a. m.

The order may be varied by specifying particular trains over which the extra shall or shall not have right of track, and any train over which the track is thus given the right of track, must clear its time as many minutes as such train is required to clear the schedule time of a first-class train.

Form F.—Extra trains.

176. Car No. .... will run extra from ..... to .....

EXAMPLES.

(1) Car No. 402 will run extra from Berber to Gaza.

A train receiving an order to run extra is not required to guard against opposing extras unless directed by order to do so, but must keep clear of all regular trains as required by rule.

A "work train" is an extra for which the above form will be used for a direct run in one direction. The authority to occupy a specified portion of the track as an extra, while working, will be given in the following form:

(2) Car No. 20 will work as an extra from 7 a. m. until 6 p. m. between Berne and Turin.

The working limits should be as short as practicable, and changed as the progress of the work may require. The above may be combined, thus:

(3) Car No. 20 will run extra from Rome to Berne, and work as an extra from 7 a. m. until 6 p. m. between Berne and Turin.

When an order has been given to "work" between designated points, no other extra must be authorized to run over that part of the track without provision for passing the work train.

When it is anticipated that a work train may be where it cannot be reached for meeting or passing orders, it may be directed to report for orders at a given time and place, or an order may be given that it shall clear the track for a designated extra, in the following form:

(4) Work extra, car 20, will keep clear of extra 51 south between Antwerp and Brussels after 2:10 p. m.

In this case, extra 51 must not pass either of the points named before 2:10 p. m., at which time the work train must be out of the way between those points.

When the movement of an extra train over the working limits cannot be anticipated by these or other orders to the work train, an order must be given to such extra, to protect itself against the work train, in the following form:

(5) Extra 51 will protect itself against work extra, car 20, between Lyons and Paris.

This may be added to the order to run extra.

A work train when met or overtaken by an extra must allow it to pass without unnecessary detention.

When the conditions are such that it may be considered desirable to require that work trains shall at all times protect themselves while on working limits, this may be done under the following arrangement. For example (2) add the following words:

(6) Protecting itself against all trains.

A train receiving this order must, whether standing or moving, protect itself within the working limits, and in both directions on single track, against all trains.

When an extra receives orders to run over working limits, it must be advised that the work train is within those limits, by adding to example (1) the words:

(7) Car 20 is working as an extra between Berne and Turin.

A train receiving this order must run expecting to find the work train within the limits named.

Form G.—Holding order.

177. Hold .....

EXAMPLES.

(1) Hold train No. 6, car No. 206.

(2) Hold all trains east.

This form will be used only in special cases, to hold trains until orders can be given, or for some other emergency. The reason for holding may be added, as:

"for orders."

This order is not to be used for holding a train while orders are given to other trains against it, which are not at the same time given to it in duplicate. It must be respected by conductors and motormen of trains thereby directed to be held as if addressed to them. Conductors and motormen, when informed of the order, must sign for it, and obtain "complete."

When a train is so held it must not go until the order to hold is annulled, or an order is given in the form:

"..... may go."

This must be addressed to the person or persons to whom the order to hold was addressed, and must be delivered in the same manner.

Form H.—Annulling a scheduled train.

178. Train No. .... of ..... is annulled.

EXAMPLES.

(1) Train No. 1 of February 29 is annulled.

(2) Train No. 3 due to leave Maples Saturday, February 29, is annulled. Adding "from Ayr" or "between Ayr and Greenock," when appropriate.

This order takes away all rights of the train annulled, and authorizes any train or person receiving it to use the track as if the train annulled were not on the time-table.

If a train is annulled to a point named, its rights beyond that point remain unaffected.

When a train has been annulled it must not be again restored under its original number by special order.

Form I.—Annulling or superseding an order.

179. Order No. .... is annulled.

This will be numbered, transmitted and signed for as other orders.

An order superseding another may be given, adding "This supersedes order No. ...." or adding "instead of ....."

EXAMPLE.

Train No. 1, car 201, and train No. 2, car 202, will meet at siding 9 instead of siding 10.

An order which includes more than one specified movement must not be superseded.

An order that has been annulled or superseded must not be again restored by special order under its original number.

In the address of an order annulling or superseding another order the train first named must be that to which the rights were given by the order annulled or superseded, and the order must be given to the train whose rights were annulled or superseded first before the order is sent for other trains.

DUTIES OF EMPLOYEES.

TRAIN DISPATCHERS.

Train dispatchers report to.

180. Train dispatchers report to and receive their instructions from the superintendent.

## Duties of dispatchers.

181. They will issue orders in the name of the superintendent or other designated authority, for the movement of trains; see that they are transmitted and recorded in the manner prescribed in the rules; keep a record showing the time of arrival and departure of trains at specified points and such other records as may be required, and record all important incidents which occur while on duty.

## Care in sending orders.

182. They must use great care in sending orders, and not transmit an order faster than the person receiving can take and plainly write it. They will anticipate the necessity for orders as far as possible and have them ready for trains; compel a prompt performance of duty on the part of the trainmen, with a view to preventing delay.

## Enforce rules.

183. They must see that unnecessary business is excluded from the wires; that the rules for the movement of trains by train order are complied with; and that every motorman and conductor has signed for a copy of each new time-table issued before he is permitted to go on the road.

## Record orders.

184. They must see that the train dispatcher going off duty makes, in a book provided for that purpose exclusively, a written memorandum of all orders by number that may be on hand not fully executed, and must see that such orders and all business pertaining thereto are fully understood by the relieving dispatcher.

## Report condition of telephone lines.

185. They must see that the telephone lines are kept in good working order and report every morning to the chief lineman the condition of the wires upon their division.

## Not allow unauthorized persons in office.

186. They must not permit any unauthorized person to enter the train dispatcher's office.

## MOTORMEN AND CONDUCTORS.

## Report to.

187. Motormen and conductors report to and receive their instructions from the superintendent.

## To be fully informed—time-table, bulletins, etc.

188. Before going out on the road they must have a copy of the latest time-table, and must examine the bulletin board and be fairly informed as to all notices posted for their guidance.

## Jointly responsible for safety of trains.

189. They are jointly responsible for the safety of the train and the proper use of all precautions required by the rules and regulations.

## Report defects in car.

190. On arrival at a terminal station, or where there is an inspector or foreman of repairs, they must report to him any defects in the condition of the cars, or any imperfect action on the part of the brakes during the trip.

## Report defective switches, etc.

191. They will report promptly, by telephone, to the train dispatcher, any defective switch or target lights, switch locks, defective wire or track, etc., noticed by them. If defect is serious or considered dangerous, train crews must not leave the point unless relieved by order of the superintendent.

## Sickness preventing reporting for duty.

192. In case sickness prevents a motorman or conductor from reporting for duty, the dispatcher must be notified in ample time to enable him to obtain an extra man to take train out on schedule time.

## Train orders to be sent daily to superintendent.

193. Train orders received by motormen and conductors must be sent by them daily to the superintendent, unless otherwise directed.

## Obtain permission for absence from duty.

194. No motorman or conductor, or other employee, will be permitted to absent himself from duty or to change off with another for a trip or part of a trip or day, without first obtaining permission from his superior officer.

## Duties before leaving car in house or yards.

195. When a train is run into the yard or car house, either day or night, it is the duty of the motorman and conductor to see that all lights are turned off; that the trolley is removed from the wire; that the stoves and heaters are left in safe condition, the dampers properly adjusted and all signals are taken down and put in their proper places before leaving the train.

## Trains not to be left unprotected.

196. Trains in commission must not be left unprotected. Either motorman or conductor always remaining in charge, unless necessary to leave momentarily for orders, or to carry out provisions or rules, or for safety of trains.

## Daily defect report.

197. Conductors and motormen will make a written report at the end of each day's run of any defects in their car, so that repairs or alterations may be made before the car is again placed in service.

## Remain with disabled car.

198. The motorman or conductor of any disabled car, withdrawn from the service temporarily, must remain with car until relieved by proper authority or until car reaches car house.

## Do not cause arrests without instructions.

199. Motormen or conductors must not, except in cases of extreme emergency, or for a violate or criminal act, cause the arrest of any passenger, truck driver, or other person, without an order from the superintendent.

## Joint responsibility.

200. Motormen and conductors will be held equally responsible for the violation of any of the rules governing the safety of their trains and must take every precaution for their protection, even if not provided for by the rules. **IN CASE OF DOUBT OR UNCERTAINTY, TAKE THE SAFE COURSE AND RUN NO RISKS.**

## MOTORMEN.

## Observe position of switches.

201. Motormen are required to observe the position of all switches,

and must know that such switches are right before passing over them, and that no portion of their train or car is allowed to stand where it will obstruct other tracks improperly.

## Interpretation of signals.

202. They will be held responsible for detection and careful interpretation of all signals while on the road.

## Conversation forbidden.

203. Motormen while operating cars are permitted to answer questions of superior officers, and to give proper instructions to students only. All other conversation with motormen while car is in motion is forbidden.

## Passing cars.

204. When passing cars on double track in cities or towns, the gong must be sounded and car brought under full control.

## Care in coupling cars.

205. Motormen must exercise caution and good judgment in moving and coupling cars, and in stopping and starting trains, and must avoid all unnecessary jerking, so as to prevent disturbances to passengers or injury to persons or property.

## Backing train.

206. When a passenger train runs by a station or other stopping place, they must always give the back-up signal (see rule 82 C) and receive the response from the conductor before starting back. Great care must be exercised in backing a train to avoid injury to passengers or others by sudden or unexpected movement.

## Do not move trains at night without lights.

207. They must not move any train or car at night without a light in front and rear.

## Do not allow others to operate car.

208. Motormen will, under no circumstances, allow any one, no matter what rank, to operate any of the machinery on the car, unless they have a letter directed to them personally and signed by the manager, in which case they will be held accountable for the safety of the train.

## Conductor must not stay in motorman's vestibule.

209. Under no circumstances shall any person be permitted to ride in motorman's vestibule without authority of the manager, nor shall the conductor remain in the motorman's vestibule longer than is necessary to properly receive or deliver train orders, or attend to any other business requiring his presence there.

## Reversing car.

210. Never use the reversing lever to stop car, except to avoid a collision or injury to a person or animal, or when the brake rigging is disabled.

## Descending grades.

211. In descending heavy grades motormen must shut off the power and allow car to coast, being careful to keep it under control.

## Passing cars at tongue switches.

212. Never run against a facing switch point or crossover when meeting a train or car, but slacken speed sufficiently to allow the train moving in the opposite direction to pass before striking switch point.

## Economical use of current.

213. In order to effect an economical use of the electric current, it is necessary that the continuous movements of starting and increasing speed should be made gradually. An economical start does not jerk a car or train.

In starting a car or train, let it run until the maximum speed of each notch has been obtained before moving the handle to the next notch.

Do not apply brakes when the current is on.

Do not apply current when the brakes are applied.

A great amount of power can be saved by using judgment and discretion in approaching stopping places and switches by shutting off the power so as to allow the train to drift to the stopping place or switch, without a too vigorous use of the brake; but time must not be sacrificed to save power.

## Power off line.

214. When the power leaves the line, the controller must be shut off, the light switch turned on, and the car started only when the lamp burns brightly. When off over five minutes all trains affected must report to train dispatcher from nearest telephone connection.

## Sanded rails.

215. Never run on freshly sanded rails with brakes full on, except to prevent an accident.

## Do not slide wheels.

216. On a slippery rail do not allow wheels to slide; as soon as wheels commence to slide, the brakes must be released and reset.

## Spinning of wheels.

217. Care must be taken, particularly during snow storms, to avoid "spinning" of the wheels with no forward or backward motion of the car. As often as wheels begin to "spin" throw off the power and build up again one notch at a time.

## Water on track.

218. When there is water on the track, run the car very slowly, drifting without the use of power whenever possible.

## Motormen to be present when apprentices operate car.

219. Motormen will not permit apprentices to operate their car except in their presence.

## Cars blockaded.

220. In the event of a blockade of cars from any cause, cars in such blockade must not all attempt to start at one time, but at such intervals as will not overload the power.

## Destination signs.

221. It is the duty of the motorman to see that all cars are equipped with the necessary destination signs and that same are properly displayed.

## Passing vehicles.

222. Motormen are cautioned to exercise great care when a vehicle is being driven ahead of car. Sound the alarm vigorously and run cautiously until the vehicle is passed.

## Examine car before leaving initial terminal.

223. Before leaving initial terminal on first trip, motormen must examine their car and see that it is fully equipped and in good condition for

safe operation. They must make further examinations while waiting on sidings and during layovers at terminals.

Motormen of work trains.

224. Motormen of work trains located at other than terminal stations, must in all cases obtain permission of the train dispatcher before absenting themselves from the vicinity in which they are stationed, as they are likely to be called upon at unusual hours.

Thunder storms.

225. During thunder storms turn on the light circuit.

Passing schoolhouses.

226. Motormen should use the utmost precaution when passing schoolhouses during recess or when children are assembling or leaving school. The car should be under perfect control.

#### CONDUCTORS.

Changing off before completion of trip.

227. In case conductors change off before the completion of their trip they must carefully exchange all orders which they may have, and each must know that his orders are perfectly understood by the other. They must then carefully compare the orders they receive with those in the hands of the motorman of the train to which they have transferred, before proceeding on the trip. Changes of this kind must never be made without permission from the proper officers.

Car to report accidents.

228. In case of accident resulting in the loss of life, injury to persons, or damage to property, conductors must use the utmost care in making reports, and such records as will enable them to furnish a full and complete statement of all the facts, with the names and address of all persons who witnessed, or may have information concerning the accident. See rule 250.

Train to be supplied with proper signals.

229. Each conductor must know that his train is supplied with proper signals.

Collect fares promptly.

230. Conductors of passenger trains will pass entirely through their train after leaving each station where their train stops, for the purpose of collecting tickets and fares; and where stops are made at long intervals, they shall frequently pass through to look after the comfort of the passengers.

Time of trains at junction points.

231. Conductors will keep themselves thoroughly posted as to the time of arrival and departure of trains of connecting roads at junction stations.

Render aid and information.

232. Conductors are expected to render to all travelers such aid and information as they may need, bearing in mind that many matters plain to the experienced need explanation to those who are inexperienced, especially to the humbler classes, many of whom are ignorant of our customs and language. Such should command the sympathy of every one.

Provide seats for passengers.

233. They will, if possible, provide all passengers with seats, not permitting anyone to occupy more seats than tickets entitle, unless there is room for all.

Call stations.

234. Conductors will see that stations are promptly and properly called in each car in his train; at stations and crossings, where trains leave in different directions, the conductor of each train must announce distinctly in each car before starting the principal stations on the route.

Conductor at rear platform at stations.

235. When a train is standing, the conductor must be on the ground at the rear of his train, or on the rear platform, unless compelled to be elsewhere in the discharge of his duty.

Conductors on rear platform.

236. When stops are made at principal streets, places of amusement, or at any point where a considerable number of passengers enter or leave the train, the conductor must be on the rear platform until such point is passed.

Call streets.

237. Conductors will announce distinctly the names of streets at which the cars will stop in the principal towns when approaching same.

Disorderly persons.

238. Conductors will not permit disorderly persons to get on the train; nor allow disorderly conduct on the part of any passenger; promptly repress all disturbances, threatened violence, profane or offensive language.

Signal to start.

239. Conductors must never give a signal to start unless they can see the rear steps and know that passengers leaving the train are clear of same, or that passengers boarding the train are safely on the car. They must be careful not to give a starting signal when passengers are approaching, or close to a train and about to board it. When flagging railroad crossings conductors will keep rear door closed opposite to the side of the car from which they will flag crossing.

Removing trolley at night.

240. Conductors will not remove trolley from wire at end of run or elsewhere at night until after passengers have alighted from the car.

Passengers to ride inside of cars.

241. Conductors must not permit passengers to ride on rear platform when there is room inside the car. The rear platform must be kept clear whenever it is possible to do so, except on cars provided with observation platforms.

Conduct of passengers.

242. Conductors must not allow persons to put their feet on the cushions of the car or allow them to spit on the floor. They will see that smoking-room door is not left open.

Require transportation.

243. Conductors must require transportation from every person on the train, except such officers and employees of the company as the rules governing free transportation permit to ride without presenting transportation, and employees on duty on the train.

Cars left on sidings.

244. When leaving cars on sidings, conductors must know that they are properly secured against running or the possibility of their being blown out on the main track, and that they are left far enough from the main track to safely clear all trains.

Cars left at stations or yards.

245. When leaving cars at stations or yards, they must in all cases be put on storage tracks, and under no circumstances left on passing tracks without permission from the superintendent. If brakes are inoperative wheels must be blocked.

Testing brakes.

246. Conductors will require their brakes to be tested, cylinder and connections examined, and motorman to apply the air on all air brake cars before starting from the terminal station, or at any point where the air connection may have been cut or broken while switching or otherwise.

#### ACCIDENTS AND PERSONAL INJURY.

Employees to render assistance.

247. In case of accident, however slight, to persons or property, in connection with or caused by any train, the trainmen in charge of same will render all assistance necessary and practicable. In no case will they go away leaving injured persons without first having seen that they are cared for.

Immediate report.

248. Conductors and motormen will make immediate verbal report to the dispatcher of any accident, blockade or serious mishap of any kind.

Medical assistance.

249. Trainmen will not authorize medical assistance except for the first visit in severe cases of personal injury, nor will they visit injured persons at any time afterwards, unless specially instructed so to do by the superintendent.

Complete report.

250. A full and complete report of every accident, no matter how trivial, apparently, and whether on or near the train, will be made by the conductor upon the prescribed forms. In all cases full data must be obtained and stated in the report.

Extent of injuries.

251. Ascertain carefully the extent of injuries or damages, if any, before leaving the place of accident.

Accidents caused by passing the rear of standing car.

252. In case a person is struck by a train or car after passing around the rear of standing train or car, the numbers of both trains or cars must be obtained.

Accidents caused by defective equipment.

253. If accident is caused by any defect or damaged condition of car, the conductor must report same.

Accidents to employees.

254. Accidents to employees will be reported the same as accidents to passengers.

Obtain witnesses.

255. The conductor will obtain the names and residences in full of all witnesses on or near the train. The motorman will assist the conductor in securing the names of witnesses whenever practicable.

Other troubles to be reported as accidents.

256. Any trouble or disturbance of a boisterous or quarrelsome character which occurs on a train, or the ejection of a person from a train, will be reported as an accident.

Giving information.

257. No employee shall, under any circumstances, give any information whatever concerning any accident, delay, blockade or mishap of any kind to any person except to a properly authorized representative of the company, except as provided by law.

#### EJECTIONS.

Ejections—when authorized, and how to be made.

258. Should a person be found upon the train without a ticket or pass or some form of authorized transportation, he must be required to pay fare, and in case he refuses to do so, he should be ejected from the train, only such force being used as is sufficient for his removal, and in no case with unnecessary violence, harsh language or display of ill-temper, or while the train is in motion. The ejection must be made by the conductor and trainmen as an act of legal duty and only in a reasonable manner and at a proper place. It should not be in such a place, in such weather or at such unreasonable hours of the night as might easily endanger the life or safety of the person ejected. The person ejected must not be a child of tender years, a person of unsound mind or a person in such feeble and helpless condition as to be unable to take care of himself at the point of ejection.

Conductors to protect passengers.

259. Conductors must attend to the safety and comfort of passengers on their trains and protect them against rudeness, threatened violence, abusive or obscene language. Any passenger acting thus on a train, after having been requested to desist, whether provided with a ticket or not, should be ejected from the train promptly, but not at such a place as will endanger his life or personal safety, and with only sufficient force for the purpose.

Defective transfers.

260. Whenever a passenger presents a defective transfer, conductors will notify the passenger that transfer is not good, explaining why. If the passenger refuses to pay fare, lift the transfer, enclose it in an envelope, giving time, place, name of passenger, and all facts relating to the incident and deliver the report to the superintendent as soon as possible. Do not in case of doubt eject a passenger on a defective transfer.

Persons stealing rides.

261. Any person caught stealing a ride on a car must never be pushed from the car, or so frightened that he will jump, while the car is in motion.

Witnesses in case of ejection.

262. In case of ejection, always get names of witnesses, and make full report, the same as in case of accident.

Use persuasion before ejecting.

263. When ejecting a passenger all means to persuade him to leave

the car without assistance should be used before taking hold of the passenger.

TRACK AND ROADWAY DEPARTMENT.

Report to.

264. The ..... will report and receive instructions from .....

Responsible for.

265. .... is responsible for the care and economical use of all track material and supplies, and must keep such records and make such reports of them as is directed. .... is responsible for keeping the track, roadbed, bridges, culverts, stations and everything pertaining to the roadway in repair.

Duties required.

266. He must pass over his division frequently, observe carefully the conditions of tracks and bridges and do everything to secure the safety of the road.

Duties of .....

267. .... has charge of the track foremen and other laborers employed on his respective division, and must see that they are competent and perform their duties properly; enforce such discipline as he may deem necessary; keep such records of the time and work done by such men as may be prescribed.

Enforce rules.

268. He must know that those under him understand and obey the rules governing their respective duties, particularly those having reference to the operation of trains, the displaying of signals, etc.

Work trains.

269. Work trains and men in charge of them shall be under the direction of ..... when transporting materials and performing work for the track department, subject to all rules and directions for the operation of such trains and such orders as may be given by the .....

Correct time.

270. .... must have correct standard time and frequently compare the same with foremen.

Report whereabouts.

271. .... must keep the train dispatcher posted at all times of his whereabouts.

TRACK AND SECTION FOREMEN.

Report to.

272. Track and section foreman report to and receive instructions from the ..... They must keep the roadbed up to the prescribed standard, properly drained and ballasted in its proper place.

Duties required.

273. They must pass over their section at least every alternate day, either on foot or by car, and make careful personal inspection of the track, switches, bridges, banks, ditches, road crossings, fences, bonding, etc.

Work personally.

274. They must engage in work personally and instruct the men under them and see that they properly perform all their duties, reporting any neglect or misconduct to the .....

Track.

275. They must see that the track is properly lined and surfaced; that the rails are spiked to a true and uniform gage; ties properly spaced, lined and tamped; proper allowance being made for contraction; bolts and nuts tight, etc. They must know that all switches are provided with locks, take proper care of all signal lights entrusted to them, and know that switch points close tight to the rails.

Switches and frogs.

276. During freezing weather they must see that switches and frogs are cleaned and salted, and in case of heavy snow storms, will keep section men constantly on duty caring for switches.

Rules of operating department.

277. They must be thoroughly familiar with the rules and regulations of the operating department, have a copy of current time tables on hand at all times, and be thoroughly familiar with the time of trains over their section.

Lanterns and flags.

278. They must provide themselves with two red and two yellow flags, two red and two white lanterns.

Removing rails, etc.

279. Under no circumstances must a rail, switch or frog be removed nor any part of the track be made unsafe for the passage of trains without first displaying STOP SIGNALS, and never within ten minutes of the time of a regular train. They must bear in mind that extra trains may be expected at any moment.

Display signals.

280. The foreman is responsible for the proper displaying of signals and must promptly report to ..... every case where train men disregard signals.

Observe passing trains.

281. When trains are passing, in case anything is observed out of order or dragging, signal the trainmen to stop; or if their attention cannot be attracted, notify dispatcher.

Position of foreman.

282. Where practicable the foreman will stand on the right hand side and the laborers on the left of passing trains. Where this is impracticable the foreman should stand away from his men so that he can readily be distinguished from them.

Observe signals displayed.

283. He shall carefully observe the signals displayed by trains and be constantly on the lookout for extra trains. In case a train is running in sections, allow all sections to pass before obstructing the track. Acknowledge all whistle signals given by passing trains.

Report defects.

284. Report to dispatcher immediately any defects noted.

Patrolling tracks.

285. During heavy wind or rain storm detail a sufficient number of men to watch the road.

Special examinations of bridges, etc.

286. After heavy rain storms make a special examination of bridges, culverts, etc., reporting immediately to the ..... any damage that may have occurred; if the damage is likely to interfere with the safe movement of trains, protect with proper signals and notify the dispatcher. Take every precaution to prevent accidents without waiting for instructions.

Foggy weather.

287. In case of heavy fog or storm, do not attempt any work that will obstruct the track except in case of emergency and then only with proper protection by flags and signals.

Weeds.

288. All weeds must be cut down at the proper time.

Scrap material.

289. Any material dropped from cars shall be picked up and stored.

Hand and push cars.

290. Hand cars must be run with great caution and never attached to moving trains. Hand and push cars must not be used except in the service of the company, and no one will be allowed to ride except employees in the proper discharge of their duty. When not in use, they must be kept locked and secured at such a distance from the track as will properly clear passing trains. They must not be left on road crossings.

Care in using hand cars.

291. When using hand cars at least one man shall face in each direction, keeping a sharp lookout for trains, and before rounding a curve or when view is obstructed, the car shall be stopped and proper precaution taken to prevent an accident.

Loading of hand and push cars and clearing schedule trains.

292. Hand and push cars must be so loaded as to prevent jumping the track and admit of their prompt removal and must be off the track and clear of the line five (5) minutes before schedule trains are due. Push cars must not be put upon the main track until proper signals have been placed. Hand and push cars will not be allowed on the track after sundown, except in emergency, in which case they will display a white and a red light.

Taking hand or push cars into switches.

293. Main track switches must not be opened to allow hand or light loaded push cars to pass to and from the main track. Such cars must be lifted from one track to the other.

Switch keys.

294. Foremen must not allow their switch keys to pass out of their possession, and must personally attend to the opening, closing and locking of all switches in connection with their work, and must not open or close switches for train crews.

Injury to stock.

295. Section foremen will do all in their power to prevent the killing of or injury to stock. They must keep fences and cattle guards in good repair, see that all farm gates are kept closed and report to the ..... the property owner's or tenant's name and designate location of gates found open.

Live stock on right of way.

296. All live stock found within the right of way must be immediately driven a safe distance from the right of way and owners, when known, notified to keep them off the right of way. Investigate every case of injury to stock.

Disposition of killed stock.

297. When stock is killed or injured, the section foreman will notify the owner, and if he does not take charge of the carcass within twelve (12) hours, the foreman will make such disposition as the ..... may advise, first appraising the value of the animal, acting with one or more disinterested persons. Render all assistance possible in every case of accident, whether accident occurs on their own or adjoining sections, making a careful and complete report on proper form.

Highway crossings.

298. Highway crossings must be examined to see that the crossing is in safe condition and that the flangeways are properly cleaned.

Switch lamps and sign posts.

299. Switch lamps and targets must be kept in good order, also mile posts, whistle posts, crossing and station signs, etc.

Encroachments.

300. See that no encroachment is made on the right of way or other land belonging to the company.

Tools.

301. All tools at the close of the day's work must be safely stored.

Old Ties and Rubbish.

302. Old ties and rubbish will be disposed of under instructions from the .....

Location of switch stands.

303. It shall be his duty to study and observe carefully the location of all switch stands and other signals; see that the view is unobstructed to an approaching motorman, and see that such signals are kept in good repair. When he cannot make such repairs nor remove such obstructions without authority, he shall call the attention of the ..... to the facts in writing.

MAINTENANCE OF OVERHEAD LINE.

.....Report to.

304. The ..... will report and receive instructions from the ..... He is in charge of all linemen and is responsible for the condition of all overhead work, including telephone and signal service.

Linemen report to.

305. Linemen will report to and receive instructions from the ..... and will, when repairing any line trouble and when necessary, give the proper signals to trainmen as to the operation of their cars at that point, and shall also protect themselves by flagmen or proper signals when working at night or on curves or at any place where the view is hidden by some obstruction.

Care of live wires.

306. They will exercise great care not to permit any wire to hang near the ground where any person or animal would be liable to come into contact with it.

Poles not to obstruct view of switch stands or signals.

307. .... must not set or permit poles to be set so as in any way obstruct the view of a motorman of an approaching car, of any switch stand or signal and should he find, or his attention be called, to a switch stand or other signal, where the view is obstructed, he must take immediate steps through his proper officer to have it corrected.

Correct time.

308. Line foremen must have correct standard time and daily compare the same with the train dispatcher.

Rules for operating department.

309. They must be thoroughly familiar with the rules and regulations of the operating department, and have a copy of current time tables on hand at all times.

Switch keys.

310. Line foremen must not allow their switch keys to pass out of their possession, but must personally attend to the opening and closing of all switches in connection with their work and must not open or close switches for train crews.

Must have pilot.

311. Men not familiar with the road and time table must have with them an authorized employee to act as pilot, linemen must be governed by the rules for and set all signals required by section foremen when running hand cars, tower cars, push cars, and speeders.

Hand cars, etc., only to be used in service.

312. Hand cars, push cars, tower cars, and speeders must be run with great caution and not be used except in the service of the company, and no one will be allowed to ride except employees in the proper discharge of their duty. When not in use, they must be kept locked and secured at such distance from the track as will properly clear passing trains. They must not be left on road crossings. Main track switches must not be opened to allow such cars to pass to and from the main track, they must be lifted from one track to the other.

Handling wires.

313. To handle trolley, feed, telephone and signal wires when down on the ground, employees must always stand on dry wood or rubber. They must be sure that no nails or other metal is sticking through same to the ground. They must keep their body clear of all metal and ground connections of any kind, such as iron poles, rails and wires other than the one to be picked up. After getting rope or pick up on the wires they must not touch the wire after stepping from board to the ground.

Insulated cars.

314. In case a car becomes insulated from the rails when making stops on road crossings, occasioned by dry earth or other matter between rail and wheels, hold switchhook in fold of coat and give it a ground by making contact with the rail first; then lean switch hook against wheel or truck frame. Controller must be in OFF position when contact is being made. Break contact first at the wheel or truck frame.

This rule for insulated cars applies to all lines having 600 volt trolley pressure. Further precautions are necessary for higher trolley voltage.

High-tension wires.

315. Before handling high-tension circuits be sure that current is shut off at the power house or sub-stations. Before getting closer to wires than three feet throw a chain over circuits each side of the place where work is to be done and be certain that chain is in perfect contact with all phases of chains grounded. The chains should have 20 ft. of paraffin rope at each end.

SAVING FROM DEATH BY ELECTRIC SHOCK.

By Frederick Strang Kelle, M. D.

1st.—Lay the patient on his back.  
2nd.—Move the tongue back and forth in the mouth by seizing it with a handkerchief or the fingers, while working the arms to induce respiration.

3d.—Don't pour anything down the patient's throat.  
4th.—Try to cause the patient to gasp by inserting the first and second fingers in the rectum, and passing them suddenly and forcibly toward the back.

5th.—If possible, procure oxygen gas, and try to get it into the lungs during the efforts at artificial respiration.  
6th.—Get a doctor as quickly as possible.

7th.—Treat the body as though it had been under water, by trying to obtain artificial respiration.

The above items have been arranged in the manner given, to avoid the immediate necessity of reading that which follows, in cases of emergency. It is quite natural to realize that the victim of shock must be pulled out of circuit or disconnected from the wires carrying the current. To do this a stick of dry wood, a piece of dry cloth, a coat or a soft felt hat, may be used. It will be understood, therefore, that means are taken more or less familiar to the electrical man for removing the body from continued danger of this kind; the best to use being, of course, rubber gloves for this purpose, if convenient.

**Air the lungs.**—The patient must be made to breathe AT ONCE. To accomplish this, lay him on his back with a coat under his shoulders to throw out his chest. Then, lift his arms over his head and back again until they press against his chest. This process will force air in and out of the lungs, as required. A second party ought to assist in pulling the tongue forward, when the arms are raised above the head and let it fall back when the arms press against the chest.

**Rate of breathing.**—The rate of breathing produced artificially should be 16 times a minute; a little more or less will not affect the result.

**Jaws locked.**—If the jaws are locked by the clenching of the teeth, force them open with a knife or spoon handle, or their equivalent, so that the tongue can be seized and moved as described.

**Effects of tongue on teeth.**—By the rubbing of the lower side of the tongue on the under row of teeth, the patient is apt to gasp automatically, and thus fill the lungs with air. The fact that an effect of this kind is possible is a good sign, and should be produced at intervals of a few seconds if possible.

**Time of keeping up artificial respiration.**—The operations indicated should not be discontinued for a long time. In many cases an hour or more is required before the body begins to resume its natural functions, as shown by the beginning of ordinary breathing.

**Throat free.**—The throat must be free to admit air, when the lungs are inhaling, by the upper movement of the arms. The movement is similar

to that transpiring during the process of yawning and stretching the arms over the head. The inhalation must be made as deep as possible and the operations leading to it continued with systematic care until results are visible. Filling the throat with the back of the tongue at the wrong time, will mean failure. Therefore, the movement of the tongue back and forth must be intelligently performed.

**Paper cone for oxygen gas.**—An inhaling cone may be made of paper, the larger end over the patient's face, and the smaller end or stem attached to the oxygen tank by means of a piece of rubber pipe. A little oxygen in the lungs causes a strong heart action, and operates to revive quickly.

**Friction of the limbs.**—Rubbing of the body is a secondary means of hastening the blood circulation. The inactivity of the lungs and heart are due to a temporary paralysis or shock caused by the passage of the current. The removal of this condition means resuscitation, part of which process may be carried out by massage of the body and limbs.

**General character of the treatment.**—As may have been noted in reading this popular version of the means of assisting recovery from shock by electricity, the general drift is in the direction of getting the patient to breathe and his heart to beat strongly. Other legitimate ways may be tried, but they must not be so heroic as to induce death during so critical a condition. The continuance of an accepted method is better than irrational experiments. These should be checked at once, and the above program followed out, until a physician takes charge of the case.

COPIES OF SECTIONS OF CRIMINAL CODE OF STATE OF INDIANA, EFFECTIVE APRIL 15, 1905.

Railroad crossings—steam or electric—stops.

Sec. 668. Whoever, being the engineer of any locomotive of the motorman of any interurban electric car running upon any railroad track, upon or over which passengers are, or may be transported, runs such locomotive or interurban electric car across or upon the track of any other railroad or interurban railroad at a place where no system of interlocking works or fixtures is maintained as provided by the laws of this state, without first coming to a full stop before entering upon or crossing such other track, and without first ascertaining that there is no other train, locomotive or car in sight, approaching and about to pass over such other track; or whoever, being such engineer or motorman, runs such locomotive or interurban electric car upon or across such tracks, when a locomotive or car is in sight, approaching and about to pass upon and over such crossing on such other track, shall, on conviction, be fined not less than one hundred dollars, nor more than one thousand dollars, and be imprisoned in the county jail not less than three months nor more than one year; and if any person shall be injured or killed by reason of such crossing, such engineer or motorman so violating the provision of this section shall be imprisoned in the state prison not less than two years nor more than fourteen years.

Deceiving engineer or motorman.

Sec. 669. Whoever shall falsely report to the engineer of any locomotive or motorman or any interurban or electric car running upon any railroad track, upon and over which passengers are or may be transported, that there is no train or locomotive upon the track of any other railroad or interurban railroad, in sight, and approaching the place where such roads cross, or upon such crossing; or whoever, being the conductor of any train or interurban or electric car, orders and directs the engineer or motorman to violate the provisions of the preceding section, or whoever, being a brakeman of any train of cars, by reason of his gross carelessness or wilful neglect of duty, causes such train or locomotive of such interurban or electric car to run across or upon such crossing, shall, on conviction, be fined not less than \$100 nor more than \$1,000, and imprisoned in the county jail not less than three months nor more than one year; and if any person shall be injured or killed by reason of the violation of any of the provisions of this section; the person so violating such provision or provisions shall, on conviction, be imprisoned in the state prison not less than two years nor more than fourteen years.

Railroad crossings—running upon.

Sec. 670. Whoever, being an engineer or motorman, permits his locomotive or interurban or electric car to run upon or across the track of any other railroad or interurban railroad at a crossing not provided with a system of interlocking works or fixtures, before the locomotive or train coming upon the other track shall have passed over such crossing, if the locomotive or train on the other track shall arrive at the crossing first, shall, on conviction, be fined not less than \$100, nor more than \$1,000, and imprisoned in the county jail not less than three months nor more than one year; and if any person be killed or injured by reason of the violation of any provision of this section, the person so violating such provision shall, on conviction, be imprisoned in the state prison not less than two years nor more than fourteen years.

Railroad crossings.—Stopping cars on.

Sec. 671. Whoever, being the engineer, conductor, motorman or other person, having charge of any railroad train or locomotive or any interurban or electric car, permits or suffers the same to be stopped or remain stationary upon any railroad or interurban railroad crossing, unless the same is done by united agreement and under specific regulations adopted by the directors of such crossing railroads, shall, on conviction, be fined not less than \$100 nor more than \$1,000, and imprisoned in the county jail not less than three months nor more than one year; and if any person be injured or killed by reason of the violation of any provision of this section, the person so violating such provision shall, on conviction, be imprisoned in the state prison not less than two years nor more than 14 years.

Permitting cars to be locked.

Sec. 672. Whoever, being the superintendent, officer, agent, or employee of any company engaged in transporting passengers, suffers or permits any of its cars, containing any passenger, to be locked, whether the same is running or standing; or whoever locks or fastens the door or doors of any such car, so that the same cannot be easily opened by such passenger; or whoever directs or orders the locking or fastening of any such car door, shall, on conviction, be fined not less than \$5 nor more than \$500.

Signals for crossings.

Sec. 673. Whoever, having charge of a locomotive engine, or interurban electric car, fails or neglects when such engine or car is approaching any road-crossing to sound the whistle, or if not equipped with whistle, the gong, at a distance of not more than 100 nor less than 80 rods from such crossing, shall, on conviction, be fined not less than \$10 nor more than \$50; and if any person is injured or killed by reason of such failure or neglect, the person so causing such injuries, shall, on conviction, be imprisoned in the state prison not less than two years nor more than 14 years, but nothing contained in this section or the preceding seven sections shall be so construed as to interfere with any ordinance or by-law that has been or may be passed by any city or town regulating the management or running of engines or trains within such city or town.

## UNIFORM RULES FOR OPERATION OF MICHIGAN INTER-URBAN RAILWAYS UNDER CONSIDERATION

At a conference at Lansing, Mich., on June 4, between representatives of electric railways in Michigan and members of the Michigan Railroad Commission, a committee was appointed for the purpose of drafting uniform rules for the operation of interurban railways in the State. The following constitute the committee as named: Henry Bullen, general superintendent, Detroit United Railway; B. F. O'Mara, Michigan United Railways; W. K. Morley, vice-president and general manager, Grand Rapids, Grand Haven & Muskegon Railway; Strathearn Hendrie, general manager, Grand Rapids, Holland & Chicago Railway.

The meeting was called primarily to discuss informally the subject of dispatching rules, but the discussion was broadened to include general rules for operation. The managers of electric railways informed the commission of the existence of three sets of rules, those of the American Street & Interurban Railway Association, the Central Electric Railway Association and the Street Railway Association of the State of New York. The commission was also informed regarding the uniform rules compiled for adoption in Indiana and that the railways of the States of Ohio, Illinois and Wisconsin might adopt the Indiana rules.

The committee is to formulate and present rules to the commission within 30 days from the date of the meeting. The rules will then be submitted to the various companies in Michigan in order to give an opportunity for a full expression of opinion on the subject. After allowing ample time for criticism and within 90 days after the first meeting, the commission will call another meeting of representatives of the railways at which final action will be taken concerning the rules.

The ELECTRIC RAILWAY JOURNAL is informed that if the Indiana rules receive the approval of an important majority of the railroad commissions of the North Central States before the next meeting is held in Michigan, it is probable that these rules will be adopted as a whole in Michigan. Under these circumstances any small differences of opinion that might exist would be waived because of the advisability of having uniform rules for operation in a large section of the country in which conditions of operation are practically the same.

## RESULTS WITH WOOD PAVING

The Department of Agriculture in Circular No. 141 considers the use of wood paving in the United States. The introduction of wood for this use is reviewed as is also the progress of wood paving. Consideration of the subject proper begins under the title "Qualities of Creosoted Wood Pavement." Among the installations of wood pavement cited are those in New York by the Metropolitan Street Railway and the one in Chicago on the Rush Street bridge. Of these the report says:

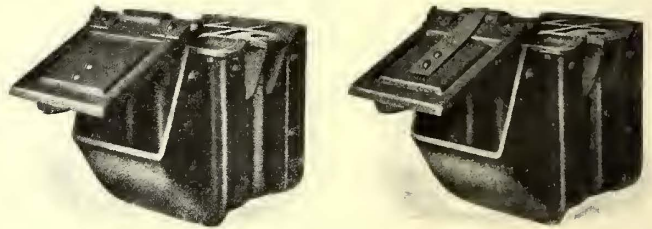
"In 1902 the Metropolitan Street Railway decided to experiment with creosoted wooden blocks for paving between its tracks. A small area of longleaf pine was laid on Hudson Street, the wood being flanked at either end by granite, the material hitherto used. At the point selected there is a very heavy trucking traffic from the North River wharves, and the stresses on the pavement, where the trucks run with one wheel just outside the car rail, are so great that the granite begins to show a rut in six months, and is renewed almost annually. At the end of four years the wood, though showing a heavy rut, was still sound and in

position and good for at least one more year. The granite on either side had been renewed three times during the four years.

"The Rush Street bridge in Chicago, Ill., is said by the chief engineer of streets to carry a traffic as heavy as any in the city. It has two 20-ft. roadways, which were paved in 1899, one with creosoted longleaf pine blocks, the other with uncreosoted blocks. The creosoted pavement, after a service of seven years, was still in good condition and is expected by the chief engineer to last several years more, while the uncreosoted pavement was renewed in 1902. The explanation of these facts lies in the antiseptic qualities of the creosote and its physical action in filling the pores of the wood and decreasing its absorption of water. Every pavement is wet a large part of the time, and wood, when saturated with water, has generally less than 40 per cent of its kiln-dry strength. The creosoting treatment, by lessening the absorption of water, maintains the strength at much nearer the dry-wood value, and thereby increases the actual service strength."

## PRESSED STEEL JOURNAL BOX

One of the interesting exhibits at the Atlantic City convention was the Kensington journal box shown by the Union Spring & Manufacturing Company, of Pittsburg. This box is intended for use with arch bar trucks and is illustrated herewith. The side, front, bottom and back of the box are made of a single piece of pressed steel. The



Pressed Steel Journal Boxes.

dust-guard pocket is also of pressed steel while the top of the box is of steel casting, making but three separate pieces in the box. The dust-proof lid, which is also of pressed steel, is made with either inside and outside springs, as shown in the illustrations. The advantage of having the top of the box a separate casting is that it affords an absolutely true bearing surface for the wedge:

The corrugation on the front of the box, which is carried all around the box, affords the additional strength necessary to resist lateral thrusts. An ingenious method is also employed in the slotting of the ribs of the top casting which supports the arch bar bolt lugs and inserting the sheet of the steel box into the slots, thus taking all strain off of the rivets.

The London County Council has, on the recommendation of its Highway Committee, resolved to communicate with the Board of Trade and the road authorities concerned with a view to the adoption of the underground conduit system of electric traction upon the tramways from Lovender Hill, via Queen's Road, to Chelsea Bridge, at an estimated cost for track construction, cables, etc., of \$265,000.

The Midland Railway of England commenced regular traffic on its electrified line from Lancaster to Morecambe on June 8. Trains of three passenger coaches are used.

**TRUCK FOR PENNSYLVANIA RAILROAD STEEL PASSENGER CARS**

One of the most interesting exhibits at the Atlantic City convention of the Master Car Builders' Association last week was a steel passenger car built for and from the designs of the Pennsylvania Railroad Company, by the Pressed Steel Car Company, of Pittsburg, Pa. This car, which is one of an order for 85 cars now being delivered, is mounted on four-wheel trucks of a design which is a radical departure from the so-called M. C. B. type; or, in fact, from any of the special patented types now in use.

The car body is built entirely of steel and no inflammable material is used anywhere in its construction except for the window sashes. It has a seating capacity for 88 passengers, and the total weight of body and trucks, including 5800 lb. of storage batteries used for lighting, is 113,800 lb., or a dead weight per passenger of 1290 lb. This compares with an average dead weight per passenger for wooden cars of the same length of 1450 lb. per passenger.

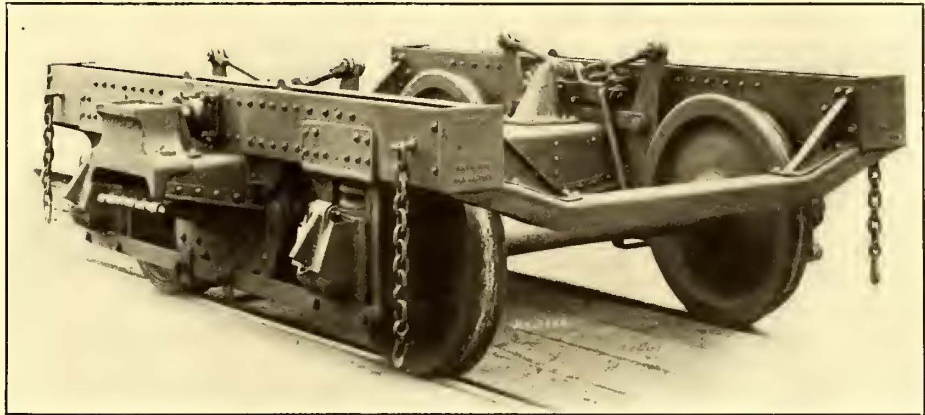
The general dimensions of the car are:

Length over buffer face plates.....	80 ft. 3¼ in.
Length over body corner posts.....	70 ft. 5¼ in.
Length inside .....	69 ft. 7⅞ in.
Width over side sheathing.....	9 ft. 9¾ in.
Width inside .....	9 ft. 1⅞ in.

The general features of the design of framing for this car are the same as for the shorter car for suburban service which was illustrated and described in the *STREET RAILWAY JOURNAL* for June 8, 1907.

are in effect balanced by each other. The center sills consist of two rolled channels 18 in. deep and spaced 16 in. apart, tied together with ½-in. top and bottom cover plates, and having a total cross-sectional area of 50 sq. in. The draft gear is mounted so that the center line of draft is approximately in the neutral axis of the center sill girder.

The floor of the car is formed of a 1½-in. layer of Karbolith placed on top of corrugated steel sheets riveted to the

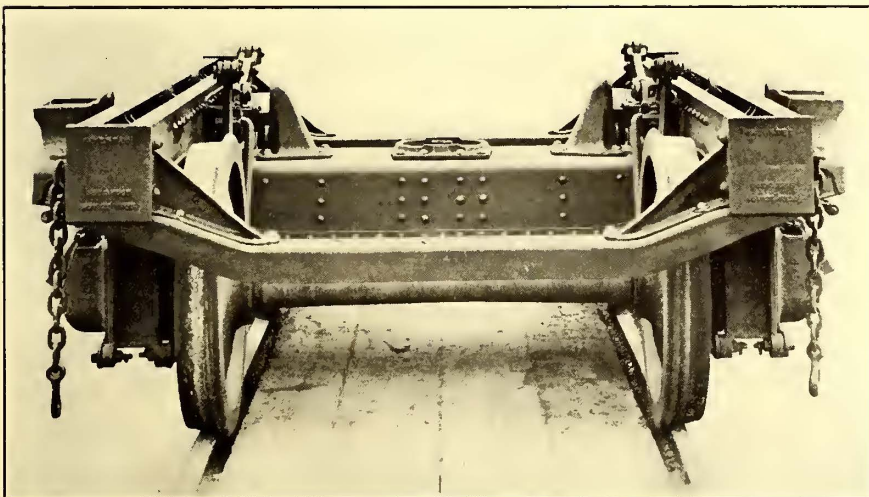


Side View of Truck.

upper surface of the underframing. The ceiling headlining is non-inflammable composite board. The outside finish, roof covering and other parts are sheet steel. No attempt has been made to conceal riveting, either inside or outside, as it was considered an advantage to plainly indicate that the car was built entirely of steel.

The trucks used under these cars are illustrated herewith. Many of the essential parts of the M. C. B. and other types of passenger trucks have been entirely discarded, and the result is a truck strong and rigid, with few parts, and having excellent riding qualities. The truck has no transoms, spring plank, swing links, brake beams or equalizers.

The side frames consist of two heavy channels riveted together with flanges turned in and separated by filler block castings. They are rigidly connected across at the ends with angle end pieces bent down to clear the deep body center sills, but no cross connection is used in the center. The top of the truck bolster is below the bottom of the side frames and the bolster projects out beyond the side frames to carry the truck side bearings. The bolster is a pressed steel inverted channel 24 in. wide and stiffened with angles. It rests at each end on sextuple full elliptic springs, carried on heavy hangers dropped from the side frames. The center of the spring bands is directly under the center of the side frames. The construction is very similar to that used in the



End View of Truck.

The whole weight of the body is carried by the deep, heavy center sills. No body bolsters are used, but the weight carried by the deep plate girders forming the sides of the car below the windows is transmitted to the center sills by two stiff pressed steel cross-bearers and the end sills. These cross-bearers are located exactly the same distance on one side of the truck center plate supports as the end sills are on the other side, so that the transferred concentrated loads

spring suspension of locomotives. Over each journal box the side frames rest on 8-in. triple coil springs bearing directly on top of the boxes. The points of spring support are thus placed the maximum possible distance from the center plate, both transversely and longitudinally.

The side thrust of the bolster is absorbed by a coil spring and plunger mounted in a spring pocket inserted in the side frames. Cast steel horns are bolted on the top of the bolster

inside the frames to engage with the inner ends of the spring plungers, and the side bearing castings on the ends of the bolster outside the frame engage with the outer ends of the plungers. Both springs come into play whenever the bolster swings in either direction.

The brake rigging has been much simplified. The brakes are inside hung with loop hangers supported from a casting riveted on the inside of the side frames, over the bolster. The brake levers on each side are connected with a push rod passing over the bolster, and the two dead levers are anchored to the side frames. A floating lever connects the upper ends of the two live brake levers and passes through a slot cut in the body center sills. The brake rod leading to the cylinder lever in the center of the car is passed inside of the box center sill and connects with the truck floating lever immediately over the center plate, so that curving of the truck has no effect on the foundation brake gear.

The truck side bearings are mounted on the extreme ends of the bolster, and the body side bearings are placed under the side sills of the car. Normally, the entire load is carried by the center plate with the side bearings on each side barely in contact. Any roll of the car body is taken instantaneously by the bolster spring on the low side. The bearing surfaces are smooth iron plates lubricated from an oil cellar formed in the body side bearing casting.

While these trucks were designed for trailer service, with some slight modifications they could be adapted for motor service. The patents have been assigned to the Pressed Steel Car Company, with reservation of shop rights for the Pennsylvania Railroad Company. As yet modified designs for motor service have not been perfected, but it is understood that the Westinghouse Electric & Manufacturing Company is working on a motor application suitable for use under cars to be run in the New York terminal tunnels.

### M. C. B. COUPLERS FOR ELECTRIC RAILWAY SERVICE

The McConway & Torley Company, of Pittsburg, included in its exhibit of car couplers, at the Master Car Builders' convention, a new type of coupler for interurban electric railway service. The device is a modification of the Janney passenger car coupler, which has been in successful service for a long time on steam railroads, and differs from that described in the STREET RAILWAY JOURNAL for Oct. 12, 1907. It can be used with trains composed of cars of 50 ft. and upward in length, around curves with a radius of 35 ft. or even less. Cars can also be coupled on curves, if necessary, and no difficulty is experienced in the operation of cars over sharp changes in grade, when equipped with this coupler.

As shown in Fig. 1, the radial movement of the coupler is under spring tension, so as to obviate the lateral buckling of couplers under the impact shock of coupling, and the coupler is normally held in the central position. By means of a special lever, however, this tension can be released, permitting the coupler to be moved laterally to any position required. The movement of the lever is indicated by the dotted arrow in Fig. 1. The elimination of the tendency on the part of the couplers to buckle when the cars are being pushed around curves is provided for by means of a lug or extension on the side of the coupler head, against which the point of the guard arm of the opposing coupler comes in contact under the impact of pushing, thus retaining the couplers practically in line.

The vertical dimension of the knuckle face is 10 in., so that it is easy to effect coupling with opposing couplers at

different heights. The device for uncoupling, as shown in Fig. 2, is easy of access from either side of the car, so that the coupler can be unlocked on either straight or curved track. The M. C. B. lines have, of course, been retained,

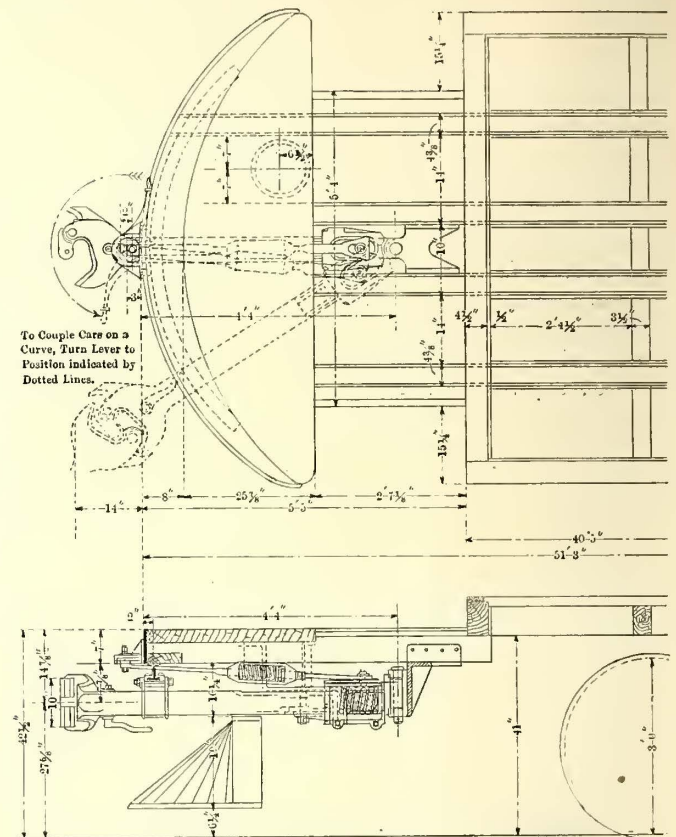


Fig. 1.—Plan and Side Elevation of Coupler.

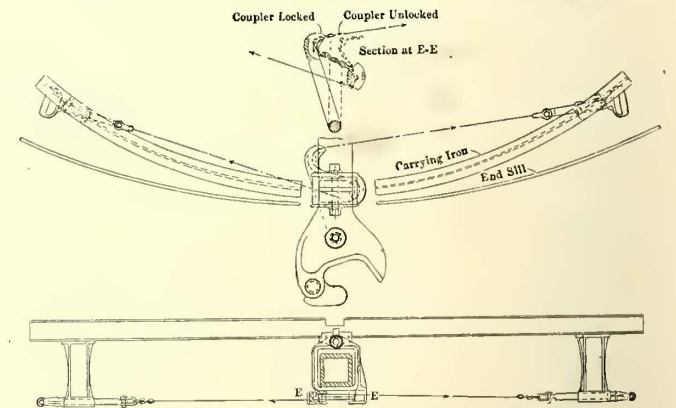


Fig. 2.—Sections Showing Locking Device.

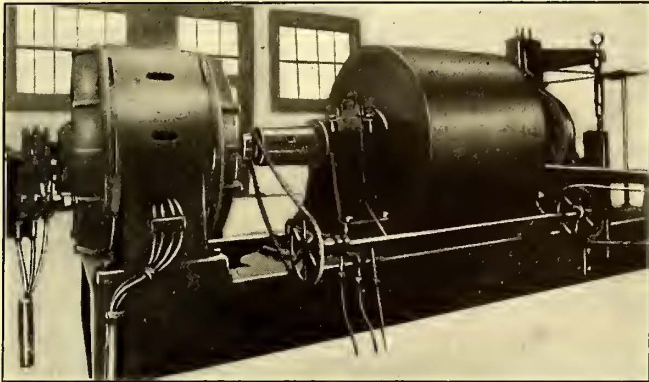
making it possible to couple electric cars equipped with this device with cars of steam roads.

The University of Minnesota has increased the length of its engineering courses from four to five years. This is for the purpose of adding to the amount of general culture work required heretofore, and at the same time rearranging and increasing to a small extent the technical work. The courses added will consist of modern languages, economics and political science. The first year is uniform for all courses, so that students need not choose their special course until after one year's work at the university. As the first four years provide a good general education, the university will give a degree of bachelor of science at the end of the fourth year. Most of the purely technical work comes in the fifth year, upon the completion of which the degree of electrical (or other) engineer will be given.



**BRAKE SHOE TESTING MACHINE OF THE AMERICAN  
BRAKE SHOE & FOUNDRY COMPANY**

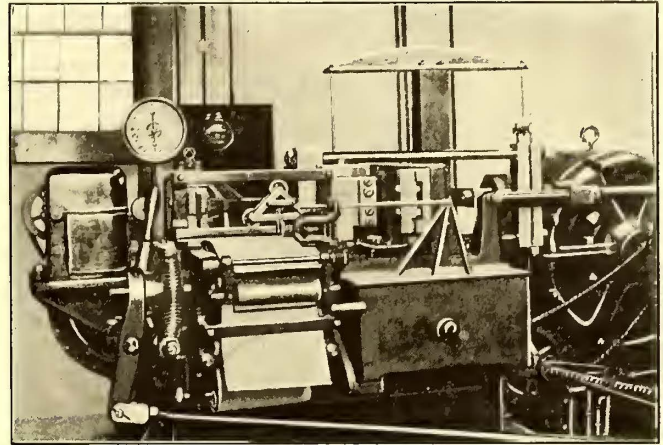
The American Brake Shoe and Foundry Company has designed and had built a new type of brake shoe testing machine which has been installed at the company's works at Mahwah, N. J. The machine differs in several important respects from the machine of the Master Car Builders' Association which is mounted in the laboratory of Purdue University, Lafayette, Ind., where the test work of the as-



**Brake Shoe Testing Machine—Rear View, Showing Oil Piping to Main Bearing.**

sociation's standing committee on brake shoe tests is carried on. It is driven by a 75-hp, two-phase, 220-volt Westinghouse induction motor, the armature of which is rigidly connected to the fly wheel shaft, instead of belt driven from a reciprocating engine which is thrown out of connection with the fly wheel at the beginning of a test by means of a clutch coupling, as at Purdue University. With the motor drive, the current is shut off after the desired initial speed has been slightly exceeded, and the test wheel, fly wheel and armature are allowed to drift until the speed

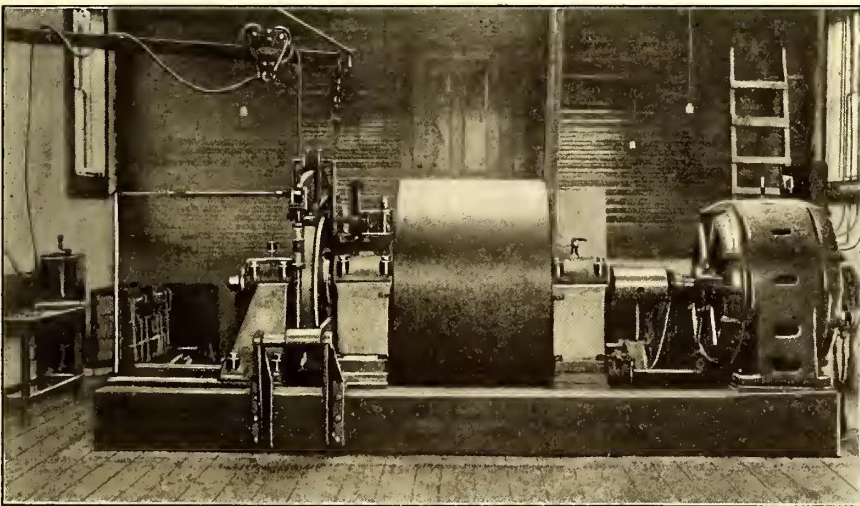
bearing and has a tendency to vary from a true vertical plane of rotation under heavy brake shoe loads. The outboard bearing is carried on a heavy support resting on the base plate of the machine. A rack and pinion gear is provided for moving the bearing support out along the bed to permit changing test wheels. The test wheels are forced on a tapered wheel seat  $7\frac{1}{4}$  in. in diameter on the main shaft, and after the outboard bearing has been racked up to place



**Brake Shoe Testing Machine.—Weighing and Recording Mechanism, with Starting Box.**

a large nut is screwed on the end of the shaft which projects through the bearing, thus holding the bearing firmly against the hub of the wheel.

The machine was designed to provide energy at the wheel tread equivalent to the energy of one wheel of a car weighing 160,000 lb. when running at a speed of 80 m.p.h. The calculated kinetic energy of one wheel at this speed is 4,280,000 ft. lb. The actual kinetic energy supplied by the fly wheel and the motor armature at 800 r.p.m., which is equivalent to 80 m.p.h. with a 33-in. wheel, is 4,510,000 ft. lb., or



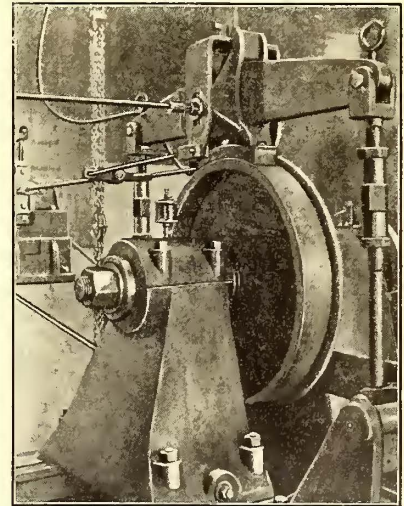
**Brake Shoe Testing Machine—Front View of Complete Machine and Details of Test Wheel, Pressure Lever Shoe and Outboard Journal.**

reduces to the desired point, when the shoe is applied. The rotating armature adds materially to the energy of the heavy fly wheel.

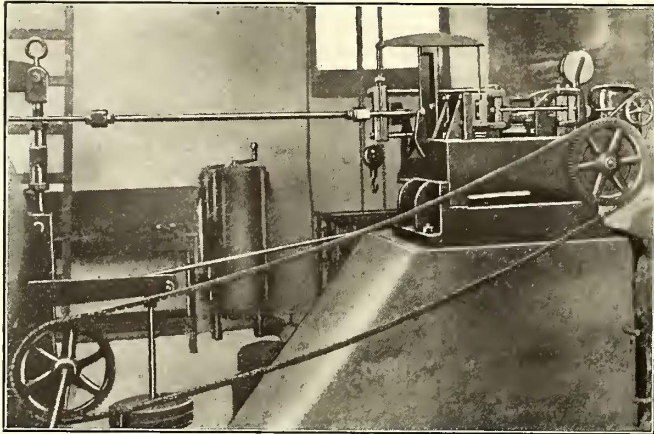
Another essential difference is that the test wheel is mounted on a shaft supported at its outer end by an outboard bearing. This reduces the bearing friction and holds the wheel rigidly in a true vertical plane of rotation. In the M. C. B. machine the test wheel overhangs the inner shaft

an excess of 230,000 ft. lb. Of this total energy the motor armature supplies 436,000 ft. lb. and the fly wheel and shaft the remainder, or 4,074,000 ft. lb. The fly wheel, which is 54 in. in diameter and 38 in. long, weighs with its shaft, which is  $7\frac{3}{4}$  in. in diameter, approximately 11,900 lb. Its calculated moment of inertia is 37,200 ft. lb.

A gravity pressure oiling system is provided for the two main shaft bearings and the outboard bearing. They are



flooded with oil, and the internal friction of the machine is not only reduced to a minimum, but is kept practically constant at all times. A number of trials showed that when the rotating parts were allowed to drift to the end of the stop, the total number of revolutions was almost constant for the same initial speed, indicating nearly perfect uniformity in the internal friction. All of the bearings are of ample size, the main bearings being 7 in. in diameter by 16½ in. long,



Brake Shoe Testing Machine—Rear View of Weighing and Recording Mechanism, with Starting Box.

and the outboard bearing 4¾ in. in diameter by 12½ in. long.

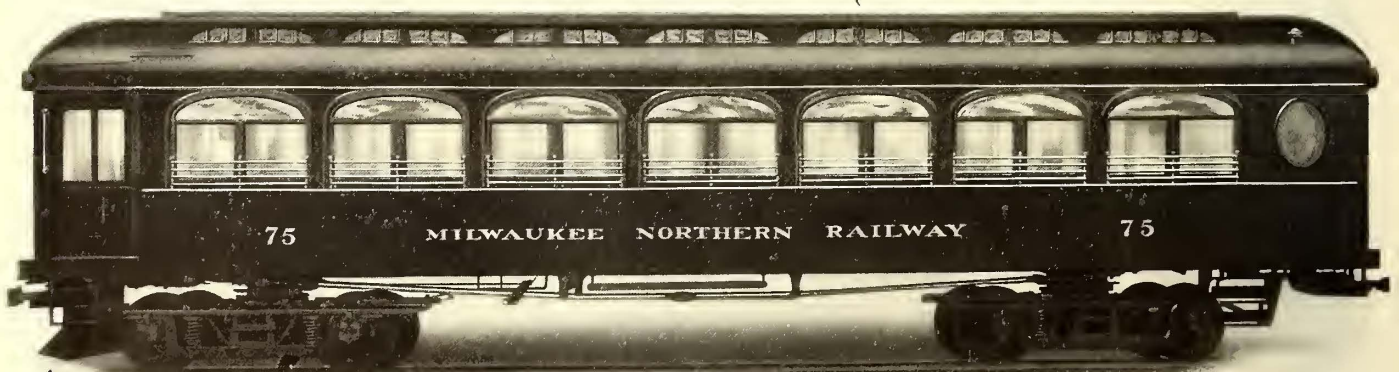
The apparatus for applying the brake shoe to the wheel consists of a floating lever bearing on the brake shoe and anchored at an end. To the other end is attached a rod connecting the leverage system through which pressure is applied to the wheel by the brake shoe. The system of levers has a ratio of 1 to 25, so that each weight of 40 lb. applied at the outer end exerts a pressure on the shoe of 1000 lb. The weights used are cast iron disks 1¼ in. thick and 13 in. in diameter. A fixed pressure or dead load of 2000 lb. is exerted on the brake shoe by the weight of the levers and their supports.

weigh a new brake shoe to within one grain, so that the actual loss in weight of metal from a shoe after a test can be accurately determined. An accurate wheel diameter gage is also provided to measure the effect of wear of the brake shoe applications on the test wheels. At the present time the equipment of test wheels consists of one chilled cast iron wheel made by William Sellers & Co., 33 in. in diameter, with cylindrical tread, and one 33-in. solid steel wheel with cylindrical tread and M. C. B. standard flange, 5½ in. wide over all. Additional M. C. B. tread wheels, both chilled cast iron and steel and steel tired, will shortly be added to the equipment of the laboratory, as will also cast iron, steel-tired and solid steel wheels adapted for electrical street and interurban cars, with the tread and flange adopted as standard by the American Street & Interurban Railway Engineering Association. The company proposes to carry out such tests as may be necessary to determine the best type of brake shoe for electric cars, and will gladly co-operate with any company in making such tests.

The machine and attachments cost \$81,000 to build and install. It was designed under the direction of F. W. Sargent, chief engineer of the American Brake Shoe & Foundry Company, to whom this paper is indebted for the illustrations and data.

### A RECORD IN CAR BUILDING

The Niles Car Works, Niles, Ohio, recently built two cars for the Milwaukee Northern Railway in record time. The road runs from Milwaukee to Port Washington, Wis., with an extension now building to Sheboygan. It forms a Y with the base at Milwaukee, the junction at Cedarburg, and the west and east terminals at Fond du Lac and Sheboygan, respectively. The increase in the business of the company made it evident that new equipment was necessary, and F. W. Walker, vice-president of the company, called at the Niles Car Works May 20 to know how soon two cars could be completed and shipped. A. W. Schall, superintendent of the works, replied that they could be built in three weeks. The order was at once signed, and the cars were completed



Milwaukee Northern Railway Combination Interurban Car, Built in Three Weeks.

The tangential pull on the shoe is measured by an Emery dynamometer attached to the brake shoe head. Its leverage is designed to give a deflection of 1 in. from the zero line for each 1000 lb. of tangential pull. The complete record of each test is made on a continuous strip of paper run through the machine. Speed is measured by an electric tachometer connected to the shaft. The testing laboratory at Mahwah is equipped with delicate balances, which will

and ready for shipment according to contract, a record of which the Niles Works justly are proud.

The cars are of the combination smoking and passenger type, with a seating capacity of 52 persons. Each is 50 ft. 4 in. long over all and 40 ft. 2 in. long over the body. The passenger compartment is 28 ft. 1 in. long and the smoking compartment 8 ft. 2 in. A special baggage vestibule, 8 ft. 3 in., is also provided. The width over the sheathing at the

sills is 8 ft. 7½ in. The plan of the cars presented herewith shows that their general arrangement embodies a number of interesting features. The toilet room, for instance, is located on the rear vestibule and extends diagonally from the rear post on the curb side of the car, with entrance from the interior of the car. In this way, space on the rear platform, which usually is wasted, is utilized and the seating capacity is increased two persons. Moreover, the hopper is at the extreme rear of car clear of trucks and all apparatus suspended under the car. The partitions between the main passenger compartment, smoking room and baggage vestibule are paneled solid so that seated passengers cannot look from one compartment into another, but the

## HINTS ON CAR DESIGN

BY A CONDUCTOR

The following suggest ways in which the present construction of cars can be improved:

The key to turn the air on and off is generally situated in such a place that a conductor may mistake it for the light switch, as in many instances similarity exists. The air should be controlled by a key carried by a motorman. A new conductor is liable to turn off the air while a car is going at full speed, and thus cause damage.

Air cocks to bleed cars are generally located under the cars in inaccessible places. This is a poor arrangement, as a motorman who has just bought a new overcoat does not feel inclined to crawl under the car. It is necessary in winter to open this cock every hour or so and inducements should be offered to the motorman to attend to this duty.

Snow gets on the vestibule windows, and if a hose was connected with the air tank

and reached to the vestibule window it would be an inducement for a motorman to bleed his air tank every hour in cold weather; the air could be used to blow snow from the windows and out of the switches. Vestibule windows should also be made so that they could be turned around. When snow and ice accumulated, obscuring the motorman's view, he could turn the outside of the window toward the inside of the car and wipe off the glass.

In some cases it is advisable for a car to have both an arc and ordinary headlights. In the city, the ordinary headlight shows, and in the country districts the arc is used. Some cities will not allow the arc light to be used in the city streets. An arc light blinds the motorman of an approaching car as well as other persons on the street. It is advisable to have an arrangement whereby the arc can be turned off and the incandescent turned on, or vice versa, instantly. For a motorman to stop and look for a button consumes too much time. At the side of the controller there should be an upright pole by means of which the motorman, by simply twisting, could instantly turn from the arc to the incandescent, or vice versa.

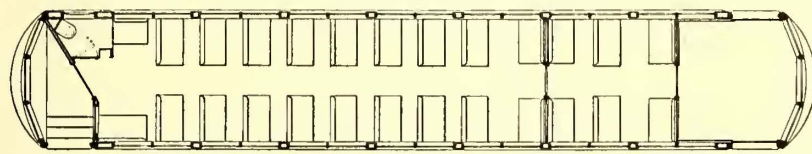
The side of every sand box should be constructed of glass to enable the motorman or inspector to see instantly if the proper amount of sand is ready.

It should be possible to fold the inside step of every car. It is dangerous for passengers to ride on these inside steps.

It is often necessary for a trainman to climb to the top of a car. On many cars the facilities for climbing are limited, as the place on top of which the trainman must catch hold is small. I know one conductor who fell from a car and was taken to the insane asylum because proper attention had not been given to this important matter. Grab handles on the top of a car should be made large. There should be one on the main roof and one on the false roof.

Lights should be distributed and not in clusters. Provision should be made to light the rear platform, and all light switches should be labeled so that in looking for them new men would not lose time.

On air cars sand should be placed on the track by air. If this is not done, it should be placed by the foot. All sand, fender and bell taps should be labeled.



Plan of Milwaukee Northern Railway Combination Interurban Car

upper portions are glazed so that the conductor and persons who are standing can view the interior. The interior, with the exception of the ceiling, is finished in quarter-sawn oak. The ceiling is of oak finished in semi-empire style, showing the natural grain, a plain, but very handsome effect. The cars are to be operated from one end at all times. The passenger entrance is on the right hand side only, but there are baggage doors on both sides of the front vestibule. The seats are of the Hale & Kilburn No. 3-C type with stationary backs. Those in the passenger compartment are upholstered in plush, and those in the smoking compartment with Pantasote. The Niles Car Works have been very busy this year, and are shipping interurban cars for the Chicago, Lake Shore & South Bend Railway, Pittsburg, Harmony, Butler & New Castle Railway, San Diego Electric Railway, Toledo Urban & Interurban Railway, and Choctaw Railway & Lighting Company.

## CAR BUILDING IN ATLANTA

It is the custom of the Georgia Railway & Electric Company, of Atlanta, to build all of the cars which are needed for operation in Atlanta. Carrying out this plan, the company does not build cars at any specified time, but turns out three or four cars per month. Owing to the decreased travel, which has been felt at Atlanta as it has been all over the country, W. H. Glenn, manager of railways of the company, says the company is not building as many cars as it did last year, but up to June 10 had turned out 15 cars. All have 20-ft. 8-in. bodies with 7 cross seats to each side, making the seating capacity 28. They are of the boxcar type with large windows and vestibule fronts. Each car is equipped with two 40-hp motors.

## MASSACHUSETTS COMPANIES ASK FOR FREIGHT RIGHTS

Approval of trolley freight rights in Framingham have been asked of the Massachusetts Railroad Commissioners by the Middlesex & Boston Street Railway and the Natick & Cochituate Street Railway. These companies are in the Newton group of railways, controlled by the Boston Suburban Electric Companies, which have already secured rights of this sort for Newton, Waltham, Lexington and other easterly parts of their system.

A car of the Chester Traction Company was damaged June 19 by dynamite by strike sympathizers.

**REPORT ON THROUGH ELEVATED SERVICE IN CHICAGO**

A series of conferences on through routing and the issuing of universal transfers by the elevated railways of Chicago, has just been terminated without definite conclusions having been reached. On April 23 George Weston, engaged as engineer by the Chicago City Council committee on local transportation to investigate the subject of increasing the capacity of the Union loop, submitted a report recommending changes which, Mr. Weston said, would, if made, increase the capacity of the loop by 43 per cent. This would mean an increase of from 680 cars an hour to 1068, with 55,536 seats in place of 35,360, as at present. In that report Mr. Weston pointed out that the remedies suggested were but temporary, and that the constantly increasing traffic demanded "that a complete and comprehensive plan must be devised to ultimately provide in a full and satisfactory manner for the traffic through the congested business district."

Since that report was presented there have been held a series of conferences between engineers representing the four elevated railway systems, and Mr. Weston, representing the transportation committee of the Chicago City Council. On June 22 Mr. Weston presented to the chairman of the local committee on transportation a report of the arguments presented in this series of conferences. The report included some interesting information on elevated traffic. An abstract follows:

As regards the increased capacity of the elevated loop due to through routing of cars between the Northwestern Elevated Railroad and the South Side Elevated Railroad, the extension of station platforms, and the relocation of some of the existing platforms, the South Side Elevated Railroad Company claims that the increased capacity will amount to 33 per cent. The Metropolitan company does not admit this increase, but has not introduced any estimate of increased capacity due to the changes recommended.

The South Side Elevated objects to through routing with the Northwestern Elevated on the basis of losses that would be sustained from extra car miles that would have to be run if trains were through routed. This is based principally upon the contention that the cars of each company should be returned to their own terminal when they are laid up.

The South Side Elevated and the Metropolitan Elevated state that they cannot concede universal transfers for a flat rate of 5 cents. In support of his position C. V. Weston, representing the South Side Elevated Railroad Company, presented figures based on an average daily business of 125,000 passengers or a total of 44,625,000 passengers per annum; which, at a fare of five cents per passenger, gave total receipts of \$2,281,000, and with operating expenses at 70 per cent, which included all charges for loop rental, would amount to \$1,596,875, leaving net earnings per annum of \$684,375. C. V. Weston sets forth the following charges and interest on the investment:

Bond interest .....	\$360,000
Cost of leased lines .....	96,000
2½ per cent allowed for depreciation on \$19,972,445 (the present estimated value of property) .....	499,311
Interest on capital stock at 6 per cent.....	619,380
<b>Total .....</b>	<b>\$1,574,691</b>

This amount, plus the operating expenses, would give a total cost for carrying 44,625,000 passengers of \$3,171,566. The cost per passenger would equal 6.95 cents. C. V. Weston, president of the South Side Elevated Railroad, claims that the present average haul is 6.6 miles. Consequently, the cost per passenger mile would equal 1.05 cents, and this cost per passenger mile makes the limit of average haul 4.76 miles at a flat rate of five cents. Therefore, C. V. Weston contends that to pay operating expenses, maintain

the property, pay fixed charges and allow 6 per cent return on the capital stock, 4¾ miles is the average haul that his company can afford to make for the flat rate of fare of five cents—that the present business, that requires a haul of 6.6 miles, is not sufficiently profitable; and that they could not entertain a proposition that, in their judgment, would increase their losses.

The Metropolitan West Side Elevated Railway endorsed the foregoing statement of President Weston with regard to the issuing of universal transfers.

The Northwestern Elevated Railroad Company set forth its position as follows:

That it was ready to through-route cars and could give universal transfers, considering that with the increased loop capacity, through routing, extension of the loop platforms and the building of stub terminals would be sufficient advantages to outweigh any losses occasioned by the through routing and issuing of universal transfers.

C. V. Weston contended that greater capacity would be given to the loop by the separation of grades at the intersections, thus doing away with the interlocker interference. This method will give the greatest capacity of any to the loop.

Regarding the 33 per cent increased capacity, as conceded by the South Side Elevated Railroad, this is based on the following factors: Average speed, 10 m.p.h. on curves; allowance of 4½ seconds to throw interlock, and an interpretation of the loop lease to mean "number of cars leaving the loop per hour," rather than "number of cars upon the loop at any one time."

George Weston says in his report that there is no question but through routing, extension of platforms, etc., would increase the capacity of the loop between the 33 per cent increase conceded by the South Side Elevated and the 43 per cent increase shown in his report of April 23. He adds:

Concerning these objections to the plans recommended, it is my opinion that it is perfectly practicable for one company to leave extra cars not required for return trips in the terminal yards of the other company.

In considering universal transfers, it is my belief that the introduction of universal transfers and through routing in Chicago, with the business district centrally located and transportation radiating in three general directions from that center, would not result in an average passenger haul beyond the limit of profitable operation to the companies.

It is apparent to every one that Chicago will grow rapidly and eventually become a city of great magnitude, and, consequently, in my judgment, it would be a great mistake to determine upon a plan that would perpetuate the present loop operation of the elevated trains.

The net results of the conferences between the elevated railroads and Engineer Weston are set forth by him in his report as follows:

The Northwestern Elevated states that it is ready to through route and to concede universal transfers, and it is stated by Mr. Mock, its representative, that he understands that this position is concurred in by the management of the Chicago & Oak Park Elevated Railroad Company.

The South Side Elevated will not through route for a flat fare of 5 cents, nor will it agree to universal transfers for a flat fare of 5 cents.

The Metropolitan Elevated will not agree to universal transfers at a flat rate of 5 cents.

The South Side Elevated and the Metropolitan Elevated contend that as great, or greater, capacity could be given the loop by separation of grades at intersections, extensions of platforms, looping of all trains, and the establishment of auxiliary stub terminals.

The Philadelphia Rapid Transit Company's claim department is supplying conductors with an envelope containing eight cards for distribution among accident witnesses to secure their signatures and addresses. It is believed that this method will insure greater accuracy and despatch than having the conductor write the names himself.

# News of Electric Railways

## Council Committee to Insist Upon Through Elevated Routes in Chicago

The committee on local transportation of the Chicago City Council has decided to insist on the adoption of through routes for the Chicago elevated railways. The position of the committee was outlined by Milton J. Foreman, the chairman, as follows:

"The eventual unification of all elevated and surface lines in Chicago under one executive management is inevitable. Through routing of elevated trains is not a problem by itself. It is a piece of the whole big scheme which those who have studied the situation see is bound to come and for which they are working. There is a lot of loose talk about subways. When all the useless waste of blind competition is eliminated from the management of the transportation systems we now have there will be plenty of time to figure out how and when and where we are going to build a subway. These other things must come first. This is a big city, and it is one city. We will have 4,000,000 people living here in 10 years, and will serve as a shopping and business center for 6,000,000 more. These are the people we are going to look after.

"The surface railways got a square deal from the city and the elevated roads will get one, too. The north and south side lines must introduce through routes immediately. Later the other through routes can be arranged, and while that is being done the people must have transfers instead of paying separate fares. Through routes in Chicago have been tried. The Chicago City Railway and the Chicago Railways Company are running cars from Seventy-ninth and Halsted Streets on the south side to Howard Avenue on the north. The plan is necessary from the city's point of view and practicable for the companies."

## The Cleveland Situation

Frank H. Smith, a taxpayer, has brought suit under the Schmidt law to restrain the city officials of Cleveland from using the city funds for holding a referendum vote on the security grant to the Cleveland Railway. He asks that Mayor Johnson be restrained from issuing a proclamation calling for an election, that the auditor be prevented from issuing vouchers to pay persons now engaged in the work of verifying signatures, and that the treasurer be prohibited from disbursing money for the work. Mr. Smith says that as he does not believe the law is constitutional it should be tested. He has been a stockholder of the company for some time.

W. T. Cook, superintendent of the Municipal Traction Company, has announced that the conductors will be furnished with \$6 worth of tickets and that the matter of furnishing a reasonable amount of change for bills will be taken under consideration. The rule not to change a bill of greater denomination than \$2 caused dissatisfaction, although conductors took only two or three bills in accordance with the rule making it incumbent on them to keep a bill of large denomination and ask the owner to call at the office for the change.

A cross-town line on the West Side has been suggested by members of the City Council from that district and it is possible that construction of such a line will be considered.

Peter Witt, city clerk, has brought suit against the Cleveland Railway, Horace E. Andrews, J. J. Stanley and other directors of the Cleveland Electric Railway, in Common Pleas Court, asking that \$75,000 deposited to secure the fulfillment of bids for the construction of lines on certain streets be forfeited to the city. Mr. Witt says that the bids were not made in good faith, but only to prevent other companies from building lines on the streets.

It seems likely that the consent of a sufficient number of property owners on Superior Avenue will be obtained to insure the proposed four-track system for that thoroughfare.

A contract between the Municipal Traction Company and the new union organized some time ago has been signed. It provides for a wage scale of 23 cents an hour for the first year, 24 cents for the second and 25 cents for the third, seniority of service to govern the runs and the hours of employment to be as nearly 10 as possible. All employees must join the union, although the new men will be given 60 days in which to join. All questions in dispute must first be submitted to the superintendent, then to the president and finally to an arbitration board of three if an

agreement cannot be reached with the officers. Strikes may be called only by an affirmative vote of a majority of the men having day runs. While this vote is to be secret, it must be taken in the presence of a representative of the company.

On June 22 Judge Phillips, of the Common Pleas Court, issued a mandatory order to the Municipal Traction Company to operate cars through East Cleveland according to the schedule fixed by the Village Council on May 7, 1908. This schedule calls for cars every 4 minutes during the morning and evening rush hours, every 8 minutes until midnight and every 30 minutes from midnight until the first cars are run in the morning. Judge Phillips holds that the company must comply with the grant made in 1896 and carry passengers at the same rate that prevails on Euclid Avenue, Cleveland, with all the privileges of the line over that thoroughfare.

The company has agents in the Public Square selling tickets. They carry the aluminum disks in a small satchel with a strap over their shoulders, and sell to individuals and supply the conductors whose cars pass through the square. The agents also assist and direct strangers.

## Cambridge Subway Hearings Resumed

Hearings were resumed before the Massachusetts Railroad Commission on June 18 in reference to the proposed location of stations in the Cambridge subway. The different interests agree on stations at Harvard and Central Squares. No additional stations are desired by the Boston Elevated Railway. Mayor Wardwell, of Cambridge, urged that a station should be located at or near Dana Street, with another in the Kendall Square manufacturing district. City Engineer Hastings, of Cambridge, submitted maps drawn to the same scale of the proposed subway from Park Street to Harvard Square, Cambridge, the New York, the Brooklyn and the Philadelphia subways, showing the station locations, and also a map showing the steam railroad station locations in Somerville, Arlington, Cambridge, Wattertown, Belmont, Waltham and Lexington. He argued that the distances between stations are generally shorter in these instances than in the case of the Cambridge subway route. On cross-examination F. E. Snow, attorney for the Boston Elevated Railway, brought out the differences in population between Cambridge, with 100,000 inhabitants, and New York, Brooklyn and Philadelphia, which have much greater density of population. The stations close together in the latter cities are in the congested districts. William Barclay Parsons, of New York, consulting engineer for the city of Cambridge, explained to the Mayor his report on traffic conditions, an abstract of which was printed in the STREET RAILWAY JOURNAL of June 15, 1907. He advised the location of a station at Dana Street on account of the potential residential development to be expected there and another at Sixth Street, in the Kendall Square district, to accommodate the manufacturing population.

At the hearing on June 19 Mr. Parsons said that his studies had been confined to the distribution of traffic in Cambridge and that he had made no attempt to forecast the number of persons who would use any particular station, but he had figured the present tributary traffic to the four stations proposed by the city to a total in both directions of 6600 passengers for the Dana Street location. Mr. Snow said that less than half the passengers east of Dana Street take subway cars for Park Street, showing that this part of Cambridge does not need special subway facilities. Mr. Parsons said that the cost of operating the Dana Hill station, which would be about \$10 a day, would soon be met by increased travel.

Geo. A. Kimball, chief engineer of the Boston Elevated Railway, estimated the cost of a station at Dana Street as \$140,000 and one at Sixth Street at \$200,000.

C. S. Sergeant, vice-president of the Boston Elevated Railway, said that it would cost about \$14.15 per day or \$5,165 a year for labor alone to operate a station at Dana Street with two entrances and two platforms. To this he added for extra cleaning, work on lights, etc., enough to make the cost of operation about \$8,500 per year, not including interest or depreciation.

Mr. Sergeant stated that an attempt had been made to learn the cost of stopping trains at this additional station, assuming a schedule calling for the operation of four-car trains for 18 hours and six-car trains in the rush hours. For 10 hours the interval was figured at 3 minutes and for

8 hours at 6 minutes. The round-trip running time was figured on a schedule of 7 minutes each way with two stations (Harvard and Central Squares) between Park Street and the end of the route in Cambridge. Allowing 2 minutes at each end, the time of the round trip would be 18 minutes, requiring six trains on the line and making the cost for wages \$88.20 per day with one intermediate station, as at Central Square. Adding a station at Dana Street would lengthen the round trip by 3 minutes and make the total running time from Park Street subway station to Harvard Square and return 21 minutes. This adds 20.8 per cent to the payroll, increases the train wages \$18.42 per day and makes the total wages \$6,723 per year.

The cost of stopping a train was estimated by means of one of the company's semi-convertible cars, since the cost of the stops on the present elevated division is undoubtedly excessive. It was estimated that with a semi-convertible surface car making four stops per mile and assuming that the cost of stopping consumes half the money spent for maintenance, the wear and tear on equipment would be 2 mills per car per stop. The current used as a result of stopping was estimated at 1 kw-hour per car, costing 1.25 cents per car per stop. In a year there would be 934,400 car stops at the station, making the total cost of stopping the trains from the mechanical standpoint \$13,548 per year. The addition of 3 minutes to the round-trip running time would necessitate another train of six cars, costing \$90,000. Allowing 12.5 per cent for taxes, interest and depreciation on the rolling stock, the annual cost of this train would be \$11,250. The maintenance of the six cars, figured at about \$600 per car per year, would be \$4,800, and figuring 10 per cent fixed charges on an investment of \$140,000 in a new station, including maintenance, \$14,000 would have to be added, making the total excess cost of operating the subway with a station at Dana Street compared with the two-station plan, \$58,822 per year.

In conclusion, Mr. Sergeant stated that in his opinion stations at Harvard Square and Central Square are all that are needed. By diverting cars into Central Square the present surface service can be brought into very close touch with the subway, leaving a narrow triangular section of the city of small area which has little use for the subway service. With a 2-minute surface-car service on the street above the Cambridge subway, carrying passengers to the nearest subway station from Dana Street in 3 minutes, the need of an additional station at Dana Street, Mr. Sergeant said, does not seem to be established.

**Line Between Wilkinsburg and East Pittsburg Opened.**—The Ardmore Street Railway Company has completed its road between Wilkinsburg and East Pittsburg. A brief description of this road was published in the STREET RAILWAY JOURNAL for May 16, 1908.

**Pay-as-You-Enter Cars in Cleveland.**—A. B. DuPont, president of the Municipal Traction Company, says that the Payne Avenue line will shortly be equipped with pay-as-you-enter cars. The new cars will be run on single trips during the rush hours as an experiment.

**Verdict Sustained in Boston Case Against Dishonest Conductor.**—William A. Robertson, formerly a conductor of the Boston Elevated Railway, was fined \$50 by Judge Pierce, in the Superior Criminal Court, Boston, last week, for larceny of fares from the company. The case came up on an appeal from the Dorchester District Court.

**Fined for Transfer Fraud in Atlanta.**—W. A. Wilson, formerly a conductor for the Georgia Railway & Electric Company, Atlanta, Ga., before Judge A. E. Calhoun in the City Criminal Court recently entered a plea of guilty on a charge of stealing transfers and was fined \$50 and costs. When arrested Wilson's rooms were searched and parts of 32 pads of transfers were found.

**First Car on Illinois Road.**—The first car to be operated on the Springfield, Clear Lake & Rochester Railway entered the city of Rochester, Ill., June 10. The company will continue to operate the Rochester end of the line until the road is completed, which will probably be about July 1. The road will then be extended to Hillsboro. J. E. Melick, of Springfield, Ill., is president of the company.

**New Blanket Franchise Proposed in Springfield, Ill.**—An ordinance providing for a 20-year blanket franchise covering all lines of the Springfield Consolidated Street Railway in Springfield, Ill., has been prepared for introduction in the Council. The company agrees in the proposed ordinance to pay to the city 2 per cent of gross receipts for the first 10 years and 4 per cent the second 10 years, also to pay half the construction cost of the Ninth Street subway.

**Lehigh Valley Railroad Experimenting with Gasoline Car.**—The gasoline-electric car of the General Electric Company which was operated some months ago over the Delaware &

Hudson Railroad as an experiment was given a service test on June 15 on the Lehigh Valley Railroad between Perth Amboy and South Plainfield, N. J. During the test, extending over a period of more than two weeks, the car will be subject to orders of officers of the Lehigh Valley Railroad.

**New Wage Scale in Muscatine, Ia.**—The Citizens' Railway & Light Company, Muscatine, Ia., made effective on June 15 a new wage scale for trainmen as follows: Conductors, first two years, 15 cents per hour; two to five years, 16 cents per hour; more than five years, 17 cents per hour. Motormen, first five years, 17 cents per hour; more than five years, 18 cents per hour. The former wage scale was 15 cents per hour for conductors and 17 cents per hour for motormen, irrespective of length of service.

**Report of Accidents in New York During May.**—The report of accidents on street railways in Greater New York for the month of May made by the Public Service Commission of the First District shows that with increasing summer travel there is a slight increase in the number of accidents. The total number of accidents was 5152 as compared with 4707 in April, an increase of 445. There was an increase of two in the number of persons killed and an increase of 51 in the total number of serious accidents.

**Kentucky Court Decides That Children Jump Off Cars at Their Own Risk.**—The Court of Appeals at Frankfort, Ky., in affirming the judgment of the Kenton Circuit Court in the case of Willis Swartwood's guardian against the Louisville & Nashville Railroad, says that children jump on and off cars at their own risk, and that it is not necessary for the companies to guard carefully against accidents to children even if their employees know that any particular child acquired the habit of jumping on and off the cars and might be injured by continuing the practice.

**New York & Port Chester Railroad to Be Investigated.**—The affairs of the New York & Port Chester Railroad are to be investigated by the Public Service Commission of the First District of New York. The company, of which the control is owned by the Millbrook Company, a proprietary company of the New York, New Haven & Hartford Railroad, has been delayed in its project of constructing a high-speed electric railway from a connection with the subway in New York to the Connecticut boundary by suits brought by interests in Port Chester. The charter of the company is said to have provided that \$800,000 be put out in construction in the two years ended on June 11. The company is not known to have done any work.

**Strike in Pittsburg, Kan.**—A strike by employees of the Pittsburg, Kan., lines of the Joplin & Pittsburg Railway followed the organization of a union which proceeded at once, through its officers, to demand that the company consult the representatives of the union in certain matters affecting the men. The demands were transmitted to J. J. Heim, of Kansas City, Mo., president of the company, who was in Mexico at the time. Mr. Heim agreed to meet a committee from the union in Kansas City, returning at his own expense, but received the reply that unless he complied with the demands of the men at once a strike would be declared. He replied that it would be impossible to comply with these conditions and the strike followed.

**Topics for Buffalo Meeting Suggested by Complaints.**—The topics suggested for consideration at the convention of the Street Railway Association of the State of New York at Buffalo on June 30 and July 1 by C. R. Barnes, of the Public Service Commission, Second District, were the result of complaints received by the commission. The topics, as reported in the ELECTRIC RAILWAY JOURNAL of June 13, are as follows: "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" and "The Practice of Carrying Musical Instruments on City Cars."

**Blackwell's Island Bridge to Open Jan. 1.**—The Pennsylvania Steel Company has completed its contract for work on the Blackwell's Island Bridge proper, and the approaches are now well under way. Chief Engineer Stevenson, of the Bridge Department of New York City, says the bridge will be ready for traffic by Jan. 1, 1909, unless something unforeseen delays the work. The bridge will form an important connection between uptown New York and Queens Borough, Long Island, and several applications are on file by different electric railway companies for the right to operate over the structure. The tracks on the structure will be owned by the city and all lines operating them will be under the direct control of the Department of Bridges. No franchises will be granted to operating companies, but short-time permits will be issued subject to withdrawal if the terms of the agreement are not met.

# Financial and Corporate

## New York Stock and Money Markets

June 24, 1908.

The general tendency of the stock market for the past week has been toward lower prices, although trading has been somewhat more active than in other recent weeks. The nomination of Mr. Taft at Chicago had no direct effect upon prices, although it was immediately followed by a decline owing to the fact that the result of the convention had been discounted by speculators who wanted to take profits as soon as the convention had acted. Other influences which may be held responsible for the downward movement, or at least the failure of any element of buoyancy to develop, were the passing or reduction of dividends on the stock of various prominent properties.

Following closely upon the admitted necessity of refunding coupons by the management of the Erie Railroad came the announcement of the passing of dividends by the Lake Erie & Western Railroad and the Cleveland, Cincinnati, Chicago & St. Louis Railway, and the reduction of the dividend on Louisville & Nashville Railroad stock from 6 to 5 per cent. While every trader understands that dividends upon conservatively managed properties are subject to reduction, the actual cut chills investors. On June 22 and 23 rumors affecting the Rock Island properties were persistent. It was reported that arrangements had been made for a loan from Wells, Fargo & Company, but that completion of the deal had been delayed. In official circles the weakness of the securities was attributed to bear attacks.

Crop and money conditions are all that could be desired by the optimists, and are cited as certain indications that a genuine buying movement must surely develop. Rates of discount in this country and Europe are very easy and the exports of gold are not of sufficient volume to attract especial notice. Call money in Wall street ranges from 1½ to 1¾ per cent, with light demand, while time money was slightly higher, although little business was transacted.

Among the industrial stocks American Locomotive issues have been declining and the same condition is true of Amalgamated Copper and General Electric. Westinghouse common advanced sharply as the impression gained strength that the reorganization plan had become an assured success.

## Other Markets

There has been little activity in traction securities in the Philadelphia market, although the main tone of prices has been firm. Philadelphia Rapid Transit sold as high as 14½, while Union Traction was fairly steady at 47½. There were listed on the Philadelphia Exchange \$203,000 of 5 per cent bonds of the American Gas & Electric Company, which had been exchanged for \$210,870 of the capital stock.

In Chicago trading in traction securities was light and prices were easier. Chicago Railway certificates, series 2, were fractionally lower.

Trading in traction issues was light in Boston, with prices about stationary. Boston Elevated was a trifle stronger, while Massachusetts Electric, preferred and common, remained at practically the figures quoted last week.

In Baltimore quotations were nominal and transactions few. United Railways securities were dull, with first mortgage 4s at 85¼, income bonds at 51½, and funding 5s around 76¼.

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

	June 16.	June 23.
American Railways Company, Philadelphia.....	44½	44½
Boston Elevated Railway.....	a131	a134
Brooklyn Rapid Transit Company.....	47½	45½
Chicago City Railway.....	a190	a190
Cleveland Electric Railway.....	52	a50
Consolidated Traction Company of New Jersey.....	a71	70
Consolidated Traction Company of New Jersey, 5 per cent bonds.....	a103	102½
Detroit United Railway.....	37	38
Interborough-Metropolitan Company.....	10¾	a10½
Interborough-Metropolitan Company (preferred).....	29	28
Manhattan Railway.....	135	a138
Massachusetts Electric Companies (common).....	9½	10¾
Massachusetts Electric Companies (preferred).....	46	47
Metropolitan West Side Elevated Railway, Chicago (common).....	a17½	a16½
Metropolitan West Side Elevated Railway, Chicago (preferred).....	a50	a50
Metropolitan Street Railway.....	a30	25
North American Company.....	a61	59
Philadelphia Company, Pittsburg (common).....	a39	38
Philadelphia Company, Pittsburg (preferred).....	41	40½
Philadelphia Rapid Transit Company.....	a13½	14½
Philadelphia Traction Company.....	88	87
Public Service Corporation, 5 per cent collateral notes.....	a98	a97
Public Service Corporation, certificates.....	a69	a68
Twin City Rapid Transit Company, Minneapolis (common).....	*90¼	87¾
Union Traction Company, Philadelphia.....	a45½	47¼

a Asked. \* Last sale.

**Boston & Northern Street Railway, Boston, Mass.**—The Boston & Revere Electric Street Railway, leased by the Boston & Northern Street Railway, has petitioned the Railroad Commission of Massachusetts for approval of an issue of \$50,000 20-year 5 per cent bonds, subject to call at \$1,050 per bond, to provide means for repaying to its lessee sums advanced for redeeming its bonds maturing in February, 1910.

**Boston (Mass.) Suburban Electric Companies.**—At the special meeting held June 15 the stockholders authorized the officers to borrow money from time to time, the amount not to exceed \$1,500,000. It was the intention of the trustees to issue new stock not to exceed 7500 shares of preferred, and an equal amount of common stock, such shares to be issued to such holders of notes or bonds as may be given the right to exchange for shares, but it was finally decided not to issue convertible notes, and the stockholders laid on the table the motion to issue this new stock which appeared in the call of the meeting.

**Cleveland (Ohio) Railway.**—Stockholders of the Cleveland Railway have been notified that the first quarterly dividend of 1½ per cent will be paid on July 1, when the Municipal Traction Company, as lessee, pays its rental.

**Kansas City (Mo.) Railway & Light Company.**—The company has sold to the National City Bank and N. W. Harris & Company, of New York, \$1,200,000 Metropolitan Street Railway Company, of Kansas City, consolidated mortgage 5 per cent bonds, due on May 1, 1910. The bonds are issued to refund the \$1,200,000 Grand Avenue Railway bonds maturing on July 10, 1908. There are now \$5,534,000 bonds of the issue outstanding.

**Nashville (Tenn.) Railway & Light Company.**—The stockholders have authorized the cancellation of the "refunding and improvement mortgage" dated July 2, 1906, and the execution of a new mortgage to be dated July 1, 1908, to secure an authorized issue of \$15,000,000 "refunding and extension mortgage" 5 per cent gold bonds. Of these bonds, \$2,000,000 can be issued at once, the balance being reserved to retire \$6,000,000 underlying bonds and to reimburse the company for 80 per cent of the cost of subsequent additions to its property. Of the bonds now issuable, \$1,425,000 have been offered to the stockholders for subscription by them. The proceeds of these bonds will permit the company to retire the \$1,000,000 of collateral trust notes which mature on July 1, 1908, and liquidate all other floating debt.

**People's Railway, Dayton, Ohio.**—This company is reported to have increased its capital stock from \$1,100,000 to \$2,500,000. This company is controlled by the American Railway Company, Philadelphia, Pa.

**Philadelphia (Pa.) Rapid Transit Company.**—The Thirteenth & Fifteenth Street Passenger Railway, one of the subsidiaries of the Philadelphia Rapid Transit Company, has declared a special dividend of 2 per cent, payable July 1. The payment is made from a surplus of \$27,000 which has accumulated in the treasury. The stock is receiving 12 per cent regularly under lease from the Philadelphia Rapid Transit Company.

**Seattle (Wash.) Electric Company.**—This company has declared an initial dividend of 2¾ per cent on its \$5,000,000 common stock, payable July 15 to stockholders of record July 1.

**Southern Light & Traction Company, Natchez, Miss.**—At the trustee's sale in Natchez on June 16 the property of the Southern Light & Traction Company at Natchez, consisting of the electric railway, the electric light and the gas plants, was sold to Lynn H. Dinkins, president of the company and president of the Interstate Trust & Banking Company, of New Orleans, for \$5,000 more than the liabilities of the company. The property is assessed at \$125,000 on a 50 per cent valuation.

**Syracuse (N. Y.) Rapid Transit Company.**—The company has declared the regular quarterly dividend of 1¼ per cent on its preferred stock, payable July 1.

**Third Avenue Railroad, New York.**—Frederick W. Whitridge, receiver, has negotiated some loans running less than one year, with receivers' certificates as collateral. The amount has not been disclosed, but Mr. Whitridge stated in his recent report to the company's bondholders that he intended to ask the United States Circuit Court for authority to issue \$2,500,000 of one-year 6 per cent receivers' certificates. It is presumed that he has arranged for their issuance and sale.

The readjustment committee of the Westinghouse Electric & Manufacturing Company met on June 23 and 24 and announced progress. Another meeting was planned for June 26.

## Traffic and Transportation

### Argument on Coney Island Fare Case.

Edward Hatch made the final argument on behalf of the Brooklyn Rapid Transit Company before the Public Service Commission, First District, on June 19, in the case involving the fare to Coney Island. Mr. Hatch said that any reduction from the present rate of fare, 10 cents, would be illegal and confiscatory. He said in part:

"In simple justice, if the fare is to be altered, it should be increased rather than diminished, for the 10-cent rate at the present time does not pay the operating expenses on the capital invested. The supreme court of this State has decided that under the law the rate is legal and since that decision there has been no alteration in the law. To cut the existing fare will mean absolute ruin, bankruptcy and receiverships.

"This commission is here to see that public utilities are built up, not torn down. Before long we will be receiving orders directing that we extend a line to that section, improve the service in another section and accommodate generally the transit needs of a population that will never cease to grow.

"How are we to carry out these orders? By bond issues? At the present moment bonds can only be sold at a loss of 27.5 cents on the dollar and the company would hardly feel compelled to make such a sacrifice. This commission must give us an opportunity to live!

"The Brooklyn Rapid Transit Company must not be treated as a single corporation in this matter, because the lines operating to Coney Island are individual corporations, which operate their own franchises, hire and discharge their own employees, and the Brooklyn Rapid Transit Company is merely the financial agent. They received their charters from the State, and many of them are steam railroads with the right to charge a rate of three cents a mile, if they so desired.

"The elevated roads were laid out by a Legislative commission and paid for their rights of way and we challenge the authority of the Legislature to alter that rate. A charter is a contract, and its provisions must be kept by the one party as well as the other.

"The State railroad law says that you cannot reduce our income to less than 10 per cent profit on the money actually expended. The Public Service Commission's law does not repeal this act, expressly, and I find no provision in which the latter law nullifies this section of the former statute even by implication. The Brooklyn Rapid Transit Company has never paid a penny dividend on its stock, for the earnings have been spent in improvements, and I don't believe we ever will pay a dividend if this reduction is decreed."

### Fare Increase Disapproved in New York.

The decision of the New York Public Service Commission, Second District, regarding a complaint of residents of Watertown, Glen Park and Brownville against the Black River Traction Company concerning the rate of fare and service was written by Commissioner Decker. An abstract of the decision follows:

"It appears that prior to November 1, 1907, the company charged five cents for carrying a passenger from any point on its line in Watertown to Glen Park; that an additional fare of five cents was charged from Glen Park to Brownville, and another fare of 10 cents from Brownville to Dexter. In the contrary direction, the fare was 10 cents from Dexter to Brownville, five cents from Brownville to Mill No. 4 (a point intermediate between Glen Park and Watertown), including Glen Park, and five cents from Glen Park or Mill No. 4 to Watertown. On September 19, 1907, the company filed its tariff, effective November 1, and sought thereby to so change the application of fares as to remove the laps indicated in the foregoing statement. The fares in force since that date are as follows: Watertown to Mill No. 4, five cents; Mill No. 4 to Brownville, five cents; Brownville to Dexter, 10 cents. In the opposite direction: Dexter to Brownville, 10 cents; Brownville to Mill No. 4, five cents; Mill No. 4 to Watertown, five cents. These are cash fares. Tickets are sold as follows: Books of 25 tickets, good for one five-cent fare, \$1.00; unlimited round-trip tickets, good for four five-cent fares, 15 cents.

"The 10-cent fare between Watertown and Glen Park is the one particularly in dispute. The former fare of five cents was established by the company for the purpose of inducing passengers to patronize an amusement attraction established by the company at Glen Park, which was abandoned in 1903; but the company continued to charge the

five-cent fare until 1907. There are several paper mills located along this line, including three at Glen Park, and another large one at Mill No. 4. Many of the employees at these mills reside in Watertown, and have occasion to ride to and fro between Glen Park and Watertown. Others reside in various localities along the line.

"The effect of the change in rates was to increase the fare from five to 10 cents between Watertown and Glen Park, in both directions. According to the company's records, the increase affected some 30 passengers; such increase amounting to about \$2.10 for each working day, or approximately \$650 per year. On the other hand, the increase has probably had some repressive effect upon the travel between Glen Park and Watertown in each direction. Since the five-cent fare was originally established, there has been considerable increase in the number of residents along the line, due largely to the extension of the paper industry, though recently a tablet factory employing a considerable number of hands has been removed from Glen Park to Albany.

"We are of the opinion that passengers from Watertown to Glen Park and return, and those residing at Glen Park and having frequent occasion to use the line to Watertown (a great majority of both classes being employed as laborers in the paper mills along the line), are entitled to have the five-cent fare between Watertown and Glen Park again put in force, and that such fare should be restored. The increase of the fare between Watertown and Glen Park, in each direction, was unreasonable and unjust; and the 10-cent fare is now unreasonable and unjust. The commission can see no objection to the lap fares in different directions which were formerly applied. The fare between Watertown and Glen Park, in both directions, should again be made effective, and order should be entered accordingly."

### Argument on Flushing Fare Case.

The Public Service Commission, First District, heard the final argument on June 19 on behalf of the Brooklyn Heights Railroad regarding the 10-cent fare to Flushing. Charles A. Collin, who made the argument, said that the Flushing extension is operated at a severe loss, and has been a bitter disappointment to the directors of the corporation. He added:

"If the fare is reduced we might as well go out of business. There is no heavy service at any hour of the day, and it is a rare exception when a car is more than half full.

"When this line was built we expected to do a profitable business, but the Long Island Railroad takes the greater part of the traffic now, and every passenger on our cars is a long-distance rider, who has the privilege of transferring at Ridgewood to any part of the borough. He can even go to Coney Island for five cents if he knows the method, and he can ride forever, too, on one fare by a certain system of transferring. On the portion of the line along the marsh there is a section where for a mile and a half only three possible passengers live, and they use the cars infrequently. The extension should never have been built, for even if the cars were filled all the time there would be no profit in the investment.

"What the people are suffering from now is not excessive rate of fare or inadequate service. Our charter, which we secured from the village of Flushing in 1894, gave us the right to charge 10 cents fare from Flushing to any point outside, and now this commission is asked to sanction and assist in the repudiation of that contract. Is that legal?

"When Flushing became part of New York City the charter did not alter the relations between individuals; a contract remains a contract, and the Legislature cannot alter that contract."

### Teaching Politeness to Passengers and Trainmen.

The Twin City Rapid Transit Company, of Minneapolis, Minn., has recently placed conspicuous signs in all of its cars reading as follows:

"Politeness and patience to passengers are required by the company of all trainmen.

"It is suggested that passengers also exercise politeness to trainmen."

**Fender Tests in Savannah.**—Tests are being conducted by the Savannah (Ga.) Electric Company of a number of fenders with a view to the adoption of a device which shall best meet the requirements of service in that city.

**Wreck Caused by Collision.**—Twenty passengers are reported to have been injured, one fatally, on June 19, in an accident on the Meadville & Cambridge Springs Street



Railway near Bakertown. A passenger car telescoped a freight car at a curve.

**Sprinkling Streets in Milwaukee.**—The franchise of the Milwaukee Northern Railway in Milwaukee provides that the company sprinkle the tracks in the city over which it operates. The company has about 3 miles of double track, making 6 miles in all, in Milwaukee, which it sprinkles daily with a Studebaker sprinkler, which is operated from 7 a. m. until 6 p. m.

**Freight Business Increased by Fruit Shipments.**—Officials of the Indianapolis & Cincinnati Traction Company report that the freight business on both divisions of the system is increasing steadily. The officials expect that the business during the summer and fall will be almost double that of the corresponding period of last year on account of the large quantities of fruit transported. The increase on the Shelbyville division for the past two months has been 50 per cent.

**Accident on Washington, Baltimore & Annapolis Electric Railway.**—It is understood that the train order for the movement of the extra car which resulted in the collision on the Washington, Baltimore & Annapolis Electric Railway on the evening of June 5 was transmitted by telephone by the dispatcher, was a written order and was repeated to the dispatcher before being made complete. An account of this accident was published in the ELECTRIC RAILWAY JOURNAL of June 13.

**Decision Affecting Oregon Railroad Commission.**—Judge Galloway, of the Marion County Circuit Court, has rendered a decision holding that the order of the Railroad Commission fixing the fare on the Portland Railway, Light & Power Company's line between Milwaukee and Portland at five cents must stand. The decision determines the point that it lies within the powers of the Railroad Commission to establish passenger rates. Complaint was filed by the city of Milwaukee on August 15, 1907, and after a thorough investigation the commission ordered, on January 30, 1908, that the fare be reduced from 10 to 5 cents between Milwaukee and Portland and from 15 cents to 10 cents between Portland and Oak Grove. The decision just rendered includes both complaints. The case will be carried to the Supreme Court.

**Results with Six-cent Fares.**—Stone & Webster, of Boston, general managers of the Brockton & Plymouth Street Railway, Plymouth, Mass., on which the unit of fare is now six cents, write as follows: "The new rate of fare has been in operation so short a time that we do not feel that comparative figures of gross earnings would be of any material value, especially under present business conditions. We can simply state in a general way that we do not believe the six-cent fare has materially reduced riding of itself, and we can certainly see nothing that looks like a decrease in pleasure riding on Sundays and holidays. That the gross earnings fail to show a 20 per cent increase, that being the percentage of increase in rate of fare, is due, we believe, to business conditions more than anything else."

**Public Service Commissioners of New York Oppose Curtailment of Transfer Privileges.**—Public Service Commissioner John E. Eustis at a banquet in Yonkers last week said that the Public Service Commission of the First District of New York would co-operate with the Second District Commission in opposing Receiver Whitridge of the Third Avenue Railroad and Union Street Railway of New York in curtailing the transfer privileges of the company in Westchester and the Bronx, in accordance with the decree of Judge Lacombe, of the United States Circuit Court. Commissioner Eustis asserted that the commissions possess jurisdiction over the questions involved in the transfer controversy and that after carefully considering the monthly receipts of the companies, the commissions will in all probability seek to have Mr. Whitridge and the other surface road receivers continue in operation the existing fares.

**The Garden Spot of the United States.**—This is the title of an interesting folder issued by the Conestoga County Traction Company, Lancaster, Pa. A feature of the publication is an excellent bird's-eye view in colors of the territory served by the company's lines and that tributary to them, the view taking in that part of Pennsylvania between Philadelphia and Harrisburg and Wilmington and Reading. The various lines are described separately, attention being called to picturesque spots and to places of historic interest. Special rates are made over the company's line to parties, and a schedule of rates is presented and the method of figuring them is explained. For instance, the full fare can be figured by deducting one cent from each five cents from the regular round trip fare, and half-fare can be figured by taking one-half the regular round trip fare, always dropping the fraction. The cover is in red and black, with a picture of two dairymaids as a center piece.

## Personal Mention

**Mr. S. L. Hazelrigg** is now acting as president of the Sea Coast Traction Company, which is leased by the Atlantic Coast Electric Railroad, of which he is president. Mr. K. I. Harrison is acting as treasurer of the Sea Coast Traction Company.

**Mr. H. H. Lingerhans** has recently been appointed purchasing agent of the Coney Island & Brooklyn Railroad; Mr. C. H. Van Slyck, superintendent of equipment; Mr. P. J. Murphy, superintendent of power stations, and Mr. E. L. Matthews, superintendent of roadway.

**Mr. Hugh J. McGowan**, president of the Indianapolis Traction & Terminal Company, expects to make an extended tour of Europe this summer and fall. Mr. McGowan was dangerously ill this spring, but is now better and plans the trip in order to make his recovery complete.

**Mr. Joseph Rowley** has been appointed chief engineer of the Norwich & Westerly Railway at Poquetamuck, Conn., and Mr. Richard Dean has been appointed assistant engineer. Both Mr. Rowley and Mr. Dean were formerly with the New London (Conn.) Gas & Electric Company.

**Mr. Clarence F. Norment**, who was recently elected president of the Washington (D. C.) Railway & Electric Company, was the guest of honor at a dinner given at the New Willard Hotel on the evening of June 16, by Mr. George E. Hamilton, president of the Capital Traction Company, of Washington.

**Mr. J. G. Atwell** has resigned as superintendent of the Zanesville lines of the Ohio Electric Railway, with which he has been connected since 1899. He will be succeeded, as stated in an earlier issue, by Mr. N. C. Draper, formerly vice-president of the Eastern Wisconsin Railway & Light Company, of Fond du Lac, Wis.

**Mr. Dennis Gerberich** was recently appointed general manager of the Slate Belt Electric Street Railway, of Pen Argyl, Pa. Mr. Gerberich was formerly connected with the Lehigh Valley Transit Company. He served with the latter company successively as timekeeper, cashier, paymaster, superintendent of the company's turnpikes and general superintendent of the Philadelphia division of the company. During his connection with the company as superintendent of the Philadelphia division that part of the system was rebuilt and the gage changed from 5 ft. 2½ in. to 4 ft. 8½ in.

**Mr. George H. Gall** has been appointed publicity manager of the Washington, Baltimore & Annapolis Electric Railway, Baltimore, Md. Mr. Gall was formerly with the Washington Times. He prepared for the Chamber of Commerce of Washington a booklet entitled "Washington, Its Industrial, Commercial and Civic Features." Mr. Gall also conducted the out-of-town shopping campaign of the Retail Trade Committee of the Chamber of Commerce. He will begin at once a campaign calling attention to the facilities of the railway for through travel and its advantages for travel between intermediate points.

**Mr. Christian W. Lynch**, Harrisburg, Pa., is president of the Hagerstown Railway, Hagerstown, Md.; Mr. D. C. Haldeman, Harrisburg, Pa., vice-president; Mr. W. C. Hepperle, Hagerstown, Md., secretary; Mr. William Jennings, Harrisburg, Pa., treasurer; Mr. William Jennings, Harrisburg, Pa., auditor; Mr. Richard C. Haldeman, Hagerstown, Md., general manager; Mr. W. C. Hepperle, Hagerstown, Md., superintendent, purchasing agent and electric engineer; Mr. H. C. Alvey, Hagerstown, Md., chief engineer; Mr. Chas. Kerslner, Hagerstown, Md., master mechanic. These officers were elected following the purchase of control of the Hagerstown & Northern Railroad and the Hagerstown & Boonville Railway by the Hagerstown Railway.

**Mr. William J. Wilgus** has been elected president of the Amsterdam Corporation, of New York, and Mr. Henry J. Pierce, vice-president. The corporation has been organized recently for the purpose of acting as engineer on special railroad problems, such as the electrification of steam lines, the building of subaqueous tunnels, the construction and equipment of urban and interurban lines, preparing plans for passenger and freight terminals and furnishing analyses of operating contracts. While the principal work of the new company will be as consulting engineer in these matters, it is prepared to act as agent in supervising and directing new construction, having no alliance or connection with any manufacturing or supply company. Mr. Wilgus was formerly vice-president of the New York Central & Hudson River Railroad. Mr. Pierce is president of the International Railway of Buffalo, and is also president of the Netherlands Tramway Corporation. The Amsterdam Corporation was incorporated under the laws of Connecticut in September, 1905. Mr. Wilgus states that it is

a close corporation, all of the shares being held by Messrs. Wilgus, Pierce and J. A. Byrne, who constitute the board of directors. Mr. Byrne is a member of the firm of Parker, Hatch & Sheehan, lawyers. The Amsterdam Corporation will employ a force of engineers, but has not yet completed the personnel of its staff.

**Mr. J. J. Dempsey**, formerly assistant superintendent of elevated lines of the Brooklyn Rapid Transit Company, has been appointed superintendent of elevated lines, succeeding Mr. L. V. Smith, who resigns to enter another line of business. Mr. Dempsey began his railroad career as station agent and telegraph operator for the Lehigh Valley Railroad, serving at Mauch Chunk, Glen Onoko and Wilkes-Barre. He entered the employ of the Brooklyn Rapid Transit Company in 1896 as a telegraph operator. He was made train clerk in 1898 and a despatcher three years later. In August, 1901, he was made trainmaster and was placed in charge of the Southern Division the following year. Mr. Dempsey was promoted to chief despatcher in January, 1905, and in May, 1907, was appointed assistant superintendent. Mr. I. Brooks Clarke, who has been supervisor of motormen for the Brooklyn Rapid Transit Company, succeeds Mr. Dempsey as assistant superintendent. Announcement is made that the department of employment has been placed in charge of Mr. A. N. Dutton, superintendent of transportation, to whom the superintendent of employment, Major J. T. Crabbs, will hereafter report.

**Mr. J. S. Mills**, who was recently appointed master mechanic of the Lehigh Valley Transit Company, Allentown, Pa., to succeed Mr. J. M. Yount, resigned, entered street railway work in 1897 with the Metropolitan Street Railway Company, New York City. He was with that company about five years, filling the positions of car-house foreman and having charge of maintenance of cars and equipping the rolling stock. In 1902 Mr. Mills became connected with the Manhattan Railway, New York City, under Mr. J. S. Doyle, superintendent of car equipment, and was with that company three and one-half years. He had charge of the 129th Street barns of this company for two and one-half years and the 148th Street and Lenox Avenue barn (subway division) one year. Mr. Mills then became general foreman of the surface division of the Brooklyn Rapid Transit Company, and during his connection with the company served for a time as assistant to Mr. W. G. Gove, superintendent of car equipment. Resigning from the Brooklyn Rapid Transit Company, Mr. Mills entered the employ of the General Electric Company, Schenectady, N. Y., as construction foreman on several large installations of both automatic and hand multiple-unit control, the most notable installation being that of the cars of the West Jersey & Sea Shore Railroad. Mr. Mills also supervised for the General Electric Company the installing of the electric equipment on the cars of the Oneida Railway, which runs from Utica to Syracuse on the tracks of the West Shore Railroad. Mr. Mills resigned from the General Electric Company to accept his present position.

#### OBITUARY

**Mr. John M. Scribner**, of New York, at one time chief counsel for the Metropolitan Street Railway, of New York, and its subsidiary properties, is dead.

#### NEW PUBLICATIONS

**How to Become a Competent Motorman** (second edition, revised), by Livermore and Williams. New York: D. Van Nostrand Company; 1908; 247 pages (6½ in. x 4½ in.); illustrated. Price, \$1.

The authors of this standard guide for motormen have in this edition enlarged and revised their work to include the latest changes in electric car equipment. It is curious to note that in 1903, when the first edition of this book appeared, the compressed air motor was still in use and consequently a chapter on its operation was necessary. Messrs. Livermore and Williams are practical operating men who know from experience just what their readers need and they have succeeded in giving much important information in appropriately simple language. Among the new features are the descriptions of multiple-unit systems, the enlarged chapters on air brakes and a selection of general rules for trainmen. The book is printed in large, clear type and is bound for service. Most of the illustrations are all that can be desired, but in view of the small size of the pages it would have been better to have presented the few complicated wiring diagrams in the form of inserts.

The Chicago & Oak Park Elevated Railway and the city of Chicago have settled their principal differences, and as a result the company will elevate its tracks from Fifty-second Avenue to Austin Avenue.

## Construction News

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

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

#### FRANCHISES

**Eufaula, Ala.**—The Alabama Railway & Electric Company has been granted a franchise to enter the city with an electric railway. J. C. Chapman, vice-president. [E. R. J., June 13, '08.]

**Los Angeles, Cal.**—Henry E. Huntington has sold and transferred to the Los Angeles Railway Company the franchise for a double-track electric railway on Seventh Street from Broadway to Boyle Avenue and on Boyle Avenue to Hollenbeck Avenue, and thence on Hollenbeck Avenue to the eastern city limits.

**Ventura, Cal.**—T. C. Carnahan has obtained a franchise to run cars through A Street, from the southern to the eastern boundaries of that city, and to connect with the Bakersfield & Ventura Railroad, which runs to Hueneme, to Round Mountain on the east and to the Paterson ranch on the west.

**\*Franklin, Ill.**—A. L. Hamilton, Waverly, Ill., and Charles Sargent, St. Louis, have applied for a franchise to operate an electric railway along Main and Charles Streets.

**Cherryvale, Kan.**—The Union Street Railway Company has been granted a franchise to extend its line into Cherryvale. L. H. Siggins, Coffeerville, Kan., president.

**St. Louis, Mo.**—The Council has passed a bill granting a franchise for entrance to the city to the Hillsboro, Kimmswick & Southwestern Railway, which proposes to build an electric railway into the city from the south.

**Long Island City, N. Y.**—The New York & Queens County Railway Company has been granted a franchise for the construction of two branches of its present line extending as far as Flushing. One will extend from Broadway and Main Street, in Flushing, to Eleventh Avenue and Thirty-sixth Street, in Whitestone. The other from Franconia Avenue and Twenty-second Street, Flushing, to Broadway and Bell Avenue, Bay Side.

**Troy, N. Y.**—The United Traction Company, Albany, N. Y., has applied for an extension of time to July 1, 1909, for the performance of certain work in construction in Troy for which franchises have been awarded.

**\*Grand Forks, N. D.**—E. J. Lander, John Dinnie, W. H. Kelsey, E. S. Kent and O. A. Webster have applied for a franchise to operate a street railway system in Grand Forks.

**Findlay, Ohio.**—The Findlay & Marion Railway & Light Company has been granted an extension of time from July 1 of the present year to Dec. 1, 1909, for the completion of its line. G. W. Meecker, Columbus, Ohio, secretary.

**Toledo, Ohio.**—The Toledo, Fostoria-Findlay Railway Company has been granted a six-year franchise to operate across Freeman and Liberty Streets, East Toledo.

**Montreal, Que.**—The City Council has passed a by-law giving the Southern Counties Railway the privilege of entering the city by the construction of an electric railway from Victoria Bridge along Mill Street to Black's bridge, and thence by a couple of short streets to the corner of McGill and Common Streets, making a junction there with the lines of the Montreal Street Railway. By the agreement with the city, the company has one year from next November to complete its line within the city limits.

**Keyser, W. Va.**—The Potomac Valley Railway Company has been granted a franchise to construct an electric street railway through the streets of Keyser. L. S. Kirker, engineer. [S. R. J., Apr. 18, '08.]

**\*Roslyn, Wash.**—A. A. Nichols and August Sassa have recently petitioned the Council for a franchise for a street railway which they expect to build between Roslyn and Cle-Elum, Wash. The promoters say that they will begin work within 90 days and will complete the road in 18 months.

#### RECENT INCORPORATIONS

**\*Vincennes, Centralia & St. Louis Transit Company, Chicago, Ill.**—Incorporated to build an electric railway from a point on the east line of the State of Illinois, in Lawrence County, opposite Vincennes, Ind., through the counties of Richland, Clay, Marion, Clinton Bond and to a point in St. Clair or Madison counties opposite the city of St. Louis, Mo. General offices, 705 Isabella Building, Chicago. Incorporators: M. A. Peoples, J. J. Burns, Clyde F. Burns, Dennis O'Connor and J. E. Burns, all of Chicago. Capital

stock, \$30,000. Burns & Company, 705 Isabella Building, Chicago, are retained in a consulting capacity for this road and will have entire charge of construction and award all contracts.

**\*Minnesota Air Line Railway, Thief River Falls, Minn.**—Incorporated in Minnesota to build a line from Thief River Falls to Roosevelt and ultimately to Zippel Bay, on the Lake of the Woods. Capital stock, \$500,000. Officers: William F. Hunt, Roosevelt, president; T. R. Hasler, Iowa Falls, Ia., vice-president; E. E. Rambusch, Roosevelt, secretary. Other incorporators: Homer B. Leavitt and L. R. Hedberg, Roosevelt, and Ralph H. Rockwood, Waterville, Maine.

#### TRACK AND ROADWAY

**Huntsville (Ala.) Light & Power Company.**—This company has approved plans to extend its street railway system to the fair grounds, 1 mile, work to begin soon. F. N. Lawton, general manager.

**Montgomery (Ala.) Traction Company.**—This company is said to be planning the erection of a new bridge over the Central of Georgia Railroad tracks, just a short distance out of the city. W. H. Ragland, general manager.

**North Alabama Traction Company, New Decatur, Ala.**—This company expects to build about 2000 ft. of track shortly. W. R. Hall, manager, writes that the material for this work is already on hand.

**Sheffield (Ala.) Company.**—It is reported that this company contemplates building a street railway extension in Florence. J. B. McClary, general manager.

**Northern Electric Railway, Marysville, Cal.**—This company is said to be planning to extend its system out of Marysville to the Knight Recreation Park and race track. A. D. Schindler, Chico, general manager.

**Denver & South Platte Railway, Denver, Colo.**—William J. Coursin, of Pittsburg, has the contract for the construction of an extension of this road from Denver to Roxbury Park and Colorado Springs, a distance of 25 miles. It is planned to have the line ready for operation early this summer. T. I. Milner, chief engineer.

**Denver (Colo.) City Tramway.**—This company has completed the grading and has begun the laying of rails for 2½ miles of new line in the north side. This line follows Forty-fourth Avenue from the end of the old Goss Street line, over Lowell Boulevard to Forty-sixth Avenue and thence westward to the terminus. The company is also putting in connections and crossings for a double-track system for the suburban Golden and Leyden lines. J. A. Beeler, general manager.

**New York, New Haven & Hartford Railroad, Hartford, Conn.**—This company has petitioned the railroad commissioners for an approval of layout and proposed method of construction of an electric railway from Willimantic to South Coventry.

**Baltimore & Washington Transit Company, Washington, D. C.**—This company is said to have been granted permission to build a line into the District of Columbia. The company also proposes to build an extension to Sandy Spring, Md., a distance of 14 miles. Wm. A. Mellen, Washington, general manager.

**Tampa-Sulphur Springs Traction Company, Tampa, Fla.**—This company, it is reported, will shortly begin tracklaying on its line, 10 carloads of rails having been purchased. L. Brill, manager.

**\*Nezperce, Idaho.**—A deal was closed here recently for the construction of an electric railway from Nezperce to connect with the Northern Pacific Culdesac-Grangeville line in the vicinity of Vollmer. The line will be constructed by Z. A. Johnson. The proposition accepted by Nezperce people provides for a bonus of \$50,000 to be paid when the road is completed. The estimated cost of the road is \$150,000.

**Bloomington, Pontiac & Joliet Electric Railway, Pontiac, Ill.**—It is stated that this line, which extends from Dwight to Pontiac, will be extended to Bloomington, the necessary amount of bonds having been subscribed by Pontiac citizens at a recent meeting of the Commercial Club. It is said that work on the extension will be started at once. H. A. Fisher, Joliet, president.

**Indianapolis, Cloverdale & Terre Haute Electric Railway, Indianapolis, Ind.**—Construction work on the electric railway which is to connect Indianapolis, West Newton, Mooresville, Cloverdale and Terre Haute, will be started Sept. 1, according to a report from E. M. Bowman. He states that it is intended to use the overhead trolley system, but the location of the power station and repair shops is undecided. The length of the system will be about 90 miles. The line will also reach Cataract Falls, an amusement resort. Capital, \$10,000. Officers: E. M. Bowman,

president and general manager; S. P. Axtell, vice-president; W. L. Cook, secretary; H. F. Butze, treasurer; H. C. Sandusky, 413 State Life Building, Indianapolis, chief engineer. Headquarters, 530 Law Building, Indianapolis. [E. R. J., June 6, '08.]

**Detroit (Mich.) United Railway.**—This company has recently placed an order with the Pennsylvania Steel Company for 715 tons of Pennsylvania Steel Company's Section 91, No. 282 T-rail, weighing 91 lb. per yard.

**Springfield, Nixa & Southern Electric Railway, Springfield, Mo.**—This company is reported to have commenced surveys for its line between Springfield and the James River. The line will be 14 miles long and will cost about \$350,000. The company expects to commence construction work immediately. A water power plant at Nixa will be developed.

**Ithaca (N. Y.) Street Railway.**—It is said that this company will begin on July 1 to double-track its line on West State Street. R. L. Post, general manager.

**New York & North Shore Traction Company, Flushing, N. Y.**—This company is obtaining the right of way for the proposed new line from the city line at Little Neck to Flushing. The company at present operates a line between Port Washington and Mineola, and the plan is to extend the line from Port Washington to Flushing. Thos. Wood, Roslyn, general manager.

**Utica & Mohawk Valley Railway, Utica, N. Y.**—This company expects to begin work on the construction of the Mohawk Street line extension shortly. C. Loomis Allen, general manager.

**Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio.**—It is officially announced that this company will build a 6-mile extension from Bowling Green to Tontogany, where it will connect with the Lima & Toledo Traction Company's lines. Right of way is obtained and surveys are made. E. H. McKnight, general manager.

**Toledo & Michigan Electric Railway, Toledo, Ohio.**—P. P. Duket, president of this company, has announced that the contract for construction work has been awarded to W. C. Ross, 502 Rookery Building, Chicago. The 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. [E. R. J., June 13, '08.]

**Galt, Preston & Hespeler Street Railway, Galt, Ont.**—It is stated that this company will extend its system out to Puslinch Lake from Hespeler. M. N. Todd, manager.

**Port Arthur, Ont.**—The Electric Railway Commission has been authorized to proceed with the double-tracking of the Port Arthur Electric Street Railway between Current River Park and the southern boundary of the city. This road is owned and operated by the city.

**Northern Cambria Street Railway, Patton, Pa.**—This company has decided to extend its line from Hastings to Barnesboro, a distance of 4 or 5 miles. J. L. McNelis, superintendent.

**York (Pa.) Railways.**—It is announced that this company will in the near future expend \$100,000 in improving the line extending from York to Dallastown, Red Lion and Windsor. David Young, Jr., general manager.

**Brookings & Sioux Falls Electric Railway, Sioux Falls, S. D.**—It is said that this company will build this year a line from Brookings, S. D., to Flandreau, 10 miles. Neill Stewart, Brookings, manager.

**Chattanooga (Tenn.) Railways.**—This company contemplates building an extension from Main Street to Rossville along Rossville Avenue and private right of way. G. E. Miller, general superintendent.

**San Angelo (Tex.) Power & Traction Company.**—E. E. Bailey, president and general manager, announces that the company expects to have 1 mile of line in operation by Sept. 7. About Sept. 15 the company will be in the market for material for further construction. It has already purchased rails for 3 miles of track. J. H. Ransom, vice-president and assistant general manager; W. D. Fuller, general superintendent; T. M. Vaughan, secretary; John W. Harris, treasurer. [S. R. J., May 16, '08.]

**\*Coulee City, Wash.**—James Fullerton, of Seattle, promoter of the electric railroad between this city and the Columbia River, is reported to have secured a franchise from the county commissioners and has applied to the Council for a franchise here. He says that the money has been secured to build the road and that the work will begin before Sept. 1.

**Panhandle Electric Railway & Power Company, Spokane, Wash.**—Arrangements have been made by this company

to proceed with the work of building the line as soon as the surveys are completed. It is hoped to have the road finished from Priest Lake to the Fidelity Lumber Company's camp during the present season. The following directors were elected for the year: A. J. Smith, D. M. Smith, Andrew Coolin, M. S. Lindsay, Thomas W. Payne, A. Savigne and C. S. Croswell. The directors later elected the following executive officers: President, D. M. Smith; vice-president, C. S. Croswell; secretary and treasurer, H. H. Wallace; general manager, A. J. Smith; general counsel, M. S. Lindsay. [S. R. J., Nov. 30, '07.]

**Wheeling & Western Traction Company, Wheeling, W. Va.**—This company proposes to build an electric railway which will connect Wheeling, W. Va., with several places in Ohio. At present it is projected to build from Uhrichsville, Ohio, to Bridgeport or Martin's Ferry, Ohio. The company has been organized by Cleveland men, and the head of the concern is A. E. Townsend, president and general manager. The length of the proposed line is about 40 miles, and it will go through a territory which now has no trolley connection. The company proposes to sell \$400,000 worth of stock and \$500,000 worth of bonds with which to build. The road is expected to touch Bowerston, Scio, Jewett, Cadiz, New Athens, Harrisville, Colerain, Martin's Ferry or Bridgeport, Ohio, and enter Wheeling through one of the latter towns, and will run through a rich farming and mining country. [S. R. J., May 16, '08.]

#### POWER HOUSES AND SUBSTATIONS

**Shore Line Railway, New Haven, Conn.**—This company is said to have completed excavations for a 2500-hp station near the mouth of the Connecticut River and the foundations of reinforced concrete are now being built. The dimensions of the power station will be 98 ft. x 67 ft. It is expected that enough power will be generated at this station to operate the entire 30 miles of road. A. W. Sperry, New Haven, engineer.

**Oregon Electric Railway, Portland, Ore.**—This company is building a new substation. All material for this building has already been purchased.

**Florin Street Railway, Elizabethtown, Pa.**—It is reported that this company will soon begin work on a new power station. The building is to be constructed of brick and of the same model as the one at Landisville. It will be 52 ft. x 33 ft., with a skeleton porch around it, and is to have a slate roof. Besides serving the purpose as a power plant, it is also to be used as a waiting room. The site of the proposed plant has not as yet been definitely decided upon. It will either be placed on Tunnel Hill or at Rheems.

**Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.**—This company is installing transformers, generators and lightning conductors in its substation at Marion.

#### SHOPS AND BUILDINGS

**Vallejo, Benicia & Napa Valley Railroad, Napa, Cal.**—This company is said to be planning the purchase of new equipment for its car house. L. J. Perry, general manager.

**Chicago (Ill.) City Railway.**—This company will erect soon a new car house at Rockwell and Thirty-eighth Streets. The building, it is estimated, will cost \$500,000 and will have a capacity of 330 cars.

**People's Railway, Dayton, Ohio.**—It is said that this company has plans under way for a car house to be erected on a tract of land recently purchased on Bohlender Avenue. V. R. Powell, superintendent.

**Ohio Valley Finance Company, East Liverpool, Ohio.**—This company will receive bids for the construction of a car house at East Liverpool, Ohio, until 12 o'clock noon, July 6, 1908. Plans and specifications may be seen at the office of A. G. White, civil engineer, Toronto, Ohio. The Ohio Valley Finance Company is connected with the Steubenville & East Liverpool Railway & Light Company and the East Liverpool Traction & Light Company.

**Portland (Ore.) Railway, Light & Power Company.**—This company has begun work on a new freight depot at the foot of East Clay Street. The estimated cost of the building is \$12,000. It is to be 200 ft. long and will be sheeted with corrugated iron. [S. R. J., May 16, '08.]

**Oregon Electric Railway, Portland, Ore.**—The contract for the construction of the concrete freight warehouse for this company to be built at Front and Jefferson Streets, has been awarded to Litherland & Abrey. It is said that work will be commenced at once on the structure. It will be of reinforced concrete and will be 35 ft. x 70 ft. in size and will be one story high.

## Manufactures & Supplies

#### ROLLING STOCK

**Vallejo, Benicia & Napa Valley Railroad, Napa, Cal.**, is reported to be in the market for new cars. L. J. Perry, general manager.

**Columbus, Urbana & Western Railway, Columbus, Ohio**, is reported to have received two new 150-ft. cars from the Jewett Car Company, Newark, Ohio.

**Toronto (Ont.) Railway**, it is stated, will construct a number of cars for its own line during the summer, as well as six for the Monterey Street Railway, Mexico.

**Oregon Electric Railway, Portland, Ore.**, expects to purchase 6 passenger cars, 2 express cars and 75 freight cars. G. W. Talbot, manager.

#### TRADE NOTES

**National Lock Washer Company, Newark, N. J.**, has moved its Chicago office from 417 Monadnock Block to 529 Monadnock Block.

**Railway Steel Spring Company, New York**, has changed its address from 71 Broadway to 30 Church Street, the Hudson Terminal Building.

**Modoc Company, Inc., Chester, Pa.**, has moved to Fernwood, Pa. This company makes the Modoc car cleaner. It has an office in Philadelphia, at 109 Chestnut Street.

**Kennedy & Jenkin, Westminster, S. W., London, Eng.**, announce that they have taken into partnership John MacFarlane Kennedy and Sydney Bryan Donkin. The name of the firm remains unaltered.

**Standard Roller Bearing Company, Philadelphia, Pa.**, announces that T. F. Salter, an engineer well known in the field of hoisting and conveying apparatus, has been appointed chief engineer of the company.

**Standard Roller Bearing Company, Philadelphia**, announces further expansion of its sales organization in the opening of a branch office at 327 Jefferson Avenue, Detroit, Mich., in charge of Ernest L. Smith, recently appointed Western representative.

**W. S. Temple Advertising Company, Boston, Mass.**, has been formed by C. Shellenberg, formerly president of the New England Car Advertising Company, 161 Summer Street, Boston. The new company will conduct a general advertising business in street railway cars in New England cities.

**Dossert & Company, New York**, have shipped to the Rio de Janeiro (Brazil) Tramway, Light & Power Company, Ltd., a consignment of Dossert two-way joints comprising 25 for 500,000 c.m. cable, 100 for 250,000 c.m. cable, 100 for No. 00 cable and 50 for No. 0 cable. The order was placed through the New York office of the Rio de Janeiro Tramway, Light & Power Company.

**Allis-Chalmers Company, Milwaukee**, reports an increase during May of 80 per cent in new business over the preceding month, comparing very favorably with the average of 1907, which was the largest year in the company's history. This rapid gain is largely ascribed to the fact that during the past six months inquiries for power and electrical machinery have been larger than at any previous period. Many deferred contracts are now being closed.

**A. L. Whipple, New York**, is now sales manager of Forsyth Brothers Company, Chicago, Ill., at its New York office in the Hudson Terminal Building. Mr. Whipple was formerly vice-president of the Telharmonic Securities Company, of New York, but before becoming connected with this company he was Eastern manager of the Curtain Supply Company, of Chicago, with which he was connected nine years. Mr. Whipple has been engaged in the railway supply business 14 years.

**Egry Register Company, Dayton, Ohio**, through its Railways Division, is installing its dispatching system on the Detroit, Monroe & Toledo division of the Detroit United Railway and has equipped the Chicago, Lake Shore & South Bend Railway, the systems of the Dayton & Xenia Traction Company, the Dayton & Covington Traction Company and the Sheboygan (Wis.) Railway, Light & Power Company. The Egry Register Company has made a modification of its car-dispatching system, which is being used in all new installations.

**Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y.**, has planned an elaborate exhibit for the convention of the Railway Telegraph Superintendents to be held in Montreal on June 24, 25, 26 and 27. The company will demonstrate in public for the first time its selective alarm telephone dispatching system and has prepared a brochure describing the system briefly, especially for this

convention. The plan of the company is to issue in the near future an illustrated catalog describing the system in detail.

**General Fireproofing Company, Youngstown, Ohio,** reports that the United States Government has replaced the wood-locker equipments in use at army posts with the all-steel lockers of the company. The all-steel lockers are now in use at posts all over the United States and in Porto Rico, Hawaii, Alaska and the Philippines. These lockers have been adopted for use in the public schools of New York and in many industrial establishments, among them that of Tiffany & Company, New York. The lockers are made in a number of different styles adapted for use in power stations, repair shops and street railway barns.

**General Railway Signal Company, Rochester, N. Y.,** has recently closed contracts with the Lake Shore & Michigan Southern Railway for its well-known electric interlocking signals as follows: Indiana Harbor lift bridge, a 136-space machine with 89 working levers and 47 spare spaces; Indiana Harbor crossing, an 88-space machine with 55 working levers and 33 spare spaces, and Clarks Junction, a 108-space machine with 64 working levers and 44 spare spaces. The General Railway Signal Company has also recently contracted to furnish the Erie Railroad with its electric interlocking system for installation at Youngstown, Ohio. This equipment will include a 64-space machine with 49 working levers and 15 spare spaces.

**Arthur D. Little, Boston, Mass.,** made a report recently on the comparative value of 13 different lubricating greases, showing the variation in the constituents, in a very interesting table giving the cost, the water and the ash. The cost varied from 134 cents to 16 cents, the water from 96 per cent to 20.5 per cent and the ash from 7.63 per cent to 62 per cent. Mr. Little reported that the greases were of very good character on the whole, only one containing an excessive amount of water. He considered the prices excessive and advised that 6 cents per pound was as high as need be paid. He further stated that the samples were practically all of greases made with a small amount of soap as a hardener or solidifier. In some of the greases an alkali soap was used, while others contained lime or alumina soap.

**Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.,** interests in Germany have just completed arrangements with the Bergmann Electric Company, of Berlin, whereby the latter company will install the Westinghouse electric traction system in Germany. The Prussian State Railway Administration is preparing to electrify the steam railways, and already \$12,500,000 has been appropriated to begin the work. This development involves enormous requirements. The details of the arrangement were not given out at the Westinghouse offices, although the fact that an agreement had been completed was admitted. The Bergmann Electric Company is semi-American, Sigmund Bergmann, the head of the concern, having been a partner of Thomas A. Edison for a number of years. The company's plant in Berlin employs about 5,000 men.

**Tracy Engineering Company, New York,** has moved its headquarters from New York to the Central Building, Los Angeles. On opening for business in Los Angeles, however, the company found that a Tracy Engineering Company was already in the city. Consequently, a new company was organized called the Blythe-Tracy Company, and new capital and stockholders were admitted. The Blythe-Tracy Company will take over the Tracy Engineering Company and will continue in business on the same lines as the Tracy Engineering Company followed. The company is finishing a shipment of 15 carloads of all iron jigs for the Copper Queen Consolidated Mining Company, of Arizona, and is building a 20-stamp mill and concentrating plant and a 200-hp electric power plant and 9-mile transmission line for the Orange Blossom Mining & Milling Company, at Bagdad, Cal.

**David Lupton's Sons Company, Philadelphia, Pa.,** exhibited at the meeting of the American Railroad Master Mechanics' and the Master Car Builders' associations in Atlantic City samples of its double-pivoted and double-hung sliding sash and standard hollow metal fireproof windows, and other Lupton specialties adapted to car barns, power houses and other railway buildings. The Lupton windows in pivoted, double-hung sliding sash and casement forms, have been approved by the Underwriters' laboratories at Chicago and when erected in standard construction and of standard size are equipped with the Underwriters' Laboratories label. The Pond operating device is said to be the only method of operating a sash in which the power is transmitted by tension to levers hinged at opposite sides of the windows. Two thousand lineal feet of sash are easily operated by this method with one gear. The bearings are phosphor bronze and the gears are immersed in oil.

## ADVERTISING LITERATURE

**Frank Mossberg Company, Attleboro, Mass.**—This company has issued a special catalog in relation to metal reels, spools and beams. The catalog covers reels and spools for wire manufacture and the textile industry. The catalog is intended for general distribution.

**Massachusetts Fan Company, Watertown, Mass.**—An attractive booklet entitled "Davidson Ventilating Fans" has been issued by this company. The illustrations show fully fans and many types of electric fans driven by standard motors of various makes applicable for the economical movement of large volumes of air at moderate pressures.

**W. H. Coe Manufacturing Company, Providence, R. I.**—The catalog of this company describes its gilding wheels and ribbon leaf, both of which are especially adapted for railway work. The ribbon leaf in all widths is put up in rolls on paper-like ribbon and can be used in the gilding wheel or gilding brush. The gilding wheels are adjustable, but it is recommended that wheels be set permanently to a particular size and that different wheels be used for each size of ribbon. The wheels are used by nearly all the large steam railroads, by the United Railways of St. Louis, the International Traction Company, of Buffalo, and the Philadelphia Rapid Transit Company, among street railways, and by the St. Louis Car Company, the Barney & Smith Car Company and the J. G. Brill Company.

**H. W. Johns-Manville Company, New York.**—This company has just issued the third edition of its catalog of J-M asbestos and magnesia railroad supplies. As it is not practicable to show within the scope of this catalog the full line of the company's materials used by the railroads, only those materials have been included which have been generally accepted as standard types and forms by the leading railroads. The company says it is the largest manufacturer of asbestos and magnesia products in the world and that it is prepared to furnish any special articles that may be required and solicits inquiries for asbestos and magnesia goods. On one page a list is given of the company's principal products, and attention is called to special catalogs descriptive of each. The company carries at each of its branches a fairly complete stock of goods so that prompt shipments of orders can ordinarily be made from each branch.

**Lintern Car Signal Company, Cleveland, Ohio.**—The Lintern system of equipping cars with rear-end signal lights and classification lights supplied with current from the trolley, with dry batteries as auxiliaries, is described in a folder issued by the company, in which diagrams also are given of the wiring for typical installations of classification lights, marker lights and marker and classification lights. In the Lintern system the signal lights are normally supplied by current from the line which has passed through the lighting circuit to the positive side of the auxiliary batteries, where it is caused to divide, part of the current flowing through the auxiliary batteries to ground. The current which passes through the auxiliary battery tends to keep the cells charged and up to voltage. If the current from the lighting circuit is not sufficient to light the signals properly the battery supplies current to keep the signal lights normal. Moreover, the battery will operate the signal lights for several hours if necessary.

**J. G. Brill Company, Philadelphia, Pa.**—Brill's Magazine for June contains some very interesting descriptions and illustrations of cars built by the Brill Company for interurban, suburban and freight traffic. There is also a description of the tool department of the Brill works, a part of the organization that heretofore has not received attention in the magazine. Not only are the tools stored and kept in repair in this department, but nearly all of them are designed and made there. The tool department is located on the second floor of the machine shop. One of the most interesting descriptions is that of the cars for the Rochester, Syracuse & Eastern Railroad. The Brill Company has recently supplied some interesting combination passenger and smoking cars, passenger and baggage cars and baggage and express cars to the Northern Electric Street Railway, Scranton, Pa., and these are described and illustrated. In connection with the description of the cars the conditions under which they are operated are reviewed briefly. Descriptions of a construction car built for the Lancaster Traction & Power Company and of new cars for the Mexican Southern Railway are given.

**Alfred Box & Company, Philadelphia, Pa.**—"Electric Traveling Cranes" is the title of a publication issued by Alfred Box & Company. At one time the installation of traveling cranes was considered necessary in power houses and in large shops only, but the economy of cranes in smaller installations is now fully recognized. That this is

the case is shown clearly by the record of installations of Box & Company, which includes 20 cranes for the Philadelphia Rapid Transit Company ranging in capacity from 5 tons and a 50-ft. span to 45 tons and a 60-ft. span, 13 cranes for the electric division of the New York Central & Hudson River Railroad, two 12-ton cranes for the Philadelphia & West Chester Traction Company, four for the Brooklyn Rapid Transit Company, one of which is of 50 tons capacity with a 92-ft. span, one for the Fairmount & Clarkburg Traction Company and one for the West Jersey & Sea Shore Railroad. The details of the machines are described completely in the text, which is embellished with excellent illustrations of the different hoisting crabs and the cranes as installed and handling equipment. One of the most interesting pictures shows a special jacking-up crane at the shops of the Philadelphia Rapid Transit Company raising a car body from the trucks.

**Harry P. Cochrane, of New York**, chief of the estimating department of the Link-Belt Engineering Company, of New York, read before the Franklin Institute of Philadelphia recently a paper entitled "Engineering Practice as Applied to the Fuel Equipment of Power Houses," which is reprinted in the Journal of the Institute for June. Mr. Cochrane reviews the different conveying systems and gives some interesting figures of cost of installation and operation of conveyors. The cost of mechanical handling varies, of course, according to conditions and the size of the plant. For the larger plants the labor cost for transferring coal mechanically is put by Mr. Cochrane at 2 cents per ton. He gives figures showing saving by the use of conveyors. One plant which cost \$16,950 saves \$3,500 a year, or 23½ per cent on the investment. Another plant which cost \$26,000 reduced the labor cost \$13,400 a year. Allowing for interest, depreciation, etc., Mr. Cochrane says that the return on the investment in the latter case was about 37 per cent. He says that no fixed solution can be offered for the problem of transportation of fuel; each case must be treated as a separate problem, depending upon the size of the plant, kind and size of coal, the rate or capacity at which the coal is handled, the location of the delivery point and whether the plant is to be storage reserve and if so, the extent of the storage capacity. Mr. Cochrane says a larger percentage of saving can be expected by proper attention to the design and operation of the boiler room than in any department of the station.

**Heine Safety Boiler Company, St. Louis, Mo.**—"Superheater Logic" is the title of a new publication issued by the Heine Safety Boiler Company, in which the Heine superheater, a new product of the company, is described. The Heine Company, whose steam boilers are so well known, has been experimenting for five years with superheaters of its own design, and announces the new apparatus with full confidence that it will fulfil all expectations. The Heine superheater consists essentially of a header box of the same construction as the Heine boiler water leg, into one side of which are expanded 1½ in. seamless, drawn, mild steel U-tubes. Opposite the tubes in the other sheet of the header box are a series of hand holes closed by inside plates, which make access to the interior easy. The superheater is located at the side of the shell of the boiler toward the front and just above the last passage of the boiler gases, being supported by special castings, which rest upon the boiler tile bar and brick setting. Depending on the capacity and degree of superheat desired, the device may be single and placed only on one side; or in two parts properly connected together, one on each side of the boiler, and above the waterline. The whole is encased in brickwork with a fire-brick roof carried by special T-bars. A small flue, built in the side walls of the setting, carries the hot gases direct from the furnace into the superheater chamber, where they make two passes around the superheater tubes. The flow of these gases is controlled by means of a damper at the outlet. When closed the circulation is stopped, and, as soon as the heat from the gases in the superheater is absorbed, only saturated steam will be delivered.

The validity of the 50-year franchise of the Oakwood Street Railway, Dayton, Ohio, has been upheld by the Circuit Court in that city. This franchise was granted under a special statute which gave cities of the second class the right to grant railway franchises for 50 years. The grant was attacked on the ground that the franchise had not been read on three separate occasions, that it had not been published as often as required by law and that there is a question as to the proper number of consents of property owners along the line. The grant was made about 18 years ago. It was held by the court that contracts entered into before the overthrow of the special legislation between municipalities and public service corporations are valid. As the constitutionality of the franchise was brought into question in this suit, it will be of interest to other companies having like grants.

## ELECTRIC RAILWAY PATENTS

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

UNITED STATES PATENTS ISSUED JUNE 9, 1908.

**Rail-Fastener**, 890,116; Frederick G. Alford, Issaquah, Wash. App. filed May 22, 1907. A clamping device for track rails comprising a central web provided with wings extending along a portion of its lateral edges, studs extending inwardly from said wings, and a screw extending through the web.

**Ticket Issuing and Recording Machine**, 890,170; John F. Ohmer, Dayton, Ohio. App. filed Nov. 4, 1905. Consists in the bringing together in a unitary machine mechanism for properly issuing a ticket for a multiplicity of fares of different denominations.

**Rail-Joint**, 890,182; Peter H. Schlegel, Killbuck, Ohio. App. filed Sept. 5, 1907. A chair in two sections which bear against opposite sides of the railends, the sections connected in a peculiar manner so that they can be forced into close engagement with the rails and any looseness readily taken up.

**Signal System for Railways**, 890,197; Louis H. Thullen, Edgewood Park, Pa. App. filed Sept. 26, 1905. Details.

**Electric Railway**, 890,198; Louis H. Thullen, Edgewood, Pa. App. filed March 2, 1906. Provides means for indicating to a motorman whether or not there is sufficient potential in the sectional conductor which he is approaching to operate his car or train, or whether it is excessive.

**Trolley-Replacer**, 890,201; John Trout, Philadelphia, Pa. App. filed July 11, 1907. Flaring arms pivoted outside the trolley harp which are raised to guide the wheel on the wire by tension on the trolley cord.

**Slack Adjuster**, 890,277; James M. Hines and John S. Barner, Albany, N. Y. App. filed Jan. 28, 1908. Details of construction of an automatic device for taking up the slack due to wear in a brake-applying system.

**Sanding Apparatus for Trolley Cars and the Like**, 890,310; Charles Snyder, Manayunk, Pa. App. filed April 15, 1907. The sand receptacle has its discharge opening near the top thereof and a partition or pocket arranged about the opening to catch sand blown up by a jet of air introduced through the bottom of the receptacle. The sand then flows by gravity to the rails.

**Alarm-Signal Mechanism**, 890,349; Ellsworth E. Flora and Robert J. Zorge, Chicago, Ill. App. filed June 19, 1907. Means for placing torpedoes on the track rails in advance of a train, under the influence of signal mechanism.

**Railway Switch and Signal Track Trip**, 890,360; Charles M. Hurst, Rawlins, Wyo. App. filed Oct. 1, 1906. Details of a depressible shoe in the road-bed for operating switches, signals, and the like.

**Rail-Bond**, 890,367; George S. Mead and Charles R. Sturdevant, Mansfield, O. App. filed Oct. 25, 1904. The end of the bond has a raised rib extending adjacent the ends thereof and along the lower edge to form a recess or seat. When the bond is applied to the surface of the rail or part to be bonded the seat is closed along the lower edge and open along the upper edge to receive solder.

**Guard-Rail Clamp**, 890,384; Christopher Switzer and Fredereck Sundman, Doe Run, Mo. App. filed Feb. 28, 1907. Details.

**Rail Fastener**, 890,396; Johannes Anderson, Hatton, N. D. App. filed May 14, 1907. A base-plate having at one side an integral lip for engaging one side of the rail base and means for keying the other side of the rail base to the base-plate.

**Trolley Wheel Support**, 890,421; John H. Gross, Norwalk, O. App. filed Oct. 10, 1906. Consists of parallel rods which maintain the usual harp and wheel in a predetermined angular relation to the wire under all circumstances.

**Three-Tie Step-Up Rail-Joint**, 890,422; George L. Hall, New York, N. Y. App. filed Dec. 21, 1906. Provides a step-up joint which will also serve as an anti-creeping device and to hold the ties straight, that is to say, perpendicular with respect to the railroad rails.

**System of Motor Control**, 890,458; George B. Schley, Norwood, O. App. filed Mar. 29, 1907. Details.

**Railway Tie**, 890,557; George M. Cote, Pittsburg, Pa. App. filed Nov. 23, 1907. Consists of a metal plate bent up into substantially box form, with a slotted bottom, and having a circumferential corrugation at either side of the rail platforms.

**Railroad Switch Operating Mechanism**, 890,576; James T. Ramage, Konawa, Okla. App. filed Dec. 4, 1907. Means for throwing a switch from a moving car or train in advance thereof.