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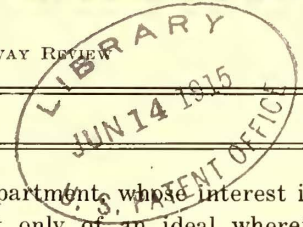
No. 24

MASTER MECHANICS ELECTRICAL COMMITTEE—The dominant note in the report made by the committee on maintenance of electrical equipment before the Master Mechanics' Association this week was clearly reassuring to the mechanical men who were advised that they would float rather than sink in the rising tide of electrification. That no insoluble problem for the steam-railroad official exists in the change from steam to electricity, in fact, is borne out by the success of the individual members of the committee with electrical operation, because the majority of them were trained only in the school of steam. Primarily, there is no important difference in the shop equipment used for repairing locomotives of the two types, and the common difference in organization, which is based on the greater difficulty in finding defects in electrical equipment and the correspondingly greater ease of remedying them is by no means essential. This, at least, has been demonstrated by the policy of the committee's chairman, C. H. Quereau, as he has followed the steam-railroad practice of eliminating, as far as possible, separate forces for inspection and repairs, at the same time keeping up for nine years on the New York Central Railroad the remarkable maintenance figure of $3\frac{1}{2}$ cents per engine mile. Even in the field of operation, electrification can bring no difficulty for the mechanical department heads, for steam engineers can get along perfectly well with electric equipment, and there is no necessity for breaking-in new enginemen. Indeed, the committee points out that the major part of the alleged extensive knowledge of locomotive engineers pertains to other matters than locomotives, and to anyone who has had dealings with them, this is a most conservative statement.

STANDARDIZE EQUIPMENT-FAILURE RECORDS—One very important point brought out in the report was the recommendation to adopt the unit, "miles per detention," as a standard basis for equipment failure records. For years the reliability of the steam locomotive has been judged solely by its record of engine failures which, on a mileage basis, is exactly the unit advocated by the committee. But with the introduction of electricity, which thus far has been confined largely to passenger service, this fact has apparently been overlooked, and electrical reliability records have been frequently based upon "miles per minute of detention," a unit that has been brought into use through its convenience rather than its intelligibility. Of course, the latter unit best serves the needs of the transportation department as a purely operating record, and it has to be made up in any event. This does not, however, entitle it to be imposed

upon the mechanical department, whose interest is confined to the attainment only of an ideal wherein the rolling equipment never breaks down. Once a failure of some locomotive part has occurred, the question whether it has caused a delay of five minutes or fifty minutes is not even of academic interest to the officials in charge of maintenance. What they need to know is that the failure occurred and the cause, and the actual number of detentions due to the equipment is what they should be charged with regardless of the lengths of the delays. As the committee suggests, it would be well to standardize this unit now, rather than to wait until the growing use of electricity for mixed traffic renders the time element in detention records altogether abortive.

HUMAN NATURE AND THE RAILROAD—A book with this title written by Ivy L. Lee, formerly executive assistant Pennsylvania Railroad and now a member of the staff of John D. Rockefeller, has recently been issued by a firm of Philadelphia publishers. Mr. Lee begins with the thesis that the railroad problem is after all a human problem. It is built by human beings, run by human beings, regulated by beings who are very human and serves human beings. The great problem is to make the railroad manager, the employee and the public, in their mutual relations, understand one another's point of view. To help get this mutual understanding, Mr. Lee gives some very simple arguments and illustrations. To illustrate the rate question, for example, he compares it to that of a hotel built in a rapidly growing city like, say, Indianapolis. Originally, the hotel was designed so that each room would contain only a bed, a washstand and a dresser, and the price of the room is assumed to have been restricted to, say, \$2 a day. Later, laws were enacted providing that the hotel should gradually be made fireproof, that a bathroom should be added to every room, that there should be elevators, more attendants, that every guest should be supplied with a drinking cup, and other facilities should be added by law so that the hotel should be more comfortable. During this time, however, Mr. Lee assumes that the public insists that the price of the room should remain at \$2 a day. How many people, he then asks, could be induced to engage in the financing of future hotels under conditions of this kind. This practically represents the situation of electric railway companies at the present day. Additions in the way of greater facilities and longer rides have been made at the demand of the public and by the requirements of commissions, but the public insists that the 5-cent fare must remain in force.



THE ERIE CAR

The all-steel car, described elsewhere in this issue, that has been designed by the firm of L. B. Stillwell for the Erie Railroad, possesses features worthy of note, not so much because of their spectacular character but rather because of their simplicity. In effect the car body is nothing but a long box with all the advantages of transverse and vertical strength that accompany a box-construction. Members which do not contribute to that general idea have been rigidly excluded. This characteristic is best emphasized, perhaps, by referring to the omission of belt rails from the side framing, because a car without belt rails, according to practically universal custom in car design, seems to be very much like a ship without a rudder. As a matter of fact, however, if one were not so used to seeing this member in car construction its retention would be the surprising matter rather than its omission, because, when full advantage is taken of the weight-supporting qualities of the car side, it must lie close to the neutral axis of the beam and thus become practically ineffective.

Judged by the standards of the average interurban railroad the weight of the car body is not exceptionally low. The reason for this is a definite one, however, and is obvious enough when the strength of the construction is considered. Its ability to resist buffing and pulling strains has an ultimate calculable value approximating 1,200,000 lb., the center sills, whose sole duty is to resist these forces and not to carry weight, being prevented from springing either vertically or horizontally by cross-bearers from the side framing. The floor is, in fact, constructed to act as one side of the box-construction that applies to the car body as a whole, and the same thing is true of the roof. Sufficient strength is incorporated in the latter so that the car can be turned upside down and supported on the roof without serious damage. It is designed even to withstand the shocks incident to rolling over, when the entire weight would be imposed upon the line of the eaves, the side posts being bent over into heavy knees at their tops and connected by a continuous deck sill. This forms the equivalent of a flange for the exaggerated girder made up by the car side. In general, the car body members are designed for the equivalent of 13,000-lb. fiber stress, and the car is capable of supporting itself without serious overstrain even when carried at the extreme ends with the trucks removed.

Although the car is to be used for the present, at least, in steam-operated trains, it has been designed throughout with a view to its ultimate equipment with motors and control for multiple-unit operation, and this feature is very significant. At the same time it is a most important consideration for steam railroads, because whether such roads are electrified or not, provision for electrical equipment on passenger cars can be easily made and involves practically no additional expense at the time of reconstruction. If there is no such provision, however, the introduction of electricity means the purchase of new cars and trucks or else expensive reconstruction of existing equipment.

"SAFETY FIRST" NOT A CUT-AND-DRIED PROGRAM

Despite the progress of the past two years in safeguarding the power plant, we are not likely to see the time when a complete recipe for eliminating the danger points can be written with universal applicability. There will always be room for intelligent study of local conditions, although in dealing with many kinds of equipment certain safeguards worth while in one installation will be found equally useful in another.

The installation of guards about gearing and belts, the use of extension pieces on galleries to prevent the dropping of tools and loose metal on the heads of operators, the placarding of high-tension wiring and dangerous contacts, the adequate railing-in of machinery, the protection of switch cells, etc., are methods that may now be said to be of general application, but in practically every station a safety survey goes farther than this. Differences in station design alter clearances and change dimensions of passageways; they necessitate the relocation of piping and valves in extensions, perhaps, or they involve difficulties of access which in themselves tend to cause trouble in emergencies. Just as each plant has individual characteristics, so the acute study of its accident possibilities reveals special hazards which may not be present in a neighboring installation. The ability to see these hazards by imaginative analysis is therefore a very important factor in the protection of the equipment and its operators.

If the safety movement were confined exclusively to the use of standard methods of protection, it might easily become a good deal of a bore to the engineer. There is danger of multiplying safety "standards," so-called, which should never be allowed to take the place of the best solution of the problem in each local case. Something can safely be allowed for the adaptability of mankind. If the safety movement were carried to the extremes sometimes advocated, we should always have the same height of risers and width of treads in stairways; ladders would be affixed to a stated maximum angle with the floor, and clearances would become uniform to the extent of giving the station operator too much room in some cases and perhaps too little in others. This does not mean that consideration should not be given to all the well-known normal methods of safeguarding equipment, but it does signify that there is still ample space for the exercise of originality in discovering possible dangers and in avoiding their occurrence.

In work of this kind more attention is going to be given in the future to the location of auxiliary apparatus of various kinds. It is far better to put the station power and lighting transformers, for instance, on a gallery behind a railed-in space which can be reached without passing in close proximity to high-voltage circuits than to put them into a cramped location near a bank of lightning arresters against which one easily may lean in opening a disconnecting switch or in replacing a fuse. It all goes back to the perennial problem of anticipating the needs of the operating man when working on the embryonic plans of the station,

and the safety movement has its place in the mind of the power-station draftsman of the first order no less than it has its proper hold upon the attention of the man responsible for the productive service.

MORE NOTES ON REGENERATIVE BRAKING

In the issue of the *ELECTRIC RAILWAY JOURNAL* for May 15 attention was directed by the editors to certain features of regenerative braking. The live character of the subject is indicated by the fact that even while the paper was in press A. H. Armstrong was explaining the application of the principles of regenerative braking in the Chicago, Milwaukee & St. Paul electrification at the A. S. M. E. meeting in Chicago. In last week's issue a letter from Frank J. Sprague, one of the pioneers in electric traction referred to in the last editorial, was printed. There were also articles describing the electric locomotive equipment of the Norfolk & Western and that under construction for the Chicago, Milwaukee & St. Paul Railway. This general revival of interest is, of course, due to the electrification of important divisions of these railways on both of which very heavy trains are to be braked.

There seems to be some confusion as to the advantages and disadvantages of regenerative braking, the point of view being determined more or less by the experience and interest of the person holding it, as well as upon the conditions under which it is applied. In one case it is principally the energy saving which counts, in another it may be the reduction in power house cost, in another ease of control and in a fourth reduction in risk of wheel breakage and brakeshoe saving, while in other cases complication in control equipment and increase in motor capacity appear to be of overwhelming disadvantage. It may therefore be worth while to summarize the situation briefly, merely touching upon the points developed in the last editorial.

Energy saving is an attractive proposition as is indicated in Mr. Armstrong's statement on page 1073 of last week's issue to the effect that, on a 2 per cent down-grade, 55 per cent of the up-grade power consumption can be restored to the line. The average saving, even on a system having considerable 2 per cent grade, is very much smaller than this. It is worth while, however, especially if the energy is purchased from a power transmission company, but the principal result is likely to be in the reduction in service charge in the case of purchased power or its equivalent power house investment cost where power is generated by the railway. In the latter case, as previously stated, the kw-hour element of the cost may be negligible due to excess of supply of water power. The conditions cited apply principally in electrifications where considerable density of traffic is involved. There are undoubtedly other circumstances under which the whole matter of energy saving may be of negligible moment.

The advantages of regeneration from braking considerations come principally in the reduction in risk of injury to the wheel flange or to the whole tire. While, as was pointed out in the editorial referred to, it may not

always be possible to demonstrate a direct money saving in brakeshoes, wheels and track sufficient to warrant the complication of regenerative braking, yet, during long periods of heavy mechanical braking the concentration of heat on wheel treads and flanges may produce serious results, due to internal stresses developed, and it is even possible that tires may be loosened and flanges broken. In this connection a former superintendent of motive power of a large steam railroad recently said that under these conditions of continued mechanical braking he had seen the paper centers of Pullman carwheels charred for a depth of 2 in. under the tires, indicating a violent overheating. This condition has undoubtedly been very influential in forcing the development of electrical regeneration.

The objections to regeneration are really not serious when conditions otherwise warrant its use. The induction motor is a natural generator when polyphase excitation is furnished, with or without the phase converter. Its constant-speed characteristics are not insuperably objectionable in the only class of service in which regeneration is practicable. The series motor can be made into a good generator by the plan suggested by Mr. Sprague, or its equivalent, without unwarranted complication. The General Electric Company has actually undertaken to build regenerating d.c. locomotives on a large scale. And the motor-heating item is not so serious either under mountain-grade conditions for this reason. Hauling heavy freight trains up long grades at slow speed involves a considerable time element, in some possible future electrification several hours. The motors have time to attain nearly steady temperature, which motors with forced ventilation do very quickly. This is evident from the data, given last week by Mr. Armstrong, showing that the motors for the C., M. & St. P. locomotive have a continuous rating only 12½ per cent less than the one-hour rating. The operating conditions here are radically different from those where intermittent load is carried by non-ventilated motors. Under the latter conditions, as was pointed out in the editorial four weeks ago, electric braking, regenerative or otherwise, means larger motors. If all the motors are used in braking, the load on them is less than the climbing load by twice the friction load, and the heating is more than proportionately less. Hence a motor that is not overloaded on an up-grade sufficiently long to bring it to steady temperature will not, by a large margin, be overloaded in holding the same train on a down-grade of the same percentage. It follows, then, that less than the total number of motors can be used in braking without overloading by the proportion which twice the train resistance bears to the up-grade load. On the Norfolk & Western, one-half the motors only are used on the down grades.

Whichever main advantage of regeneration, better braking or energy saving, weighs more in the minds of the officials responsible for the choice of electrification systems, they all agree that regeneration should be used when heavy grades are involved.

All-Steel Cars for Erie Railroad

New 44-Ton Cars 72 Ft. Overall Have Been Placed in Steam-Operated Suburban Service on This Line, the Design Providing for Future Installation of Electric Motive Power Equipment Although the Strength of Structure Has Been Based Upon the Heaviest Steam-Railroad Standards

There have just been placed in suburban service by the Erie Railroad several all-steel passenger cars which possess unusual qualifications of structural strength combined with moderate weight. The design, in fact, provides for shocks due to derailment and overturning as well as collisions without distortion of the primary structure. The weight complete with trucks and car-body equipment, but without motors or the storage-battery lighting outfit at present installed, is 87,400 lb. This is approximately 8 per cent lighter than the class of steel-underframe cars that preceded the new cars, although the former have materially less ability to withstand abnormal strains.

For the present, of course, the new cars are to be operated as trail cars drawn by steam locomotives, but the Erie Railroad, in common with the Pennsylvania, is providing for future electrification by so planning the new cars that they may be equipped with motors and electric control at any time without necessity for replacing any of the material or altering the arrangement in any way. The wheels and axles, of course, are designed especially for trailer service, but the trucks are arranged so that these can be replaced by larger wheels and axles that are suitable for a geared drive. In addition, space has been left so that inside-hung motors may be set in between the axles and the transoms, the latter being specially designed for the support of the motor nose.

Provision for installing switches and control equipment has been made in the vestibule sheathing at each end of the car and certain of the floor members have been installed with sufficient reserve strength to carry the switch group, resistance, compressor, blower, transformer and other apparatus that might be installed under the floor when the cars are equipped for electric operation. Over each truck the car roof has been given ample strength to carry pantographs or similar current-collecting devices, and the height of the roof has been made suitable for this purpose. All of these provisions have been designed with a view to the establishment of the most advantageous facilities for electrical operation, and, in addition, special consideration has been given to the questions of thorough inspection methods and easy accessibility for maintenance. However, the suitability

of the car for operation in steam-train service has been in no way impaired.

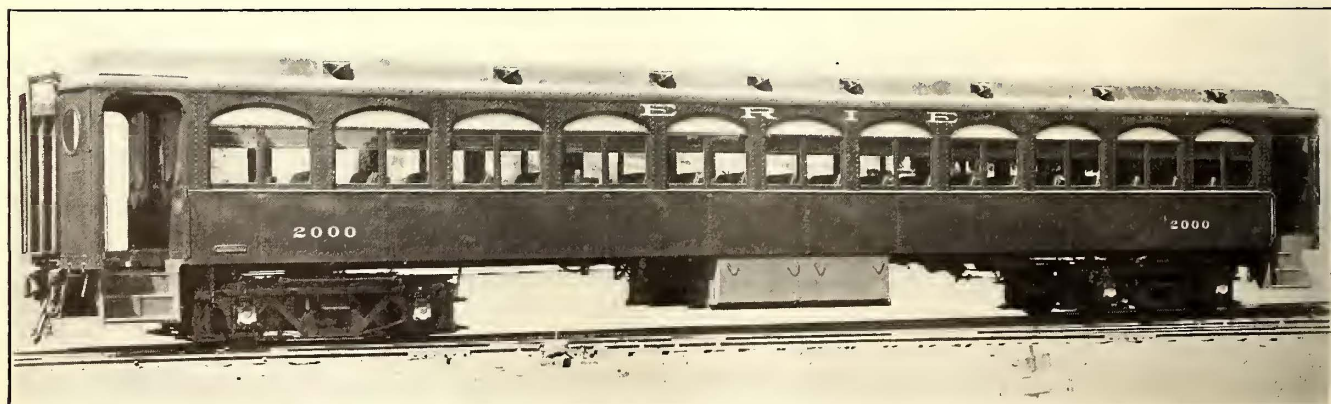
GENERAL FEATURES

The general features of this car were selected by F. D. Underwood, president Erie Railroad, and the car was designed under the direct supervision of William Schlafge, general mechanical superintendent of that system, by the firm of L. B. Stillwell, consulting engineers. Throughout the design the following characteristics were kept in mind as essential: Safety and comfort of passengers; low cost of operation; low cost of maintenance; moderate first cost.

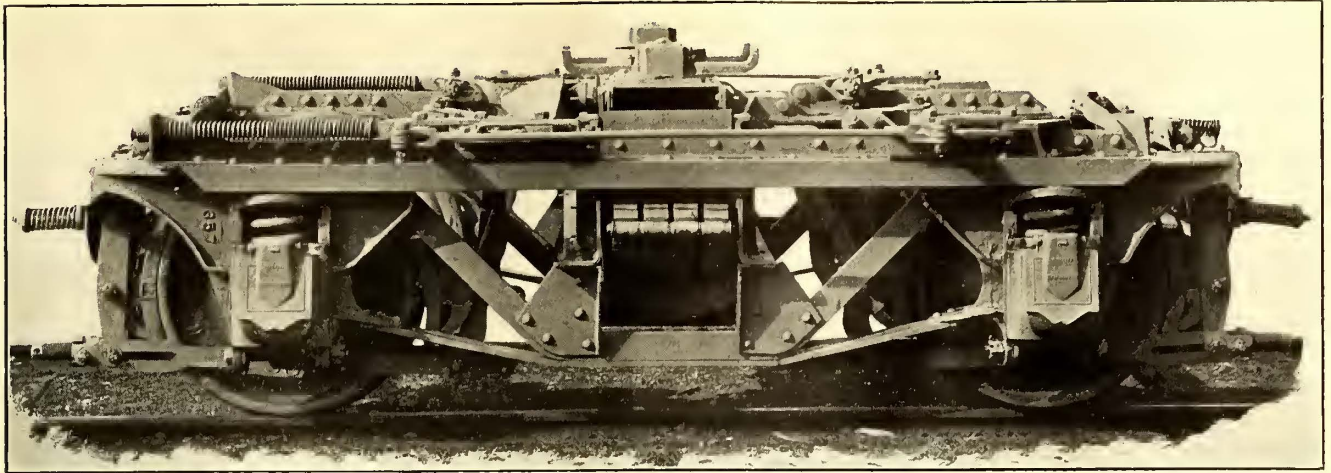
The feature of safety of passengers was covered by a special study of the behavior of railroad cars when subjected to the stress of derailments and collisions, and is secured by surrounding the passenger-carrying space with heavy, shock-resisting members, the superstructure being an integral part of the car and providing the equivalent of a solid box construction. Not only is the floor construction of ample strength, but the members forming the side walls are so disposed as to resist collapse or telescoping even should the car be overturned. The form of roof also adds greatly to this protective feature, as the side posts are bent at the top to form heavy knees and connected by a continuous deck sill made of 5-in. x 3/16-in. plate. This construction serves in effect as a flange for the high girder that is formed by the side of the car.

The vestibule end posts consist of 9-in. I-beams framed into the sills and to the vestibule ceiling construction. The body and walls or bulkheads are fitted with 1/4-in. pressed-steel corner posts 12 in. deep, and gusset connections of 1/4-in. flanged form extend from the bulkheads to the side sills and to the top plates, thus bracing the end walls against collapse in case of a heavy blow.

Comfort of passengers is contributed to by a special truck construction to give easy riding qualities, by the design of the seats and by the lighting arrangement, which avoids the use of large units that concentrate centers of intense light at several points. Instead, the reflection from the ceiling is used to effect thorough diffusion.



ERIE CAR—VIEW OF FULLY EQUIPPED CAR



ERIE CAR—NON-EQUALIZED TRUCK WITH CLASP BRAKES

CAR WEIGHTS

The cost of operation of any car involves the factor of dead weight as related to seating capacity. The results secured in this case, as indicated in the accompanying table of comparative weights, show that the all-steel car weighs less per seated passenger, and closely approximates the weight per foot of overall length, when compared with the lightest wooden car in the same company's service:

TABLE I.—COMPARISON OF WEIGHTS OF NEW AND OLD PASSENGER CARS OF ERIE RAILROAD

	All Steel	Steel Under-frame	Steel Under-frame	All Wood	All Wood
Number of seats...	86	72	72	72	72
Average weight, lb.	95,400	96,500	100,500	83,200	86,600
Weight per seated passenger, lbs...	1,100	1,340	1,400	1,140	1,200
Weight of lighting equipment, lb....	8,000	8,006	8,000	2,000	6,500
Net weight ex. lighting equip.	87,400	88,500	92,500	81,200	80,100
Weight per seated passenger, exclusive of lighting equipment	1,017	1,230	1,284	1,128	1,112
Length overall... 70' 4"	66' 3 1/2"	66' 3 1/2"	66' 3 1/2"	66' 3 1/2"	66' 3 1/2"
Weight per ft. ex. of lighting equip....	1,243	1,333	1,395	1,225	1,210

The comparison per foot of overall length is especially interesting, as it is unaffected by the seat spacing. It should be said also that the new cars are fitted with heavy friction buffing devices and friction draft gear, as well as large draft sills, whereas the lightest wooden car has only the spring platforms and wooden draft sills with tandem spring draft gear customary with cars of that type.

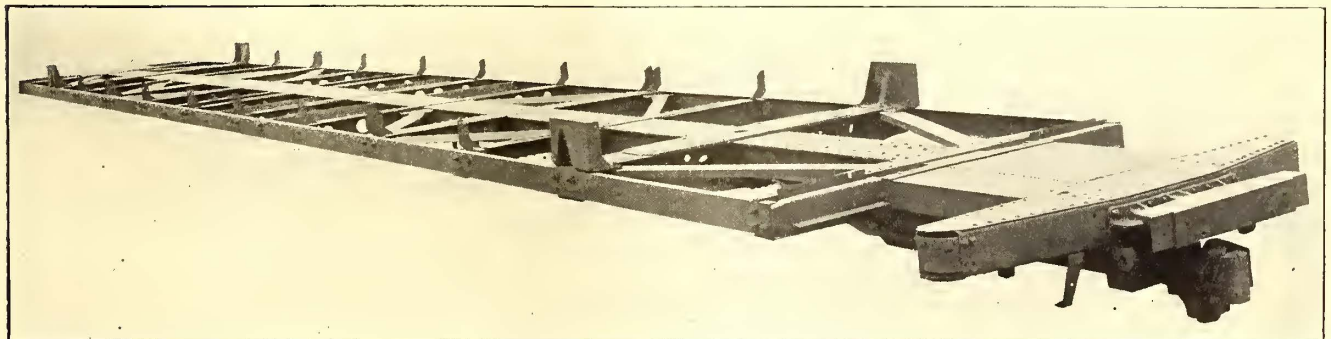
The lighter weight of the new car, as compared to other steel cars in similar service, can be attributed to the system of design originally developed by L. B. Stillwell and Frank M. Brinckerhoff for the Hudson & Manhattan Railroad and the New York, Westchester & Bos-

ton Railway. This system involves the rigorous exclusion of all unnecessary members and also the co-ordination of all members that are installed so as to develop their full structural value. The uneconomical and heavy center-sill construction of the fish-belly type has been eliminated, and a center sill of uniform section whose sole function is to absorb buffing and pulling strains extends from end to end of car. In order to develop the full strength of the center sill as a column it is supported from the deep side-frame by cross bearers at each main side post, these being on approximately 65-in. centers.

RIGIDITY OF STRUCTURE

The cost of maintenance of all-steel cars is a matter regarding which few data are yet available, and the influence of structural strength upon the rate of deterioration is a question that will require time before it can be definitely answered. However, it is obvious that the maintenance of a rigid structure will be less than that involved by one in which even slight flexure occurs at the joints. This principle has been followed in the new design by making the girder or truss that supports the load extend over the entire height of the car side.

No belt rail, in fact, has been included in the design, because the side structure of the car is composed of a series of T-shaped pressings with diagonal braces at the bottom, such as are shown by the accompanying line cut. These make up the complete supporting frame work. The sheathing serves only to house the interior of the car, and it is made up from 1/16-in. sheets of American ingot iron, this metal being chosen in preference to steel on account of its rust-resisting qualities when rolled in thin sheets. The sash rests are supported directly by the side posts, being welded to them to secure waterproof joints.



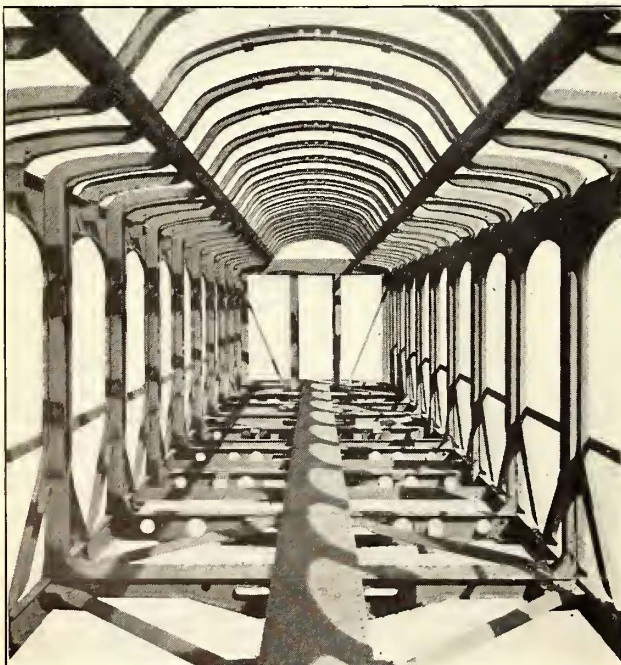
ERIE CAR—VIEW SHOWING LIGHT FLOOR FRAMING AND CENTER-SILL CONSTRUCTION



ERIE CAR—INTERIOR VIEW

As a result of this construction the truss-side of the car is 7 ft. 5 in. high, or about two-and-one-half times the height of girder that is possible in the type of construction where a heavy belt rail at the window sills serves as the compression member. As deflection varies with the cube of girder height while strength varies only with the square of the height, it is manifest that the rigidity of the structure for the cars in question is more than two-and-one-half times as great as it would have been with equal strength had the side-girder been limited to the height between the window sills and side sills.

In comparison with the underframe type of construction where there is no side girder at all, the rigidity of the new car is actually some seven times greater even with cars of equal strength. Naturally, the limitation of the deflection decreases the tendency for



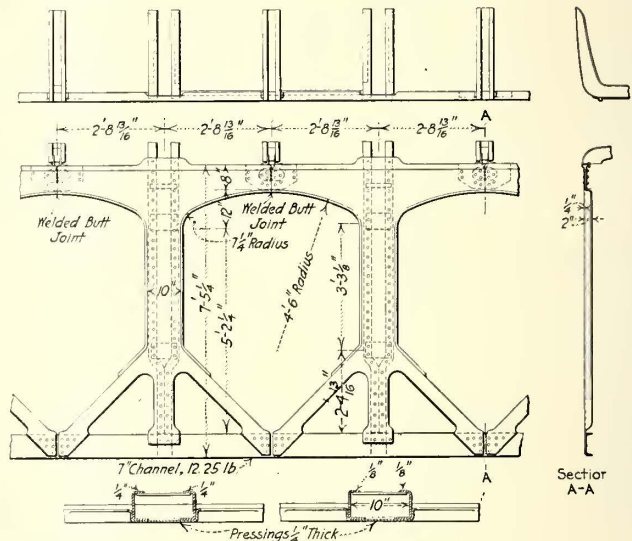
ERIE CAR—FRAMEWORK OF CAR PRIOR TO APPLICATION OF SHEATHING

spring in the joints in the roof and between the top plate and side posts and, in turn, decreases the opportunity for overstraining riveted joints and having them work loose.

The cost of car structures bears a general and approximately fixed relation to weight, and consequently, unless unusual refinements of workmanship are involved, reduction in weight means reduction of first cost. That this feature has been given consideration in the new design has been shown in the foregoing table. In general, it may fairly be assumed that a reduction of 1 lb. in weight of car will effect a saving of 10 cents in first cost.

As the rigidity of an all-steel car underframe makes the use of a friction draft gear practically imperative and the installation of an effective buffing device equally necessary, the new cars are fitted with equipment of this type that has sufficient capacity to absorb the most severe shocks that may be expected in service. The general design of the center sills is based upon an ability to absorb an ultimate force of 400,000 lb. at 18,000 lb. fiber stress.

The center sill construction forward of the bolsters is supported by the high side frames through the body



ERIE CAR—PRESSED-STEEL UNITS FORMING SIDE FRAME

and sill and bulkhead construction. The bending moment occurring at this point due to the eccentric draft gear forces is resisted by deep pressed-steel draft sills extending through the bolsters and is transferred by the body and sill and bulkhead construction to the high side frames. The center sills between bolsters are thus relieved of any eccentric loading from the draft gear, and the full section is available to resist the consequent direct compression because the sills are supported and aligned by the high side frames and heavy cross bearers as previously mentioned.

DETAILS OF CONSTRUCTION

The center sills between bolsters consist of two 8-in. 16.25-lb. channels, spaced 14 in. back to back, with a 19 in. x 3/8 in. top cover plate and two 4-in. x 3 1/2-in. x 3/8-in. angles reinforcing the bottom flanges. This gives a total section of 22 sq. in. Forward of the bolsters the pressed-steel draft sills reinforce the center sill construction and at the point of maximum depth add 10 sq. in. to the section.

The side frames of the car which are 7 ft. 5 1/4 in. from bottom of sill to top of side plate are designed like a bridge girder, with a pressed-steel compression

member at the top plate and a channel tension member at the side sill. The posts connecting these members are of 10 in. pressed channel form, $\frac{1}{4}$ in. in thickness. The posts are furnished with integral diagonal braces below the windows and with flanged gussets at portal arches. They are reinforced with other pressings to form a box shape, the thickness increasing from $\frac{1}{8}$ in. to $\frac{1}{4}$ in. at the posts which are subject to the greater horizontal shear. At the point of maximum shear the post is further reinforced by 2-in. x $\frac{3}{16}$ -in. angles inside of two corners of the box post, the shearing force here being 11,000 lb. on the one post. The maximum stress assumed in the design of these side frames was 16,000 lb. per sq. in. This stress is based upon the moment established by the total dead weight of the car resting on the center plates, plus the maximum load of passengers that could stand in the car, and with 25 per cent of the total dead load and live load superimposed in addition. Under these conditions, also, the stress in the bolsters is maintained at 12,000 lb. and that in the truck frame, which is not spring supported, at 8000 lb. The sides of the car, as previously described, are provided with transverse strength by bending over the tops of the posts to form a sort of flange. This has an estimated ability to withstand the strains imposed by the car rolling over side wise, thus loading the eaves on one side with the entire weight of the car.

The roof structure is formed of pressed channel carlines and is of the compound arch type. This outline of roof is not only strong, light and inexpensive, but gives good ventilation, good distribution of reflected light and is particularly suitable for the support of electric current collectors on cars fitted with electrical motive equipment. The roof sheathing like the side sheathing is made of $\frac{1}{16}$ -in. non-corrodible American ingot iron. The joints are riveted and flame-welded.

The trucks of the new cars are of the non-equalized type and are fitted with spiral journal-box springs and 33-in., quadruple, elliptic springs. The proportioning of the springs is such as to produce the easy-riding qualities so essential in steel car construction, not only for the comfort of the passengers but for maintenance of equipment and roadbed. The trucks, complete with clasp brakes and 33 in. wheels with 5 in. x 9 in. journals, weigh 12,500 lb. each. A feature of interest on the trucks are Coleman bolster-locking center pins which prevent the separation of car body from truck in case of derailment or collision and thus aid in preventing telescoping of the cars.

Illumination of the cars is secured by eleven electric fixtures arranged in the center line of car. The form of ceiling outline is such as to reflect and distribute the light evenly over the seats and aisle without producing shadows. One 25-watt lamp is used in each fixture. The cars are equipped with Wilson storage batteries of 800 amp hour capacity.

The interior sheathing is of fire-resisting Agasote throughout. The insulation of the car is made up of $\frac{3}{4}$ -in. Flaxinum fastened to the outside sheathing by pins that are spot welded to the frame, and bent over washers that hold the insulating material in place. In all cases the railway company's standard parts have been incorporated in the construction, so that wherever renewals are involved stock material will be available in the company's store rooms.

Employees of the Pensacola (Fla.) Electric Company were guests of the officials of the company at a banquet on the evening of May 6 at the San Carlos hotel. The banquet was held in honor of the red team in the safety-first campaign, this team having made the best record during the last six months in accident prevention.

Wage and Labor Conditions in Steam Railroad Car Building and Repairing

The bureau of labor statistics of the United States Department of Labor recently published, as Bulletin No. 163, a report on wages and hours of labor in the building and repairing of steam railroad cars. The report is based on information obtained from the principal representative establishments in the industry. Figures are presented in this bulletin for rates of wages per hour and full-time hours of labor per week for the years 1907 to 1913 and for full-time weekly earnings for 1910 to 1913.

Full-time weekly earnings of the employees in the principal occupations in this industry in 1913 were 5.5 per cent higher than in 1912, 6 per cent higher than in 1911, and 8.9 per cent higher than in 1910. Average rates of wages per hour for 1913 were 6.3 per cent higher than in 1912, 6.4 per cent higher than in 1911, and 9.9 per cent higher than in 1910. The full-time working hours per week in 1913 were 0.7 per cent lower than in 1912, 0.4 per cent lower than in 1911, and 1.1 per cent lower than in 1910.

The data for 1913 were obtained from seventy-three representative establishments and covered more than 42,000 employees. The average full-time weekly earnings in 1913 in the principal occupations in these representative establishments were as follows: Cabinet-makers, \$19.03; carpenters and car builders, wood, \$17.11; car repairers, \$15.15; fitters, \$15.99; laborers, \$10.58; machine woodworkers, \$16.26; machinists, \$17.81; painters, \$17.77; pipe fitters, \$18.56; riveters and buckers, \$19.41; tanners, \$19.28; truck builders, \$15.31; upholsterers, \$19.50.

In 1913 the full-time hours of labor per week were under fifty-four in quite a number of the establishments visited and over sixty in but very few. The predominating full-time hours per week were fifty-four, and the average about fifty-six.

Jitneys at El Paso, Tex.

El Paso was one of the first cities to be afflicted with the jitney. The first ten cars were placed in operation in November, 1914, by a concern known as The Jitney Company. Later it bought eight cars more, but did so without reckoning seriously on competition. The result is that while this concern is still in business it is operating apparently without profit. The maximum number of cars in 5-cent service at El Paso is now about 160. One of the results of the jitney competition has been a cut in auto livery service from an average of \$4 to \$2 an hour. The jitneys will perform the same service at the rate of \$1.50 an hour.

The jitneys do not operate on any specified routes or according to any schedule. Many of them also frequently give up the 5-cent business to carry soldiers to and from local posts for 15 cents one way or 25 cents a round trip.

El Paso also has ten 5-cent auto-buses which seat fourteen passengers each. These were operated at first by the Auto-Bus Company, which has since been absorbed by the Jitney Company.

The total business of all these auto vehicles, exclusive of livery service, is estimated to be less than \$4 per car per day. Quite a large number of the jitneys, as in other cities, are operated only during the peak hours on the spare time of their owners. No ordinance to regulate this business is in effect.

The *Tramway Bulletin*, published in the interest of the Denver (Col.) Tramways Company, will in the future publish items of interest concerning the Denver & Intermountain Railway and its operation.

Convention of N. E. L. A.

The Convention of the National Electric Light Association Was Held at San Francisco June 8-11. Abstracts of a Number of the Papers Are Published

The annual convention of the National Electric Light Association was held this week at San Francisco, the meetings being at the hall of the Native Sons of the Golden West. Two special trains were run from New York. The convention began with a general executive public policy session on the morning of Tuesday, June 8. At its conclusion the association held several parallel sessions, three during the afternoon of Tuesday, three on Wednesday morning, two on Wednesday afternoon, three on Thursday morning and two on Friday morning. These divisions were termed respectively, technical and hydroelectric, accounting, and commercial. There was another general session of the evening of Thursday at which the report of the public policy committee was presented by W. W. Freeman, and when there was an address on "Municipal Regulation of Public Utilities" by John H. Roemer, formerly member Wisconsin Railroad Commission and now general counsel H. M. Byllesby & Co. The final general session was held on Friday morning, at which papers were presented on topics of general interest, and officers for the ensuing year were elected.

Abstracts of some of the papers follow:

PRESIDENT'S ADDRESS

In his annual address President Scott said, in part: "We sometimes boast that our industry has attracted, on the whole, a very intelligent and industrious class of employees, but I wonder if the employee who is in contact with the consumers and the public could answer only a few of many questions that arise daily. Could he explain in a simple manner how and why corporations were created? Does he know what a mortgage or a bond is, and could he explain the provisions of a mortgage if there is one on his particular property? Could he explain the difference between an ordinary mercantile business and the public utility business? Does he know that, when averaged over a period of time, it is necessary to provide \$5 of capital for each \$1 of increased gross business, and could he explain how new capital is raised for public utility enterprises? These and many other questions that could be asked seem elementary to some of you, but I am very sure that many of us have assumed that our employees are better informed than is the case, and that it might be well to investigate the matter. It only seems to me to prove another excellent reason for employees' or company section meetings through which valuable information can be disseminated.

"The tendency of the times is making it hard for public utility companies to raise capital, and if this continues it will retard the wonderful possibilities in the growth of the electrical business and the public will suffer. For instance, if our regulating bodies will not allow a return sufficient to attract capital, fewer extensions to residential customers will be made and the extensions to the rural districts will be postponed. It is a fact that the public is more interested in the ability of public utility companies to keep pace with the growth of the communities and to render good service than in the rate for the service. I am not a pessimist, for we know the men in our industry have solved many big problems in times past and they are capable of convincing the public ultimately that capital and brains should be rewarded liberally."

REPORT OF COMMITTEE ON PRIME MOVERS

The report of the committee on prime movers expressed the opinion that probably the most important recent developments have been in surface condensers. Data were given regarding the performance of economizers installed in the Fisk Street station of the Commonwealth Edison Company, Chicago. Attention was called to the importance of providing instruments in the boiler room to show firemen the performance of furnaces and boilers. Among other subjects treated in the report were the effect of air leakage on fuel economy, methods of improving the performance of old condensers, electrical-resistance method of determining surface-condenser leakage, ventilating and cooling of electrical equipment, the deleterious effects of sodium carbonate on boilers, methods of burning coal dust, and means for computing the commercial value of various grades of coal from the ash content. A statement was given of the fuel-oil production and probable supply in the United States and Mexico, which indicates that vast quantities of this fuel are available.

The progress of Diesel engine development in this country was outlined and brief reference was made to installations of Humphrey pumps and gas engines. A letter from Prof. R. H. Fernald, which concluded the report, contained an outline of gas-producer practice in this country and Europe. In the appendix were described several methods of measuring plant feed-water under test and under operating conditions.

OIL FUEL FOR STANDBY PLANTS

According to the paper entitled "Oil-Burning Standby Plants," by C. H. Delany, the Pacific Gas & Electric Company has found that oil fuel has many advantages over coal for operating standby stations, especially when such plants must be kept in readiness to carry indefinite loads without notice. Boiler efficiencies as high as 80 per cent have been obtained, for the reasons that less excess air is required for oil combustion, very little energy is required to carry away furnace gases, leakage through the boiler setting is small because of the lower draft employed, and banked fires are not required. From 1 to 4 per cent of the total steam generated is required to atomize the oil so that it can be burned efficiently. About 0.3-in. draft has been found sufficient to operate boilers at 200 per cent rating. Starting with cold water in the boilers, it has been possible to raise steam with oil-burning equipment in twenty-five minutes to thirty minutes.

At the standby station in San Francisco all of the boilers necessary for supplying city service are kept under a light load continuously so they may be forced to carry extra load whenever hydroelectric service is interrupted. At the Oakland and Sacramento plants groups of boilers are fired in rotation so that they will always be hot and ready to generate steam quickly. Tests have shown that starting with a light load, carrying a short peak load, and then returning to the original condition in three minutes, about 0.08 lb. of oil is required per rated boiler-hp. The amount of fuel required to maintain 160 lb. steam pressure when no steam is being used has been as low as 0.038 lb. per hour per rated boiler-hp, or about 1.4 per cent of the quantity required to operate the boiler at its rated value. Other

tests to determine the amount of fuel required to restore normal pressure in boilers showed unit fuel consumptions, ranging from 0.105 lb. to 0.685 lb. per boiler-hp, depending on the construction of the dampers and on the number of hours the boilers had been standing unfired or disconnected from the steam mains. During normal operation of the Oakland plant about 1.22 lb. of oil is used per day per rated boiler-hp to keep the nine boilers hot. In addition to this there is the cost of labor, making a monthly unit expense of about \$3.18 per kw of equipment installed, which is in addition to the amount involved in keeping the turbines in operation.

Assuming that turbines in standby stations must be kept on the line, some economy can be effected by arranging to give the station notice when it will be required to carry a heavy load. Auxiliaries should be electrically driven, where practicable, so that there will be no excess exhaust steam when the plant is running with a light load. Although the fuel burned when a standby station is not operating is much less than when it is carrying a load, the standby losses are nevertheless considerably more important than the operating losses, since the latter continue for only about 5 per cent of the time.

REPORT OF COMMITTEE ON ELECTRICAL APPARATUS

Descriptions of recently developed electrical apparatus and a switchboard manual intended to serve as a guide in selecting switchboard and instruments made up the bulk of the report of the committee on electrical apparatus. Attention was called to the gradually increasing ratings which can now be obtained in single generating and transforming units. Reference was also made to portable and automatic substations, which are operating satisfactorily at pressures as high as 100,000 volts and ratings as high as 3000 kva, and a description was given of one used on the Piedmont-Northern Railway comprising a 1500-volt generator, a 2200-volt synchronous motor and a three-phase 44,000-volt transformer, said to be the first portable railway substation with as high a voltage as 1500. The mercury arc rectifier on the 1000-hp locomotives on the New Haven Railroad is reported to be working satisfactorily and to have made more than 20,000 miles.

COMMITTEE REPORT ON UNDERGROUND CONSTRUCTION

The report of the committee on underground construction contained three sections—the first relating to manhole and conduit construction, the second to cable data and protection, and the third to equipment, devices, etc. Reports received from companies owning approximately 75 per cent of the underground equipment in this country show that they have 100,862,587 duct-ft. of subway intended for electric-service conductors. According to the committee report, there exists a greater difference in practice among these companies than appears to be justified. When pressures of 10,000 volts or over are used in cable systems, careful consideration should be given to causes of heating, among which are the losses in the conductor and in the dielectric material. Loss due to leakage through a dielectric appears to be greater with some resinous compounds than with some of the mineral oil compounds, and varies greatly with changes in temperature. Attention was called to the fact that the radiation from cables changes according to the season of the year. It was suggested that some scheme for ventilating conduit be devised. To prevent disastrous fires the committee has recommended the bonding of all lead cable sheaths, the use of concentric cable and the use of fireproof cable coverings in every manhole. The advantages and disadvantages of

concrete shelves, split-tile ducts, asbestos rope, cement coatings with rope bond and asbestos tape saturated with silicate of soda or bound with metallic tape were discussed. There was a difference of opinion regarding the desirability of sealing ducts opening into manholes, but separating the ducts into groups by barriers of concrete or earth was recommended. For the benefit of companies desiring to have subway construction done by outside contractors specification and contract forms were included. The report was concluded with descriptions of labor-saving and accident-preventing devices.

REPORT OF THE LAMP COMMITTEE

According to the report of the lamp committee, the disturbed condition of the country has had its effect upon the lamp business, and during 1914 the aggregate sales of domestic incandescent lamps, exclusive of miniature units, totaled slightly under 100,000,000, which was the output for the preceding year, 1913. The 1913 sales represented an increase of about 11 per cent over 1912. Sales of tungsten lamps now amount to 70 per cent of the total domestic lamp sales. The tantalum lamp has disappeared from the market. The average size of the lamps sold during 1914 was 38.2 cp and 48 watts, making the average efficiency 0.8 cp per watt.

Nearly 1,000,000 gas-filled lamps were sold during 1914. Improvements in these lamps have been along the line of securing a more uniform product. The principal change in design has been to adopt a new line of bulbs in standard sizes. It is customary to insert a mica disk deflector between the stem and filament of these lamps, thereby deflecting hot gases from the glass seals and base. Usually these lamps are constructed for but one position of burning, namely, tip-down.

The improvements in vacuum lamps during the last year are noticeable principally in increased efficiency. Since last year's report this improvement has been in the neighborhood of from 7 to 10 per cent in sizes below 150 watts. The practice of introducing chemicals to delay the discoloration of the bulb has been extended to include 10-watt, 15-watt and 20-watt lamps and has permitted the operation of all vacuum lamps at higher efficiencies with improved maintained candle-power. According to the committee, inferior tungsten-filament lamps, of both the vacuum and gas-filled types, are making their appearance on the market in increasing numbers.

REPORT OF COMMITTEE ON PUBLIC POLICY

The report of the committee on public policy was signed by the committee consisting of W. W. Freeman, E. W. Burdett, H. L. Doherty, C. L. Edgar, Gen. George H. Harries, Samuel Insull, John W. Lieb, J. B. McCall, T. E. Murray, H. H. Scott, Samuel Scovil, Charles A. Stone, H. A. Wagner and Arthur Williams.

It expresses gratification that the conclusions and recommendations made by the committee in past reports have been accepted so generally by member companies and that further experience continues to confirm the soundness of the association policies. It says that the past year has been one of anxious uncertainty in most business quarters. Beginning with contraction in business activities due to political and legislative changes, and followed by the outbreak and active continuance of the European war, the entire commercial fabric has been subjected to severe strain. It is evident, however, that for several months conditions have been improving surely, if slowly, and the industry has demonstrated again the stability and reliability of its investments and earnings under adverse business conditions.

The report then quotes recent figures of earnings for steam railroads and public utilities to show that the

utility companies, and especially electric light companies, are affected in much less degree by varying financial and industrial disturbances than most other business enterprises, and says that as this fact becomes recognized more fully by the investing public, the securities representing electrical properties should become established still more thoroughly in their confidence and esteem. Member companies will do well to broaden the market for their securities by keeping their local investors informed as to the relative merits of electric lighting and other securities, and by a policy of frank publicity as to their earnings and financial condition. It would also be well, the committee adds, to give special attention to legislation restricting or affecting the investment of savings and trust funds, so that electric lighting bonds may receive due recognition as conservative and safe investments.

The committee then points out that thirty-two states and the District of Columbia now have commissions regulating electric light utilities but notes with regret a tendency recently in several states to give commissions a political complexion. If partisan politics seem to demand an occasional change in personnel to correspond to changed party control, such substitutions, the committee says, should be made with great care and always with due regard to the responsibilities and requirements of the office.

The question of what is a reasonable rate of return has been passed upon in specific cases by the commissions of at least fifteen states and, in cases of electric properties, 8 per cent is the figure which has been adopted generally; 7 per cent has been fixed in two cases and as high as 10 per cent in as many others. It has been recognized generally by the commissions that the prime necessity, from the public standpoint, is to insure adequate and reliable service, and that the measure of return to be allowed an electric company should be at least the measure of wages which must be offered to capital to secure its ready employment in the business.

As to the necessity or advisability of a definite appraisal of existing property for the determination of rates, a marked difference is indicated by the action of the various commissions and the laws of the several states. In some states the laws require an appraisal in advance of the fixing of rates by the commission. In Ohio and Oklahoma orders have been issued by the commissions calling for appraisals of the properties of all utilities, irrespective entirely of pendency of rate cases. Such sweeping orders, in the opinion of the committee, involve large expenditures of money and labor on the part of the companies, without corresponding advantages to the public. Furthermore, if such appraisals are to be of admitted value to the public, they must be verified by the commissions, thereby involving further large expenditures of money and labor on their part. In view of the sweeping appraisal order of the Ohio commission, the committee notes that in the first electric rate case—and thus far the only one determined by that commission (that of the company in Bucyrus)—the commission reported, after the completion of a detailed appraisal, that it would be necessary to increase rates in order to yield a return of even 6 per cent per annum on the appraised value; and because of that fact, and since the company did not wish to increase rates, the commission proceeded to fix a new and lower schedule which represented its judgment as to the rates at which consumers were reasonably entitled to obtain electric service, and which, in the judgment of the commission, would serve promptly to effect such growth of business as would yield a reasonable and satisfactory return. This somewhat novel case was concluded by the acceptance by the company of the

schedule imposed by the commission. In the New York Edison Company case, in which reduced rates became effective on May 1, 1915, opinions were filed by each of the five commissioners, and all agreed that in order to avoid further delay rates should be fixed without definite valuation. The committee agrees with the Massachusetts Commission in the Northampton gas case, that the matter is not one of "mathematical demonstration" but must involve the exercise of "sound judgment." But where appraisals are undertaken (and they may be of distinct advantage in proving the intrinsic value of capital securities), the committee says that it is important that companies be careful to include all of the elements of value, both physical and intangible, which go to make up a proper and complete appraisal.

Reference is made by the committee to the decision rendered on Dec. 9, 1914, by the New Jersey Court of Errors and Appeals, and reported in this paper, in the matter of franchise value as affecting rates of the Public Service Gas Company in the Passaic division. It also says that many prominent students of public affairs, after investigation, have announced themselves clearly as in favor of regulated monopolies in preference to competition, and, as conspicuous cases, the committee quotes from addresses of President Wilson, ex-President Roosevelt and Senator Underwood of Alabama.

The issue of municipal ownership, the committee says, is probably where it was a year ago. The committee continues to believe that municipal ownership and operation of lighting utilities is against the public interest excepting where, on account of local conditions, private capital is not readily available for such service. As an economic proposition, municipal ownership has not "made good."

The committee refers to the decision of the United States Supreme Court in the case of the Norfolk & Western Railway Company, decided on March 8, 1915, as of special interest to companies doing a combination business, such as electricity and gas, or electricity and street railway, and it may possibly apply to different divisions of the business of an exclusive electric company. In this case it was contended that earnings from the freight business should be considered as offsetting the reduction involved in limiting the passenger fare to 2 cents per mile. It was held that the rate was confiscatory because when applied to the passenger business alone, separately considered, it was found to yield but a narrow margin above the cost of such traffic.

In referring to the subject of public relations the committee says that for years it has been preaching the gospel of first-class service, reasonable rates and liberal treatment of the public as essential to the permanent prosperity of any utility company. It believes that the time has come to stop talking about the shortcomings of years long past as excusing a disinclination to give credit where credit is now due, and it asks whether the time has not now arrived when it is fitting to say something about the obligations of the public to recognize and reward services faithfully and efficiently performed. The companies are, in a very real sense, public servants; their prime obligation is to serve the public, but their measure of reward ought to be reasonably proportionate to the value of the service rendered.

The report continues that there is danger through too drastic restriction that the desirable incentive to unusual efficiency will be destroyed, and that the public will be the greatest sufferer thereby. There is real need to-day of an intelligent conception of the respective duties of public master to public servant as well as of public servant to public master. A servant who is ill fed and underpaid cannot render good service, whether such servant be an individual or a public service cor-

poration. What is needed most is an appreciation of the actual facts, with a knowledge of which the public is inclined to be fair.

In conclusion, the report says it is undeniable that a strong and efficient public utility in any community is a distinct asset to the entire community. It is invariably one of the largest taxpayers, and through its service promotes industrial development and general business activity. In view of these facts, it is entitled to the good will of at least the intelligent members of the community, and the withholding of such good will is of direct disadvantage to all business interests. From selfish motives, if not otherwise, the business people in every community should exert every reasonable effort to promote a sympathetic understanding of the difficulties and problems confronting utility companies, in order to secure the measure of public co-operation to which they are entitled by reason of a service honestly and efficiently supplied, and in which the general public, whether they appreciate it or not, are essential partners. The committee suggests that member companies should insist upon the recognition of their just claims for public support, believing that an aggressive policy with this object in view will attract attention and win respect.

OVERHEAD LINE CONSTRUCTION

This committee had no meetings during the year but the chairman's report outlines the general situation. It called attention to the general acceptance given to its previous reports as well as to the necessity of making changes in standard practice as construction methods develop. The committee considers the most important work of the year from an overhead construction standpoint is that of the national joint committee on overhead and underground line construction, on which the N. E. L. A. is represented by three members. The work of this committee has been divided among four sub-committees: structural, installation, conductors and clearance, and these sub-committees are investigating the subjects assigned to them in a thorough manner. The report continues that United States Bureau of Standards issued in April a preliminary set of "Safety Rules and Regulations," and the importance of this work has been recognized by the N. E. L. A. in the appointment of a public policy sub-committee for conference with the Bureau of Standards. While modifications have been made in the first draft of the proposed safety rules, the committee believes that these rules "as now presented, both in their general methods and in their specific provisions, still contain many features which are objectionable for general adoption, and the member companies should avail themselves fully of the opportunity offered by the Bureau of Standards for general thorough criticism of the preliminary rules." The committee also calls attention to a proposed set of regulations for high-voltage lines in cities being drafted by the International Association of Municipal Electricians, to an order on overhead standards recently issued by the Idaho Public Utilities Commission and to the preparation by a joint committee in Pennsylvania of overhead line specifications which may serve as a basis for an official order by the commission in that state. The report concludes by mentioning the adoption by the California Railroad Commission of rules tending to minimize inductive interference, drafted by a joint committee representing the various interests involved.

ELECTRIFICATION OF MAIN LINE RAILROAD

This report, presented by a committee of which B. F. Wood is chairman, called attention to the advantages of the supply of power to main line railroads from a central system serving an extensive territory with di-

versified power requirements. In a specific case that has been called to the attention of the committee, the power system of an electrified steam road, including station, substations and transmission lines, represented approximately one-half of the new capital requirements above the amount chargeable to renewals and replacement, or about one-third of the total cost, and the road could have afforded to have purchased energy from a central station and still obtain a net return nearly 50 per cent greater than by developing its own power supply. The committee gives other arguments for the purchase of electric power instead of its generation by railroads, and says that if the railroads provide their own generating and distributing facilities, they will find it difficult later to convert these facilities to the use of central station energy if such a plan should be desirable.

MUNICIPAL REGULATION OF PUBLIC UTILITIES

At the public policy meeting on Thursday evening a paper by John H. Roemer, general counsel H. M. Bylesby & Company, Chicago, and formerly chairman Railroad Commission of Wisconsin, was presented. The author showed that through natural causes the advantages of state regulation as opposed to municipal regulation or ownership of public utilities were becoming increasingly apparent. In the early days public utilities largely confined their operations to the various municipalities in which they happened to be located, but now these operations are becoming less and less nearly co-extensive with the boundaries of any one municipality. This applies to electric railways, telephones, electric light and power, and even water and gas systems.

This condition seems certain to continue as the economic development of electric public service companies' systems has been found to require larger and larger units of production. An example of the benefits resulting to the public from the combination of small public utilities is the Central Illinois Utilities Company, which serves twenty-three or more communities in Illinois from a single station. Formerly these communities were served by nine small separate generating plants.

When one appreciates how increasingly inter-related and inter-dependent public service companies are becoming, both as to their physical operation and their corporate control and ownership, it is easy to see that municipal ownership would not be in the direction of the most economic development of public utilities. The author quoted here some abstracts from the decision in *South Pasadena v. Terminal Railway Company* (1895, 109 California, 315) in which the court described the difficulties which would arise in case extra-territorial municipal power should be permitted. He also quoted *City of Texarkana v. Southwestern Telegraph & Telephone Company* (48 Texas Civil Appeals, 16) to show the interest of the state at large, even in municipal ordinances relating to utilities. Again, it is to the interest of the state as a whole that there should not be over-development in one locality and under-development in another. With municipal ownership it is almost impossible to conceive of sufficient continuity of policy and breadth of view to cope successfully with the problems presented.

The speaker then criticised the theory that municipal ownership is an adequate substitute for state regulation and pointed out that municipal plants as a rule furnished poorer service than privately owned or operated utilities; they are less responsive to new discoveries and improved methods; they practise flagrant discrimination in rates and are backward in their methods of book-keeping. In conclusion the speaker stated that there should be certain standards of service uniform throughout the state, but subject to modification, of course, when a local situation of an unusual nature demands it.

Electrification of the Jamestown, Westfield & Northwestern Railroad

This Line, Which was Originally Built to Handle a Freight Transfer Business Among Several Trunk Roads, Has Been Transformed into a High-Speed Interurban Railway to Develop a Passenger Traffic Among the Many Summer Resorts Along the Line

The Jamestown, Westfield & Northwestern Railroad is an interesting case of the transformation of an old steam road, originally built as a connecting link for freight interchange among several trunk lines, into a high-speed interurban electric railway.

Formerly called the Jamestown, Chautauqua & Lake Erie Railroad, this railway connected the Lake Shore & Michigan Southern and Nickel Plate Railroads at Westfield with the Pennsylvania Railroad at Mayville and with the Erie at Jamestown. Because of changes in traffic conditions the property was no longer a paying proposition while dependent for its revenue upon freight haulage only. To secure the additional income from passenger and freight traffic between Jamestown and Westfield and intermediate towns, as well as to obtain the advantages of electric operation, the road has recently been electrified.

Beginning at Westfield, which is near the Lake Erie shore, the road ascends a very steep grade to the top of the bluff bordering the lake. On a clear day it is possible to obtain a splendid view of the lake from the car windows. The road then drops down slowly, through Mayville into a valley, passing through the picturesque villages and summer resorts on the north side of Chautauqua Lake. The passenger traffic will come largely from the many summer resorts along the route and consequently will be far heavier in summer than during the winter months.

The freight traffic which this railroad expects to

handle will consist not only of interchange freight among the trunk lines which it intersects but also ice from the icehouses bordering Lake Chautauqua, coal to manufacturing plants in its territory and, most important of all, freight and farm produce for the farmers all along the line. To handle this traffic, the Jamestown, Westfield & Northwestern Railroad proposes to haul mixed freight trains of from four to eight cars. The old steam locomotives are still used for this service.

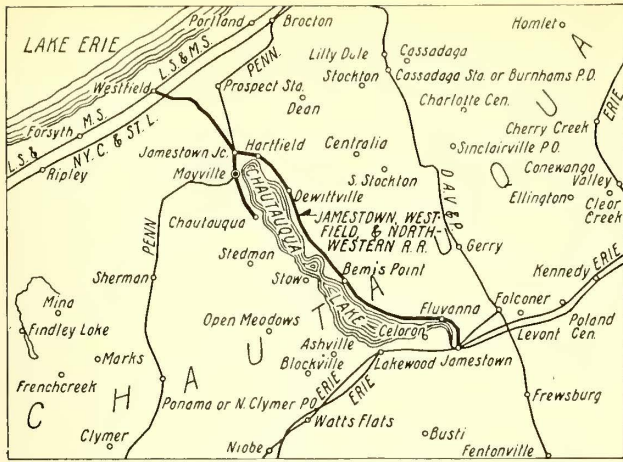
ENERGY DISTRIBUTION

Power to operate the road is purchased, at a cost of 1½ cents per kilowatt-hour, from the Jamestown Street Railway, which is also controlled by A. M. Broadhead, president of the Jamestown, Westfield & Northwestern Railroad. The Jamestown Street Railway has a large power plant at Jamestown, and its subsidiary, the Chautauqua Traction Company, maintains substations at Stow and at Mayfield. By tying in the feeders and trolleys at Jamestown, Stow and Mayville, it has been possible to obtain fairly good power distribution for the interurban road without necessitating the use of additional generating apparatus.

By reference to the map, it will be seen that the town of Stow, where one of the substations is located, is on the opposite side of the lake from the tracks of the Jamestown, Westfield & Northwestern Railroad. Lake Chautauqua is very narrow at this point, and the energy is transmitted across by two ungrounded lead-covered



JAMESTOWN ELECTRIFICATION—MOTOR CAR ON JAMESTOWN, WESTFIELD & NORTHWESTERN RAILROAD, QUARTER VIEW



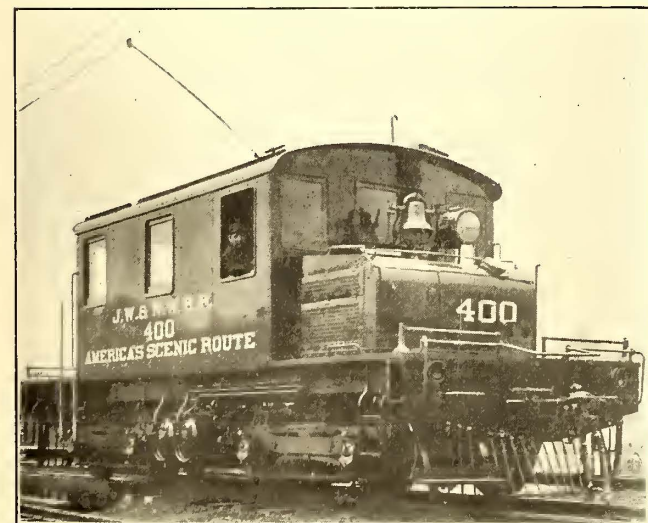
JAMESTOWN ELECTRIFICATION—MAP SHOWING ROUTE OF THE JAMESTOWN, WESTFIELD & NORTH-WESTERN RAILROAD

submerged 500,000 circ. mil. cables. Double-throw switches are installed at each end, so that if the positive cable should become grounded it will be possible to change over and use the negative cable as the positive conductor until the other cable can be repaired.

A permanent substation will shortly be built at Westfield in order to take care of the heavy pulls which occur on this part of the road in going from Westfield to Mayville. At present a portable substation is located at this point. This portable substation was provided only after a close study of the operating conditions, and it has already proved its usefulness in caring economically for the wide fluctuations in traffic which arise particularly during the summer season. One of the illustrations shows this substation in service at Bemis Point, where it was first used to handle an unusually heavy load due to a convention.

The equipment of the portable substation, which is of Westinghouse Electric manufacture, consists essentially of a three-phase, 550-kva, 16,500-volt transformer of the outdoor type, and a 500-kw, 600-volt rotary converter. The rotary, switchboard, meter, transformers, etc., are housed in a cab which is also equipped with a desk, telephone, etc., for the use of the operator.

The high-tension circuit is controlled by a three-pole Burke horn-gap switch with choke coil, lightning arrester and fuse. All of the high-voltage switching apparatus is mounted on the roof of the cab, although the



JAMESTOWN ELECTRIFICATION—VIEW OF 45-TON FREIGHT LOCOMOTIVE

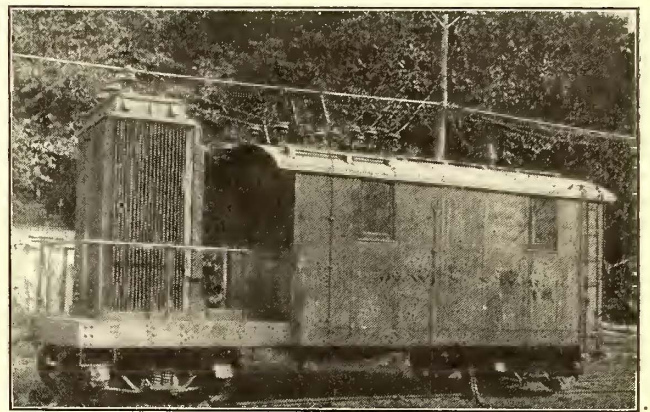
switches are operated from the switchboard by means of a standard remote control handle.

The cab is 18 ft. long, and the car has an overall length of 28 ft. The general construction of trucks, draft gear, etc., is in accordance with M.C.B. standards.

ROLLING STOCK

The passenger cars, one of which is illustrated, are of the usual interurban type, seating sixty passengers. One-third of the car is partitioned to form a smoking compartment. The cars are of all-steel construction and are insulated throughout with compressed cork to keep out heat and cold. They were built by the Cincinnati Car Company. The principal dimensions follow:

Length over all	53 ft. 6 in.
Length over dash	52 ft. 2 in.
Height (rail to top of roof)	12 ft. 10 1/4 in.
Extreme width	8 ft. 9 1/4 in.
Door openings (clear)	30 in.
Rail to first step	14 3/4 in.
Width of seats	38 1/2 in.
Width of aisle	23 3/4 in.
Bulkhead door opening (clear)	36 in.
Partition door opening (clear)	22 in.



JAMESTOWN ELECTRIFICATION—500-KW, 25-CYCLE, 600-VOLT ROTARY-CONVERTER PORTABLE SUBSTATION

The electrical equipment of each car consists of four Westinghouse No. 306-A-2 railway motors rated at 52 kw (70 hp) at 600 volts, and the HL unit switch control system. The split frame is of cast steel, divided along the horizontal center line with hinges on the opposite side from the axle.

A Baldwin-Westinghouse freight locomotive will be put in active service within a few weeks. It is a 45-ton machine, of the double-truck type. It will handle standard railway rolling stock, and is intended to traverse curves of 170-ft. radius with a trailing load, and of 40-ft. radius without load. It is arranged for double-end operation, and has a central cab, with sloping hoods at each end, as shown in the illustration.

The electrical equipment consists of four Westinghouse No. 562-A-6 motors, each rated at 100 hp at 600 volts with HL electropneumatic control. An interesting feature of the design of the motors is that they are fitted both for self-ventilation and forced cooling. A motor-driven blower is furnished to provide a blast of air irrespective of the speed of the motors. However, should the blower be put out of commission, fans on each armature provide sufficient ventilation to allow the locomotive to operate at three-quarters of its rated capacity. The principal dimensions are as follows:

Wheelbase, rigid	6 ft. 6 in.
Distance between truck centers	16 ft. 0 in.
Diameter of wheels	36 in.
Size of journals	5 in. x 9 in.
Width	10 ft.
Height to top cab	12 ft.
Length between coupler knuckles	34 ft. 9 1/4 in.
Weight	90000 lb.

Meeting of C. E. R. A. A.

Three of the Papers at the Annual Meeting at Indianapolis This Week Discussed Respectively "Analysis of the Balance Sheet," "Electric Light and Power Accounting by Combined Railway and Light Property," and "Small Electric Line Handling Carload Freight"

The twenty-seventh meeting of the Central Electric Railway Accountants' Association was held at the Severin Hotel, Indianapolis, Ind., on Friday and Saturday of this week. Abstracts of three papers presented at that meeting follow. A report of the proceedings and abstracts of the other papers presented at the meeting will appear in a later issue.

ANALYZING THE BALANCE SHEET

BY L. T. HIXSON, AUDITOR TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY, INDIANAPOLIS, IND.

After a balance sheet has been prepared in accordance with the best accounting practice, there remains much to be done before all the available information is put into condition to be quickly grasped. In order better to illustrate the analysis of a balance sheet, the following usual form statement is taken as the basis:

ASSETS	
Fixed property	\$26,000,000
Current assets	700,000
Accrued and prepaid accounts.....	45,000
Deferred or pending accounts.....	7,000
Reserve funds	20,000
	\$26,772,000
LIABILITIES AND CAPITAL	
Bonds	\$7,500,000
Capital stock	17,000,000
Current liabilities	600,000
Accrued liabilities	400,000
Reserves	272,000
Surplus	1,000,000
	\$26,772,000

This balance sheet, when analyzed, will show:

Invested assets:	
Fixed property	\$26,000,000
Less capital stock and bonds in hands of public....	24,500,000
Excess invested assets over stock and bonds.....	\$ 1,500,000
Appropriated assets:	
Reserve funds	\$ 20,000
Book reserves	272,000
Balance reserves for which no specific assets have been set aside	\$ 252,000
Balance invested assets, after providing for reserves..	\$ 1,248,000
Current assets	\$ 700,000
Current liabilities	600,000
Excess current assets	\$ 100,000
Balance	\$ 1,348,000
Accrued and prepaid accounts—assets.....	\$ 45,000
Accrued liabilities	400,000
Excess accrued liabilities.....	\$ 355,000
Balance	\$ 993,000
Deferred or pending accounts—assets.....	7,000
Balance, unappropriated assets in excess of stock and bonds (surplus)	\$ 1,000,000

This shows the amount of permanent or fixed investment in excess of the capital stock and bonds in the hands of the public; also the amount of book reserves which are invested in the general company property, such amount being the excess of book reserves over assets specifically set aside for reserve funds. These book reserves may represent amounts set aside for injuries and damages, bonds purchased and canceled, and so forth. They may also represent bonds purchased and not canceled but held by the sinking fund

trustee. In this paper such bonds are not shown as a part of the contra account (sinking fund), inasmuch as they have been deducted from the total bonds and only bonds "in hands of public" shown.

The statement also shows the excess of current assets over current liabilities, and excess of accrued liabilities over accrued and prepaid accounts—assets. The balance, or excess of unappropriated assets over stock and bonds, represents the surplus earnings and will be in agreement with the analysis of the income statement, together with direct charges and credits to surplus.

There may be some question as to the advisability of showing the excess reserves over assets specifically set aside, as invested in fixed property of the company. There would seem to be no ground for this objection so far as the reserve represents bonds purchased; but if it represents injuries and damages, or some contingent liability, for which it might be necessary to pay out a considerable sum, it would perhaps be best to set up an additional amount to provide for contingent liability reserves in excess of the amount specifically appropriated, so that the statement would show clearly the comparison between unappropriated current assets and current liabilities. When treated in this manner, assuming that such contingent liability reserve amounts to \$200,000, the statement would read, in part:

Excess invested assets over stock and bonds.....	\$1,500,000
Appropriated assets—	
Reserve funds	\$ 20,000
Current assets set aside for contingent liability reserve in excess of specific appropriations.....	200,000
	\$ 220,000
Book reserves	272,000
Balance reserves invested in fixed property.....	\$ 52,000
Balance invested assets after providing for reserves....	\$1,448,000
Current assets	\$ 700,000
Less amount set aside for contingent liability reserve as above	200,000
	\$ 500,000
Current liabilities	600,000
Excess current liabilities.....	\$ 100,000
Balance	\$1,348,000

There would be no change in the remainder of the statement.

If this plan is followed, there would be no need to set aside any certain group of assets to offset the book reserves, for the reason that the analysis would always show clearly just what amount of assets was available after making provision for the reserves. This would meet the objection of those who contend that it is poor policy to take a sum out of the business and place it on deposit at interest, when the needs of the business may then require the borrowing of a similar amount at the same or perhaps a higher rate. Moreover, for those who take the view that there should be a fund to represent all book reserves, the analysis will show just how the company would stand if such amounts were set aside.

The foregoing should show clearly how the surplus has been invested. Yet, for the benefit of those who are asked the following question: "The books show that the surplus is \$1,000,000, but the cash balance is \$200,000—what has become of the money?" a statement of surplus on a basis of cash or its equivalent may be of some benefit.

Surplus per books.....	\$1,000,000
Add—	
Accrued liabilities which have been deducted in the income statement, but cash not paid out.....	400,000
Excess accruals for reserves over cash set aside....	252,000
	\$1,652,000
Deduct—	
Accrued revenue which was taken into the income statement, but cash not received.....	\$ 30,000
Prepaid accounts which have not been included in the income statement as items of expense on account of applying to a later period.....	15,000
	\$ 45,000
Surplus, on cash basis.....	\$1,607,000
Cash from loans, etc.....	600,000
Total to be accounted for.....	\$2,207,000
Invested in—	
Fixed property	\$1,500,000
Deferred and pending accounts.....	7,000
Accounts receivable	200,000
Stores	300,000
	\$2,007,000
Cash balance	\$ 200,000

This latter statement will not ordinarily be required except by the active head of the concern with relation to the disposition of the surplus for that period.

ELECTRIC LIGHT AND POWER ACCOUNTING

BY OREN A. SMALL, AUDITOR BENTON HARBOR-ST. JOE RAILWAY & LIGHT COMPANY, BENTON HARBOR, MICH.

The uniform classification issued by the Michigan Railway Commission, taking effect Jan. 1, 1915, provided in the case of combined railway and lighting properties for making a showing of investment in light and power department, as nearly as it was possible to ascertain, prior to Jan. 1, 1915, in a lump sum, and accounts were required to be set up subsequent to that date in accordance with the text of the uniform classification.

Our company does not carry any accounts for stocks, bonds or mortgages for the light and power department, these accounts covering the property as a whole. Power station apparatus is also covered by whole-property accounts. We purchase power coming to us at our sub-station at 26,000 volts at the transformers and 2300 volts on the bus-bar. These transformers are the property of the supplying electric company, so that our investment in the power station for the light and power department consists mainly of switchboard apparatus.

The following accounts have been set up and are being kept in accordance with the commission uniform classification of accounts:

INVESTMENT ACCOUNTS

- Underground conduits and subways
- Poles and fixtures
(These accounts are sub-divided, to show investment in each community served.)
- Distribution System
- Land
- Overhead conductors and devices
- Service wires
- Underground conductors
(These four accounts are sub-divided in the same manner as the underground conduit and subways, and the pole and fixture accounts.)
- Meters
- Transformers
- Arc lamps
- Municipal street lighting system
(This account includes all items pertaining to street lighting arc lines, except the cost of lamps.)
- Office furniture and fixtures
- Shop equipment
- Storeroom equipment
- Stable and garage equipment
- Miscellaneous equipment:
 - (a) Laboratory equipment
 - (b) Tools and implements

INCOME ACCOUNTS

- Commercial lighting
- Commercial power
- Municipal street lighting, arc
- Municipal street lighting, incandescent
- Municipal building lighting
- Municipal power
- Miscellaneous electric revenue
- Non-operating revenue

(All income accounts are sub-divided to show revenue from each community served. The sub-division of these accounts requires, at the present time, the keeping of thirty-two accounts.)

POWER

(On account of purchased power, only one account is carried under this head, this being charged with the cost of power utilized in the light and power department, as ascertained by meter measurement.)

OPERATING EXPENSES

- Distribution—Operation
- Wages:
 - (a) Superintendence
 - (b) Wages
- Supplies and miscellaneous expenses:
 - (a) Maps and records
 - (b) Office expense
 - (c) Miscellaneous expense
- Distribution lines:
 - (a) Labor and expense subways
 - (b) Labor and expense overhead conductor.
 - (c) Labor and expense underground conductor
- Meters:
 - (a) Salaries and expense
 - (b) Testing
 - (c) Miscellaneous expense
- Setting and removing meters and transformers
- Distribution—Maintenance
- Underground conduit
- Overhead lines
 - (a) Repairs—conductors
 - (b) Repairs—pole lines
- Underground conductors
- Service wires
- Transformers
- Meters
 - Utilization—Operation
- Renewal incandescent lamps
- Inspection customers' premises
- Customers' installation
- Municipal street arc lamps
- Municipal street incandescent lamps
 - (a) Installation
 - (b) Renewals
- Utilization—Maintenance
- Municipal street arc lamps
- Municipal street incandescent lamps

COMMERCIAL EXPENSE

- Officers' salaries and expense
- Salaries and expense meter readers
- Salary and expense collection bureau
- Office supplies and expenses
- Discount light and power
- Discount electrical supplies

NEW BUSINESS

- Officers' salaries and expense
- Miscellaneous supplies and expense
- Solicitation:
 - (a) Salaries—canvassers
 - (b) Expense—canvassers
- Advertising
- Promotion wiring
- Promotion signs and devices

GENERAL EXPENSE

- Garage expense
(Any portion of expense in this account which is properly assignable to investment accounts, is so apportioned.)
- Printing and stationery
- General office expense
- Injuries and damages:
 - (a) Medical expense
 - (b) Injuries to employees
 - (c) Injuries to others
- Depreciation
(Under this heading is accrued each month an amount equal to one-twelfth of 6 per cent of the record value of investments, this value being taken at the close of the fiscal year preceding.)
- Uncollectible bills
- Miscellaneous non-operating expense
- Store and stable expense

While these accounts are not all which the uniform classification calls for, they are all that might affect a company of our magnitude. The question of operation and maintenance expense is as finely drawn in the light and power classification as in the Interstate Commerce Commission classification for electric railways.

Entries are made direct from meter readers' books into the customers' ledger, proper extension being made at the same time. These extensions are transferred to the customers' invoice blanks, previously prepared on an addressograph, and the latter are mailed in window envelopes. Fifteen days are allowed in which the customer may secure a discount for prompt payment, the proper credits be posted into the ledger from the collection sheets, and the ledger balanced with the cash book and the controlling account in the general ledger.

All expense and income accounts are closed through the profit and loss account. The amount of accrued depreciation is deducted from the balance of profit and loss, and the net profit and loss is carried to the profit and loss account for the railway, this last account reflecting the profit and loss of the property operated as a whole. From this interest on funded debt and other fixed charges are deducted in the manner pro-

vided by the Interstate Commerce Commission classification. In compiling the annual report for the commission the item of profit from light and power department is carried to the income account under auxiliary operations.

CAR-LOAD FREIGHT ON SMALL LINES

BY JAMES S. CLARK, AUDITOR MARION & BLUFFTON TRACTION COMPANY, BLUFFTON, IND.

The Marion & Bluffton Traction Company, which operates 32 miles of electric railway, has associated with it under the same operating organization the Bluffton, Geneva & Celina Traction Company, which runs from Bluffton to Geneva, a distance of 18 miles, through a very rich agricultural region. This short line penetrates a territory which had been without any transportation facilities of any kind. The Clover Leaf Railroad saw its opportunity to develop some traffic for its line and encouraged the development of the car-load business by arranging for a connection between the steam and the electric line at Bluffton. Later the car-load business extended to the Marion line also. Two elevators and a milk condensory which were erected along the electric line depend upon it to handle their business to the steam roads. The elevators draw from a radius of 5 to 8 miles and, in the course of a year, deliver and receive from the steam roads from 500 to 600 cars of coal, hay, grain, lumber, tile, etc.

In 1913 arrangements were made for a steam line connection with the Cincinnati, Bluffton & Chicago Railroad. Through this we were solicited to interchange with the Lake Erie & Western Railroad, thus giving an interchange of freight and equipment with all three of the steam roads operating into Bluffton.

In reality the company serves as a feeder to the steam roads. There is no through billing with them except on stone, however, and that is only a switching rate on the steam line. On cars of coal, hay, grain, etc., we handle on a local tariff rate, between point of origin and steam road junction. We find these rates more profitable than if we were to pro-rate with the steam roads. Of late, however, we have had some complaint and believe that in the near future we will be handling this class of freight on through billing. This tariff is constructed as a commodity tariff and names rates in cents per hundred pounds. Any commodity not named in this tariff takes the regular classification rate.

Our own equipment consists of two freight motor cars. The Marion & Bluffton Traction Company owns one freight motor car equipped with four 60-hp Westinghouse 93A railway motors and the Bluffton, Geneva & Celina Traction Company has one freight motor car equipped with four 60-hp GE 87 motors. Both cars have automatic and straight air equipment and M. C. B. couplers for handling standard steam cars. We use one car to handle the L. C. L. shipments for both roads and the other car to handle the car-load shipments. When we need more cars we always get them from the steam lines, paying at the regular per diem charge of \$0.45 per day while on our line. We watch this item very closely and try to hold it down to a minimum. Another item that we watch is demurrage. If we were not governed by our strict demurrage rules, we would need another 5 per cent increase in our freight rates to pay our per diem bills. Up to this year we have always collected demurrage on the straight demurrage plan, but now we are using the average plan with stone shippers. We believe this plan is very satisfactory to the large shippers.

The Erie Stone Company, one of the largest manufacturers of crushed stone, has a large quarry at Bluff-

ton and for the last five years we have been able to secure all of this kind of freight that we could handle. This stone business as a rule starts May 1 and lasts until Oct. 1. The plant is located along the steam roads and the stone is delivered on our tracks on a switching charge of 10 cents per ton. We haul this stone in trains of three to seven cars, depending upon grade conditions. We can handle a train of four cars with a capacity of 300 tons on any grade on our line and a train of nine or ten cars with a capacity of 750 tons on level track. Last year in four months, we handled 816 cars that averaged 50 tons of stone to the car. We use both gondolas and hoppers. As our sidings are large enough to accommodate eight or ten cars, some of the shippers have their own unloaders, whereby they are able to handle the stone very rapidly.

As most of the stone is handled on sidings at non-agency points, in order to keep our records complete on the car service, our freight conductor is supplied with blanks with which he takes a receipt for every car he sets on a siding, showing the car initial and number and also the time and place. This is signed by an authorized agent of the consignee. The conductor also gets a receipt from the same agent for all cars released. These slips serve as a receipt for the freight and as a basis for computing demurrage.

We have no track scales on our line but we have no trouble in securing the correct weights. All the stone is weighed at the plant. The elevators located along our line have their own scales, and the Snider Preserve Company has two weighing stations where the tomatoes which we handle in carload lots are weighed. Those few cars on which we are unable to secure the correct weights before leaving our lines are weighed by the steam lines, who are able to give the correct weights within a week.

The additional accounting connected with the handling of carload shipments is comparatively small, as the billing of all cars is handled by the agents. They make all collections of freight and demurrage except that on stone, this collection being handled in the accounting department on account of most of the stone being delivered to sidings at non-agency points. The daily interchange of equipment is taken care of by our dispatcher because he is most familiar with the cars handled. Reclaim statements are issued each month on all cars handled on switching tariffs, such as the coal that we switch from the steam lines to the city water works and light plant. The privilege of making this reclaim of five days takes care of the per diem on these cars. The city paid for the siding and receives a credit of \$1 on every car received at the plant until it is reimbursed. This switching charge is 15 cents per ton, with a minimum of 40,000 lb.

We believe that this freight business is much more profitable than L. C. L. shipments, as in the handling of 1700 cars during 1914 we did not have a claim. Moreover, every car-lot shipment that can be secured by the traffic department is a development of business that would not otherwise be handled, and the only additional expense for the handling is the cost of power and car-service charges. There will, of course, be some additional expense for track maintenance but this is not found excessive.

The following for 1914 is a fair example of the various commodities handled in one year:

Stone	816 cars	Oats	22 cars
Coal	240 cars	Pipe	21 cars
Hay	226 cars	Horses	20 cars
Corn	121 cars	Bolts	19 cars
Tomatoes	51 cars	Brick	18 cars
Tomato crates	46 cars	Tile	15 cars
Miscellaneous	42 cars	Lumber	11 cars
Wheat	27 cars	Milk	6 cars

Master Mechanics' Association

At the Forty-eighth Annual Convention at Atlantic City, June 9-11, Reports Were Presented on Electric-Locomotive Maintenance, Headlights and Other Subjects of Interest to Electric Railways.

An Account of the Exhibits Is Published

The forty-eighth annual convention of the American Railway Master Mechanics' Association was held at Atlantic City, June 9-11. A number of the committee reports were of direct interest to the electric railway industry and these are published in abstract below. At this convention the association took up for the first time the subject of electric operation through its newly appointed committee on maintenance and operation of electrical equipment, the members being: C. H. Quereau, New York Central Railroad, chairman; G. C. Bishop, Long Island Railroad; G. W. Wildin, New York, New Haven & Hartford Railroad; J. H. Davis, Baltimore & Ohio Railroad, and R. D. Hawkins, Great Northern Railway.

MAINTENANCE OF ELECTRICAL EQUIPMENT

In its first report this committee has confined itself to a broad outline of the additional tools and the new organization involved by a change from steam to electricity as a motive power. The committee also has pointed out for the first time the need for establishing standards for operating records, the use of the unit "miles per detention" being considered preferable to the more common "miles per minute detention" as a basis for judging the reliability of operation of electrical equipment.

In part, the report states that up to Jan. 15, 1915, electrification had been introduced on fourteen steam railroads, to the extent of 591.3 route miles, including 1761.65 miles of track, and that for nearly ten years electricity has proved its ability to handle successfully a heavy and exacting traffic. The experience gained has demonstrated the fact that the only question to be settled regarding further electrification is that of first cost.

With regard to the new problems placed before those who may be called on to maintain electric equipment, the committee considers that experience with steam equipment is the best possible training for the new responsibilities. Indeed, few additional facilities are required for maintaining electrical equipment in a steam railroad shop. This is borne out by the following statement from the superintendent of motive power of an important eastern railroad which has considered electrified mileage: "The only additional machine required by the electric car work was a journal-truing lathe to repair both inside and outside bearings on the motor-truck axles without having to dismount the wheels. We also built a few wooden-frame, light, gantry hoists for use in applying the motors to the motor trucks. These hoists were made to span the erecting shop tracks on which the work was done and were required because the shop had no overhead crane facilities. The armature work on the cars is done on wooden horses and in a standard engine lathe. A testing transformer was also provided, together with a certain miscellaneous equipment of lifting hooks, checks and clamps, which do not deserve listing separately."

In connection with the experience with electrification, the following list shows the additional tools which were found necessary for handling the electric equipment at a certain shop which was originally equipped only for the maintenance of steam equipment: A 190-ton port-

able hydraulic press used in removing crank pins from discs and discs from motor shafts; hook for lifting front end of electric locomotives; lifting beam for motors; lifting beam for removing and replacing cabs; special chuck for boring jack-shaft and motor bearings; tension device for re-banding armatures on a driving wheel lathe; a 3-kw insulation-testing transformer; cradle for holding armatures after removing them from the locomotives.

Referring to the above list, the local master mechanic said: "This covers about all the special tools which we have found necessary to take care of the electrical work. The manner in which the electric equipment is handled is exactly the same as that in which we handle any other equipment."

The committee considers that a feature worthy of note in connection with the maintenance of steam and electrical equipment will be found in the comparatively small machine tools and light cranes installed in electric locomotive repair shops. The reason for this is the relative lightness of the individual parts of the electric locomotives. Another feature is that, on the average, the age of the employees in an electric equipment shop is less than in a steam equipment shop. A maintenance organization should have one or two electrical experts, mechanics rather than engineers. However, experience has shown that at least 90 per cent of the work to be done and of the problems to be solved are mechanical. There is this characteristic difference between steam and electric equipment: With steam locomotives it takes about five minutes to locate a defect and from a day to a week to make repairs; with electric equipment it takes an hour or two to locate the cause of the trouble and from five minutes to a day to repair the defect.

At the time of introduction of electric operation on any railroad, the usual plan is to qualify the regular steam locomotive engineers and firemen for service on the electric locomotives. A few days' instruction by a qualified traveling engineer and a few trips over the road under his supervision are sufficient. Knowledge of the book of rules and of the significance of signals and train orders, experience in handling the air brakes and an intimate acquaintance with the route constitute at least nine-tenths of the qualifications of an efficient engineman. These are the same for electric and steam operation. Many division superintendents and mechanical officials have qualified hundreds of their steam enginemen to operate safely and successfully their most important trains with electric equipment, the time required per man not exceeding a week. Of course, the motorman, when first qualified, is not as competent as after a longer experience, but he can "safely and successfully" operate the most important trains.

In connection with records the report points out that numerous statistics relating to electrically operated roads have been published, including the cost of labor and material expended in repairs, and the efficiency of apparatus and maintenance methods as shown by the number of delays. Several of these statements use, as a basis for judging the efficiency of the equipment and its maintenance, the unit "miles per detention," and also the unit "miles per minute detention," but the majority of those published do not show the former item.

For the operating officials the unit, miles per minute detention, is of decided value, but this is not the proper basis on which to judge the efficiency of the apparatus nor of the force that maintains it, because the length of the delay is affected in most cases more by operating conditions than by the nature of the failure originally causing it. In three cases on one electrified road detentions due to broken tires were respectively thirty-eight minutes, sixty minutes and ninety-two minutes. Inasmuch as the length of the train delay due to this single class of failure varied from thirty-eight to ninety-two minutes, it makes the unit, miles per minute detention, of absolutely no use to the superintendent of electric equipment. The fact of importance to him and to those who are interested in the efficiency of the equipment is that the tires broke. Including the length of the delay only confuses matters. It appears to be advisable, therefore, to consider only the unit, "miles per detention," in connection with the records of the maintenance department.

It seems also to be desirable to subdivide the cause of train delays due to electric equipment under three general headings: "man failures," "electrical" and "mechanical." The headings "electrical" and "mechanical" are self-explanatory. The heading "man failures" is intended to cover failures of equipment which are due to the men operating it, and obviously this item should not be included in the statistics by which either the equipment or the force responsible for maintaining it are judged. However, man-failures should be included in the delay statistics for the benefit of the division superintendent and other operating officials.

LOCOMOTIVE HEADLIGHTS

Among the other committee reports which are of interest to the electric railways is that on locomotive headlights. This committee submitted a series of standards for use in connection with the incandescent lamp headlight, stating that the Columbus tests show that an incandescent lamp of approximately 50 mean horizontal candle-power will give sufficient light to meet the recommended maximum requirement of 3000 apparent beam candle-power.

The proposed specifications therefor call for 50-cp, 7 volt, G-20 clear bulb, Edison screw bases (style 100), loop-back, tungsten filament, multiple-burning, headlight lamps. In case gas-filled lamps are used, the filament winding should be of such form and shape as to correspond closely with the form and shape of filament used in the lamp above described, and "gas-filled" must be specified when ordering. For use in cab, for markers, etc., 6-cp, 7 volt, G-10 clear bulb, double-contact bayonet candelabra base (style 100), tungsten filament, multiple-burning lamps are recommended. When metal reflectors are used, the minimum nominal diameter should not be less than 16 in. When parabolic glass reflectors or semaphore type lenses are used, the minimum nominal diameter should not be less than 12 in.

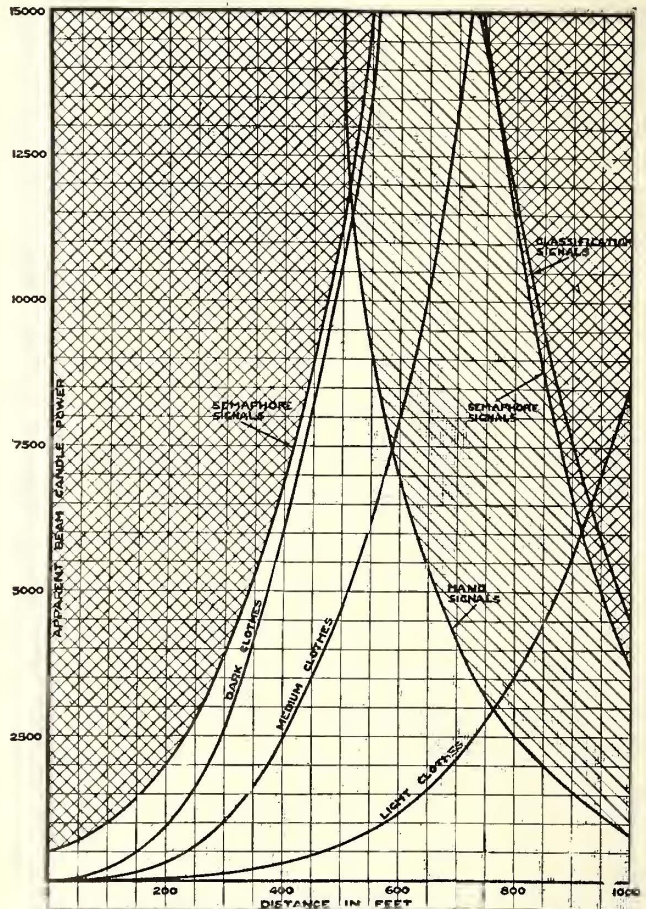
The report also contained details of a method of photometering, and a summary of headlight laws in the United States, together with a curve indicating the relations existing between arc and incandescent-lamp headlights. This showed that any object that may be seen with an arc headlight of 800,000 apparent beam candle-power may be seen just as readily with an incandescent-lamp headlight of only 100,000 apparent beam candle-power.

Another set of curves which was based on the Columbus tests is reproduced herewith. All of the curves indicating dangerous conditions, as referred to in the last year's report, have been reduced to a common scale and plotted on one sheet. The cross-sectioned space is the "danger" zone and the blank space is the "clear"

zone. In selecting a safe headlight it is evident that its apparent beam candle-power value must lie within the limits of the blank space.

OTHER REPORTS

The committee on locomotive stokers stated that the past year's experience with the locomotive stoker strengthens the conviction that it is not only accomplishing its purpose but withstands the test of continuous service with remarkable durability. While it may be said that nothing novel has been presented during the past year, a great deal of very good work has



MASTER MECHANICS' HEADLIGHT REPORT—DIAGRAM SHOWING DANGER ZONES FOR POWERFUL HEADLIGHTS

been done along already established lines. The effort has been chiefly in the refinement of details. Watching the progress from the outside, one may be impressed with the thought that on the one hand there is fear of added complication, while on the other the fear that vital features may be disturbed. Still, simplicity is always desirable without the sacrifice of utility, each design is a study in itself, and efficient development can only be made by degrees.

The committee on smoke prevention conducted no new tests of smoke-preventing apparatus on steam locomotives during the past year, but received inquiries from several members relative to the improved methods and results concerning this problem in the city of Chicago. A brief description of Chicago methods was presented in the belief that the development of similar arrangements in other cities may be productive of equally good practical results.

Another year's use of the steam-air jets, quick-action blowers, etc., as recommended in the report to the 1913 convention, has further confirmed the belief that locomotives so equipped may be kept comparatively free from smoke, provided the engine crews are instructed

in the proper use of these devices and carry out such instructions at all times.

The feature of the report of the committee on forging specifications was the inclusion of a requirement for a proof test on all forgings "unless otherwise specified by purchaser." With this was a recommended table for heights of drop ranging from 1 ft. 3 in. on a 5-in. shaft to 33 ft. 9 in. on a 15-in. shaft, when a 1640-lb. tup is used. With a 2000-lb. tup these heights are, respectively, 11 in. and 24 ft. 8 in. For quenched-and-tempered carbon steel forgings up to 7 in. thick the elongation is specified at 2,000,000 divided by tensile strength with a minimum of 20.5 per cent, and with forgings from 7 in. to 10 in. thick the elongation is 1,900,000 divided by tensile strength, the minimum being 19.5 per cent. With quenched-and-tempered alloy steel forgings a diameter of 7 in. calls only for minimum elongation of 20 per cent, and for 7-in. to 10-in. forgings this is reduced to 18 per cent.

THE EXHIBITS

Diversity was, perhaps, the notable feature of the Railway Supply Manufacturers' exhibits at the convention. A number of track accessories were shown as well as apparatus only indirectly connected with locomotive and car maintenance, such as a speed-limiting device, tanks of oxygen for autogenous welding, calculating machines and the like. A total exhibit space of 70,000 sq. ft. was reported, the average space occupied by each individual exhibit being rather larger than the figure of last year.

Among the car coupling devices was shown a new-type M. C. B. coupler that had been subjected to a destruction test, the knuckle finally failing at a pull of 820,000 lb. by a break through the knuckle-pin hole. Another coupler had been subjected to a 500,000-lb. pull but remained in fully operative condition, showing that the new coupling devices have kept pace fully with the new locomotives having extraordinarily large drawbar pulls. An automatic connector for train-line and signal hose and electrical jumper cables was shown in operation, the device being hung under standard couplers that were brought together and separated to show the reliability with which the devices were latched and unlatched pneumatically.

A marked increase in the exhibits of 70-ton trucks indicates that the extra-large-capacity freight car is here to stay. The trucks were generally provided with cast-steel side frame, but one forged truck-side was made up throughout of steel-plate pressings. This tested to 300,000-lb. load on one truck side with a deflection of 0.7 in., and at the same time was subjected to 20,000-lb. transverse load, the transverse deflection being 0.1 in. Roller side-bearings were in evidence to some extent as an indication of the desire for flexibility, and none of the freight trucks shown had transoms, being held square only by the spring planks which were in most cases angles riveted to the truck sides.

The cast-iron wheels designed for use under the 70-ton cars were splendid examples of foundry work, the weights ranging from 750 lb. to 925 lb. for a 33-in. wheel.

The most striking novelty displayed among the track appliances was a "continuous rail-base," designed to take the place of tie plates and to permit the use of lighter rails and fewer ties by stiffening the construction. This rail base is rolled in lengths of from 8 ft. to 32 ft. as required, the sections being rigidly fastened together by toothed joints. The shape is that of a trough which has the sides flattened down at 2-ft. intervals, or at the ties, to give extra space for bearing

as well as for the spikes. The rails rest in the trough and are held also by the spikes. At joints the joint plates are rigidly fastened to the rail base to prevent creeping of the rail, provision for expansion and contraction being made at the bolt holes.

There was shown also a steel tie which was perfectly insulated from the rail so that it could be used in automatic signal territory. The insulation is effected by a plate of fibre that rests on top of a block attached to the tie. On top of the fibre plate is an inverted trough-shaped tie plate, and the rail rests on this. The whole structure is held down by steel spikes driven into holes cored 4 in. deep in the block, these holes being lined with bushings of fibre $\frac{1}{4}$ in. thick. A spirally-split track bolt was also shown, the warped surfaces of the two halves providing a certain amount of elasticity that was stated to keep the nut from coming loose under vibration.

The value of the wedges for use with heavy castings was brought out in two devices, one a guard rail brace in which the lugs were held against the rails by wedges in a broad base, and the other an ingenious scheme for holding rerailers against the rail while the derailed wheels are moving up on them. The holding device, which can be used with any make of rerailer, consists of a bar-shaped malleable casting with one end bent over to catch onto the flange of the rail and with a sliding lug at the other end to fit against the base of the rerailer. The lug is wedged tightly in place by a flat wedge sliding between the moveable lug and a stationary lug at the end of the casting. The casting, it may be said, is bent slightly so that by pressing down on the end outside the rail the end at the inside is raised and can be caught on the rail flange, thus eliminating any necessity for going underneath the car.

The all-steel box car also was in evidence in one of the exhibits. This had flat steel-sheathed sides and corrugated ends, the roof being of wood supported on steel carlines. The interior sheathing and floor were of wood. The capacity was 100,000 lb., the length inside being 40 ft. 8 in., and the weight was 45,900 lb.

Among the other novelties displayed was a sliding guard for parcel racks in passenger cars. This is put up in pairs either one of which slides past the other when it is desired to get access to the rack, and as the guard is attached by brackets it can be easily installed on old equipment. Self-lubricating bearing metal in which the lubricant was contained in the alloy itself was also shown. The exhibition of several sanding devices showed that the problem of getting sand on the rail with certainty and economy was still a live issue. One device made an ingenious application of the almost obvious plan of introducing air in the discharge pipe just beyond the sand chamber for the purpose of cleaning out the pipe by air from time to time, preventing it from freezing or clogging up. A ball joint for pipes was shown as a competitor for steam-heat hose and air hose. This was made up with a special composition gasket on a brass ball, the gasket being good for a life of about 100,000 car miles and being replaceable at a cost of about 15 cents, with a working movement of 18 deg. each way from the centerline.

Forty-one pupils representing six schools rode free on the Knoxville Railway & Light Company cars, each having been presented with a book of fifty car tickets for their best essays on safety-first topics. The company renewed its offer for May and distributed blotters with lists of subjects, and illustrations, from which the teachers in the various schools selected topics for the essays. Needless to say, the company had the hearty co-operation of the teachers in the competition.

Manganese Steel Track-Work Specifications

The joint standardization committee of the Manganese Track Society and the Manganese Steel Founders' Society has issued booklet of standards No. 5 containing specifications for manganese steel track work for steam railroads. Since these specifications will no doubt form the basis of those for manganese steel special work in paved streets, the essential features are presented.

Regarding the general condition of the castings, the specifications require that they shall be free from such blow holes, sand holes, cracks, cold shuts and other defects which may impair the serviceability. Castings must also be out of twist and reasonably true, both as to general surface and alignment, and must not show any signs of straining or undue denting as a result of the straightening process. Tread surfaces within $2\frac{1}{2}$ in. of the gage line and the side of the groove 1 in. down from the tread must be free from physical defects of all kinds, unless they are so small that they may be removed in finishing the casting. Castings must also be free from shrinkage cracks running vertically in the web members of solid work, or horizontally at or near the ends or in the corners at the junction of projecting members, or longitudinally in grooves.

Shrinkage cracks that will not materially weaken a casting are acceptable but must not exceed $\frac{3}{4}$ in. downward across the tops of guards. Cracks are considered acceptable that do not exceed half the width of the bottom flanges of solid work and which do not extend up more than $\frac{3}{4}$ in. from the bottom of vertical members in railbound work. Cracks in the bottom of the groove transversely and not extending beyond the lower fillet, and horizontal cracks in the web members, not at or near the ends, will pass inspection. Exception to these rules is taken where two cracks are close together or nearly opposite on the two sides of a casting. Repairs to cracks with an electric welder are not permitted on the running surfaces, but imperfections on the other parts which do not affect the strength may be welded to improve the appearance.

These specifications also provide that the running surfaces shall be finished in practically the same manner as rolled rails, variations from true level of not more than $\frac{1}{16}$ in. in 5 ft., and not more than $\frac{1}{8}$ in. in the total length of the structure, are permitted. Where the side of the casting lies up against the rails a fit with a $\frac{1}{16}$ -in. tolerance is required. Grooves must conform to the Manganese Track Society's standard contour with tolerances permitting them to be $\frac{3}{16}$ in. deeper but not more than $\frac{1}{16}$ in. shallower. Tolerances at joints provide that when they are bolted up tight the rails shall line correctly with the casting, with no greater variation than $\frac{1}{32}$ in. in either line or level. The bottom parts of castings that rest on ties must be reasonably straight, with no greater variation than $\frac{1}{8}$ in. in 5 ft. from the true plane, and shall be free from other imperfections which would prevent a good bearing.

Other tolerances provide for variations from the given dimensions in the gage lines not to exceed $\frac{1}{16}$ in., the over-all lengths not to exceed $\frac{1}{8}$ in. under size to $\frac{1}{16}$ in. over size. In special frogs and crossings a variation of $\frac{1}{8}$ in. short or $\frac{3}{16}$ in. long for each 10 ft. in length is allowed, and in cases where two or more pieces connect these tolerances apply for each 10 ft. of combined length. The tolerance in the spread of angles permits frogs and crossings to be $\frac{1}{8}$ in. wide or narrow between gage lines at the extreme ends of the arms. The gages in crossings may also be $\frac{1}{8}$ in. wide or $\frac{1}{8}$ in. narrow. The spacing of fish-plate holes in solid frogs

and crossings is allowed to vary $\frac{1}{8}$ in., either vertically or horizontally and on railbound work not more than $\frac{1}{16}$ in. variation is permitted. The size of the holes in solid manganese steel work is required to be not more than $\frac{1}{8}$ in. over size in solid work and not more than $\frac{1}{16}$ in. over size in railbound work.

Overhead Construction in the Philadelphia-Paoli Electrification

An extended account of the equipment for the electrification of the main line of the Pennsylvania Railroad from Philadelphia to Paoli was published in the *ELECTRIC RAILWAY JOURNAL* for April 18, 1914, and an article on the method of training the enginemen for train operation appeared in the issue for May 22, 1915.



CONSTRUCTION GANG ON PHILADELPHIA-PAOLI ELECTRIFICATION STRINGING WIRES WITHOUT INTERRUPTING TRAFFIC

In a recent statement issued by the company the cost for the equipment of this line, 20 miles in length, is given as \$4,000,000, or at the rate of \$200,000 per mile. Undoubtedly this expense was due in considerable part to the difficulties of performing this work without interruption of traffic. Through the six track approach at the first interlocking tower west of Broad Street Station, Philadelphia, where sixty-five switches and fifty-two signals are located, no less than 2295 separate movements of trains and engines occur daily, and means had to be devised by which the construction gang could work without interruption to this immense traffic. In all the work of electrifying this 20 miles of railroad included the stringing and restringing of 660 miles of electric wires, the erection of 760 poles, thirty-six signal bridges and four substations, and the installation of a wholly new type of automatic block signal system. In this system all moving parts have been eliminated, the semaphore arms being replaced by a series of electric lamps so arranged that their position indicates the horizontal, diagonal or vertical position which would be taken by the semaphore arm.

The accompanying illustration shows the method followed in the erection of the overhead wires. Strong scaffolding, erected on flat cars, was used to get the men up to the level of the wires with which they were working, and large gangs of men were employed in order that they could work very quickly during the limited time they were permitted to occupy a track in this manner. The view shows a train just pulling into a station with the electric workers busy overhead.

COMMUNICATIONS

A. C. Testing of Railway Motor Insulation

NEW YORK MUNICIPAL RAILWAY CORPORATION

BROOKLYN, N. Y., June 8, 1915.

To the Editors:

I have noted the editorial on testing motor insulation which appeared in the issue of the *ELECTRIC RAILWAY JOURNAL* for June 5. In this connection I firmly believe that the recommended practice of the A. E. R. E. A. for trolley roads, specifying 2500 volts alternating current for five seconds on new armatures and fields and 1000 volts alternating current for five seconds on old armatures and fields, is entirely proper and desirable, where there is severe service placed upon the equipment and reliability in service is one of the main factors.

Of course, this is quite a high standard for maintenance and repair of old equipment, but I am firmly convinced that it is absolutely necessary where it is essential that cars be kept on the road, and this test should be applied to all motors, at definite periods, depending upon the class of service in which the equipment is operated.

I do not believe it to be a fact that the insulation is unduly strained by these alternating current tests when they are properly applied and when the above voltages used, as there should always be a sufficient margin of safety in the insulation of both armature and fields to withstand the continued shocks from voltage surges, and weaknesses due to abrasion, moisture, etc., from various causes will be thereby picked out and the proper safety factor maintained.

WM. G. GOVE, Engineer of Car Equipment.

Flange-Bearing Special Work

UNION TRACTION COMPANY OF INDIANA

ANDERSON, IND., May 27, 1915.

To the Editors:

Your editorial in the issue of May 8 on flange-bearing special work was very interesting, and I believe is in line with the best practice of to-day. Flange-bearing special work is increasing the life of special-work pieces, and by using the welder the life of these pieces may be prolonged considerably. The length of the approach in the special-work flangeway or the rate at which the flangeway rises to its maximum height, however, is a question which is just as important as the flange-bearing. The flangeway should be smooth, and the rate at which the flangeway rises should be uniform. In using the welder it is very easy to get a rough surface, in fact, a rough surface will be obtained, and grinding is necessary to make it smooth. The hand grinding which is necessary makes a uniform rate of rise rather difficult to obtain. It is possible, however, to obtain this uniform rise by constructing a templet with the desired slope, upon which the hand grinder can slide. If this is done the welded material can be ground to a smooth and uniform bearing surface.

Probably most of the trouble attributed to raised flangeways from the standpoint of chipped wheels has been due to a too rapid rise in the flangeway. The heavy blow struck on account of too steep an incline will, I believe, prove as injurious to the special work as to the wheels. I believe that the rate of rise should be not more than 1/32 in. vertical to 1 in. horizontal. In cities where both interurban and city cars are operated and where the depth of wheel flanges differ it may be difficult to decide which flange should have the bearing in special-work pieces. Of course, if the city car wheel flanges have the bearing the interurban car flanges will also ride. The treads of the wheels, however, will be

raised from the ball of the rail by the difference in the depth of the two flanges. At the rate of incline above mentioned I do not believe that interurban car wheels would be injured. In cities of from 20,000 to 50,000 inhabitants I believe that it would be sufficient to raise the flangeways to take care of the interurban car wheels only, provided both types of cars are operated over the special work. This question must be decided on the basis of local conditions, but in general we should have raised flangeways.

L. A. MITCHELL, Superintendent of Roadway.

Traffic Characteristics and Investment per Revenue Passenger

FORD, BACON & DAVIS

PHILADELPHIA, PA., June 1, 1915.

To the Editors:

Traffic surveys are not expensive. It is not always possible to show that they produce direct financial results, but they enable a manager to say "I know" instead of "I think." In these days a man is not covering his job unless he has examined every possibility of improvement. And even if a method or a disposition is right or best, he must know that it is so and prove it so far as it can be proved.

Besides the obvious immediate value of a traffic survey in making schedules, its usefulness extends to routing, transfer regulations, choice of economical size of car, determination of value of fostered traffic and to restraining demands for extensions of lines when not warranted by the density of travel.

The net and surplus earnings of street railways represent the final answer to the transportation problem which involves a great many operating conditions or factors. The variations in these factors from year to year have curiously balanced one another so that for twenty-five years we have been able to carry passengers under vastly changed conditions at the same nominal rate of fare. Thus:

Raises in wages which seemed overwhelming have been balanced by gains in efficiency of apparatus and management.

Increases in length of haul have been balanced by increased density of traffic.

The relentless decline in net earnings per passenger has been balanced by the increase in number of passengers per unit of investment.

Of late years this comfortable equilibrium has been rudely disturbed. If a company cannot wait upon its nominal increase in density to restore its balance, there are only two remedies, namely, still greater efficiency and higher rates of fare. In efforts to apply both of these remedies, the traffic survey will help. Its usefulness in the promotion of efficiency has been mentioned. Gains in efficiency are not easily made at this stage of the art, but increases in fare or even hopes of increases are much more elusive.

A traffic survey may substantiate several good arguments for higher fares, but principally it gives accurately the average length of ride.

The fare question ought to be settled ultimately on a logical basis, due weight being given to length of haul and density of travel. Correct fare zones are not necessarily circular but bulge where density is high and draw in where density is low. A plea for a higher fare on a given line should be backed up by proof that the favorable factor of density does not overbalance the burden of the long car trip or the long average ride per passenger.

The service performed by a street railway may be defined or described as follows:

(1) During the rush hours it provides the necessary

number of passenger spaces at the point of maximum loading in the direction of heaviest loading. Whether a passenger rides a long or short distance, this passenger space must make a round trip over the designated route of the line in order to furnish the passenger space required at the point of maximum loading in the heavy direction. This portion of the service therefore consists of "passenger space miles."

(2) During the period between the morning and evening rush hours, sufficient seats must be provided at the point of maximum load. These seats must be moved over the designated route of the line whether they are occupied or not. This portion of the service therefore consists of "seat miles."

(3) Before the morning rush and after the evening rush, schedules are generally governed by headways mandatory or practical. This means that cars large or small must be passed over designated routes at certain intervals. This portion of the service therefore consists of "car miles."

The street railway man's general problem is to find the routes, schedules and types of equipment which will perform these varied duties most efficiently. The writer is of the opinion that it would pay to order our accounting system so that the cost of service of each character can be determined without too much analysis and calculation. One of the results of such an analysis of the cost of service would be to shatter the mistaken and harmful notion that strap-hangers pay the dividends. Electric light and power people discovered long ago that the customer who uses electricity only at the peak is expensive and undesirable. It is not hard to show that business does not pay which requires the purchase of equipment for four or five hours' use out of twenty-four hours and then to carry a load, however large, in one direction only.

If street railways did not already have their rush hour equipment on hand, with interest charges accruing on it, they might not find jitneys an unmixed evil. For if jitneys thrive at all, they do so during the rush hours. In many cities the track capacity of some streets is already reached during the rush hours. In such cases the fixed charges on track must be figured against the peak load, and this gives rush hour traffic a considerably worse financial aspect.

Referring to Mr. Doolittle's very interesting and comprehensive outline of his subject and plan of treatment, the models will be worth while if they have a definite purpose in giving specific instruction to traffic men, or in demonstrating to and impressing on the public mind the relation of service to traffic. Diagrams seem better than models for this purpose, but anything which helps in any way is welcome.

The writer would suggest that "traffic factor" and "service factor" would be preferable to "concentration index." The former terms correspond to the well known and accepted "load factor" in central-station work.

Not with the intention of anticipating Mr. Doolittle's conclusions regarding standard methods of procedure for traffic surveys, the writer would state his belief that the destination count as made in Philadelphia is entirely practicable for any city. It can be made complete with all compilations at a cost of not over \$30 per car counted. It gives information which can be confidently relied upon in questions of routing and transfer regulations. Unless a city is growing or changing very rapidly, the information obtained by such a count should be useful for five years or more.

The ratio of investment to gross revenue has undoubtedly been overworked and misapplied, but the writer is not favorably impressed with Mr. McGrath's suggestion that the "revenue passenger" be used generally as a basis of comparing investments. This unit

would correspond to the "kilowatt hour" in central-station work, and we know that no electrical man would consider figuring his investment per kilowatt hour. While the demand costs are not so large a proportion of the total in railway as in central-station service, they are nevertheless very important, and nobody desires to belittle them. We want to make the rush hour passenger realize that the investment necessary to carry him when he wants to travel is greater than that required for the non-rush passenger, even though the former sometimes gets only standing space.

For railway and financial people the cost per mile of track is the most useful presentation of investment. The cost per mile of track varies principally with the amount of equipment necessary per mile of track, and with the general character of construction. Both of these factors vary directly with the density of traffic and, therefore, with each other. So that if we know the maximum number of forty-seat cars required per mile of track we have a direct line on the cost of equipment and, indirectly through the density, a measure of the average character of construction required. It is true that at present the maximum number of forty-seat cars—or an equivalent unit—is recorded for very few railways. It is a simple figure to compile, however, and it undoubtedly will be taken up in the future as it shows the important element of demand. The cost per mile of track for systems having various numbers of cars per mile of track could be plotted on a simple diagram and a reasonable basis for judging any other property obtained. It goes without saying that any unusual conditions should be taken into account.

In the absence of the maximum number of forty-seat cars or an equivalent demand unit, a fairly satisfactory basis of comparison can be had by using the car miles per mile of track. This has the disadvantage of not taking account of load factor or size of cars.

For use before the public, the investment "per capita" would seem to carry more weight and to be more appropriate than the investment "per revenue passenger." A resident of a city, for example, would obtain a better idea of the street railway problem if he thinks of the company's investment in his service as \$75 rather than as 30 cents for every time he rides.

J. A. EMERY.

Safety First in Manila

The Manila Electric Railway & Lighting Company, Manila, P. I., has taken up the safety-first propaganda, and, under the direction of C. Nesbitt Duffy, vice-president, with the active assistance of his department heads, the company has inaugurated a safety-first campaign. The matter was first considered at a meeting of the company's officials and department heads on June 26, 1914. A few days later a safety committee was appointed, consisting of twelve departmental heads not officials of the company. The executive committee was composed of C. H. Van Hoven, who is the claim agent; Oscar Keese, superintendent of transportation, and Ramon Lopez, superintendent of distribution. Lectures have been given in the public schools by C. H. Van Hoven in English, and by F. P. Santiago in Tagalog. Circulars in English and in Tagalog have been sent to cocheros, chauffeurs, owners of automobiles, garages and livery stables. Placards or posters have been placed in the cars operated by the company. According to Mr. Duffy 1512 accidents were reported in 1914. Of this number 610 were caused in boarding or alighting from cars, while 646 were caused by collisions with vehicles. These two forms of accidents were 85 per cent of the total reported. C. H. Van Hoven is in general charge of this movement.

Equipment and Its Maintenance

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

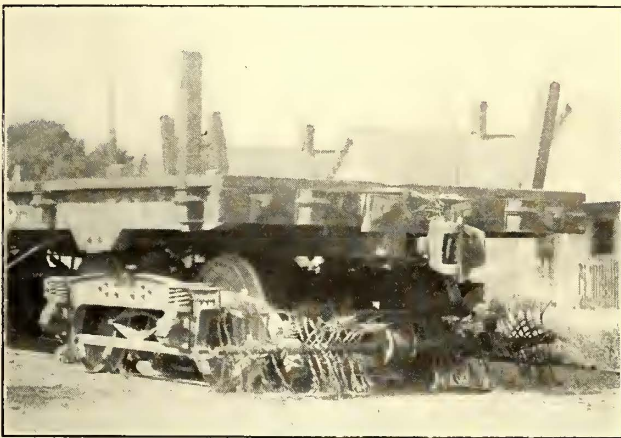
(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Northern Texas Traction Weed Cutter

BY R. E. GRIFFITHS, NORTHERN TEXAS TRACTION COMPANY, FORT WORTH, TEXAS

To reduce the expense of cutting weeds and grass on its right-of-way the Northern Texas Traction Company has built the weed cutter shown in the accompanying illustration.

An ordinary flat car was utilized for the weed cutter, a revolving wire brush being mounted from the truck at one end. The core of the brush or cutter consists of a 1½-in. shaft revolving in bearings mounted directly over the rails and carrying at the center an 8-in. driving pulley. Except in the pulley and the bearings the shaft is drilled with holes on half-inch centers, adjacent holes being at right angles to each other. Wire strands are mounted in the holes, each consisting of a piece of



WEED CUTTER IN USE BY NORTHERN TEXAS TRACTION COMPANY

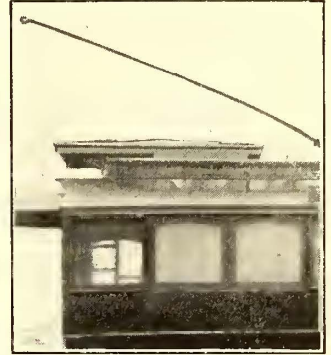
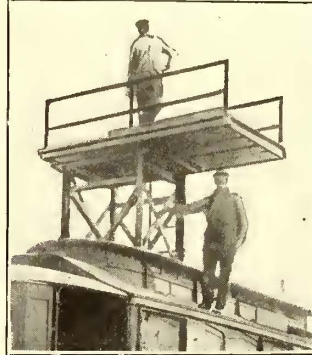
strand from a 1¼-in. switch cable. This strand is made up of seven No. 10 wires and it is raveled for 4 in. from each end, further raveling being prevented by a wrapping of wire.

The shaft revolves in simple bearings carried on brackets attached to the side frames of the truck, the upper member being formed of 1-in. x 4-in. flat steel and the lower member of ¾-in. x 3-in. flat steel. A tie-rod serves to brace the brackets sidewise. The cutter is driven through a flat belt from a 22-in. pulley on the rear axle of the truck and makes about 900 r.p.m. when the car is running at 30 m.p.h.

In operation the car is run ahead of the motor car, with the cutter in front. With the belt uncrossed the bottom of the cutter moves backward with respect to the car motion, which is the normal arrangement. The direction of rotation of the cutter can, however, be reversed by crossing the driving belt. It is only necessary to run the car over the road once to cut down all grass and weeds even with the top of the rail, excepting those directly under the driving pulley. There is no particular objection to leaving the weeds in the center of the track as they cannot be ground under the car wheels.

The Three-in-One Car

BY E. C. SHERWOOD, SUPERINTENDENT OF EQUIPMENT MANHATTAN & QUEENS TRACTION CORPORATION, LONG ISLAND CITY, N. Y.

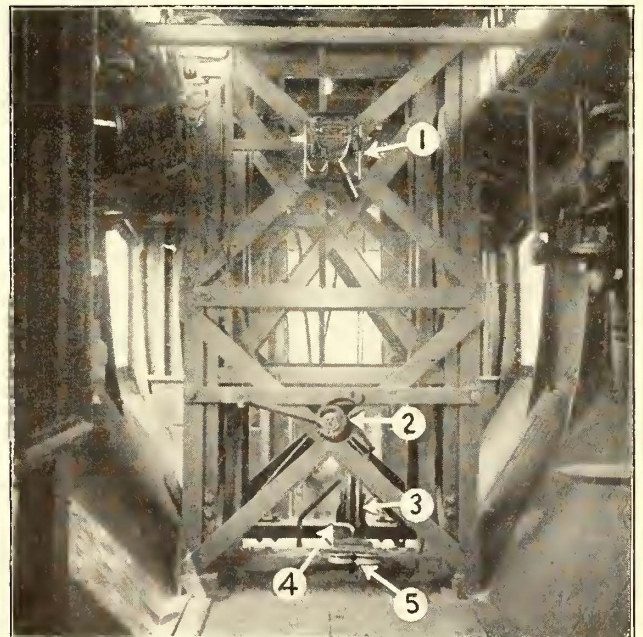


THREE-IN-ONE CAR—FIGS. 1 AND 2, PLATFORM IN RAISED AND LOWERED POSITIONS RESPECTIVELY

This company recently decided to remodel an old single-truck passenger car into a line car at a minimum of expense. In doing so it was found possible to design the car so that it would act as a snow scraper and an arc-welding outfit also. The car was built and has proved very satisfactory, becoming known among the employees of the company as the "three-in-one" car.

THREE-IN-ONE CAR AS A LINE CAR

The car available measured 31 ft. 6 in. over bumpers, 7 ft. 8 in. in width and 11 ft. 5 in. in height. In remod-



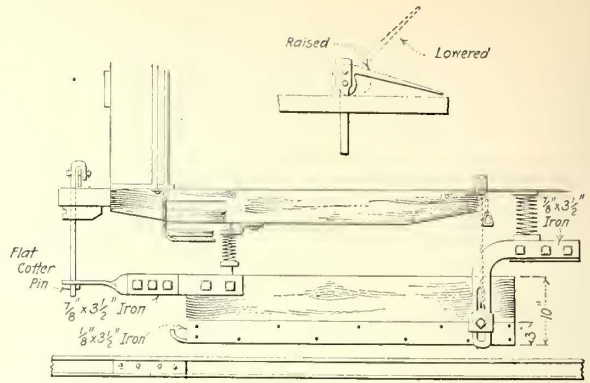
THREE-IN-ONE CAR—FIG. 3, INTERIOR VIEW, SHOWING TOWER FRAMES, GUIDE SHEAVES, ETC.

eling, the two longitudinal seats and the heaters were removed. The cables were then pushed back against the sides and covered with a protecting boarding of tongue-and-groove flooring, running diagonally from the bottom of the sash to the car floor. This arrangement left ample space for the new purpose. One end of the car from door-post to corner-post was removed and so arranged that it could be replaced and held in position by means of hooks. This opening provided ample room to admit a reel of cable or trolley wire. As a guide for the tower a frame consisting of four upright posts, 3-in. by 3-in. in size, was built between the floor and the corners of a hole 42 in. square in the roof. The posts were cross-braced and bolted both to the floor and the roof. The sliding tower is a frame made of four uprights, 2½-in. by 3-in. in size, suitably cross-braced. On top a fifth wheel was arranged to swing the platform, which is about 5 ft. x 8 ft. in size.

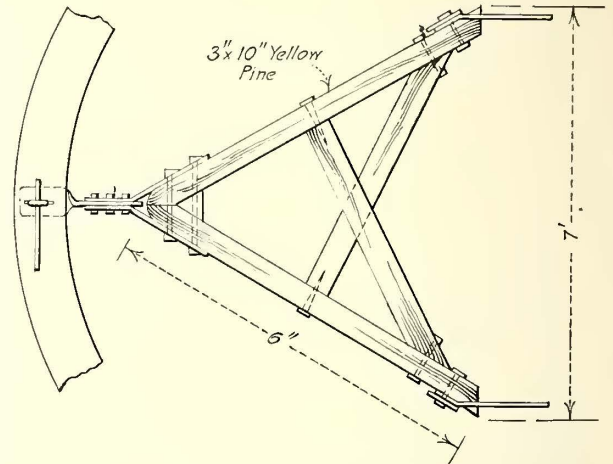
When the tower is down the platform fits close to the roof and must be raised 3 or 4 in. before the platform can be swung out. There is therefore no danger that it will swing out when the car is in motion and the tower is down, and no clamp is necessary to hold the platform in position. The tower is raised by means of a winch, cables being fastened at the bottom of the uprights and running over sheaves which are set in the cross-pieces fastened in the opening of the roof. The platform is provided with hinged railings at the side, held in place by diagonal hooks when in use and folded flat on the platform when not in use. The platform is shown in Figs. 1, 2 and 4.

The arrangements for stringing trolley wires are as follows: A rack inside the car supports the reel. From the reel the wire passes between a pair of 5-in. sheaves (5, Fig. 3), mounted on the bottom of the tower, through a tension clamp (4, Fig. 3), around a 16-in. sheave (3, Fig. 3) with a 2-in. by 1-in. groove, through the tower platform (Fig. 4) and out over a 16-in. sheave with a 2-in. by 3-in. groove. The tension clamp (4, Fig. 3) consists of two pieces of flat iron, grooved to fit the wire and shod with fiber to prevent chafing of the wire. The lower piece is fastened to the bottom of the tower, and the upper piece is raised and lowered by means of a threaded spindle. The side-by-side arrangement of 5-in. sheaves furnishes a guide for the wire no matter what its direction may be in coming from the reel. These sheaves also take any kink out of the wire. The platform sheave has a wide, shallow groove so that the wire can shift from side to side.

After the trolley wire has been fastened or anchored all that is necessary is to raise the tower to the desired height, set the tension clamp, and start the car, when the wire will be paid out perfectly straight and free from kinks. The wire can be run without pulling or lifting, and as everything connected with the tower is



THREE-IN-ONE CAR—FIG. 5, DETAIL OF LEVER AND CAM; FIG. 6, SIDE ELEVATION OF SNOW SCRAPER



THREE-IN-ONE CAR—FIG. 7. PLAN OF SNOW SCRAPER

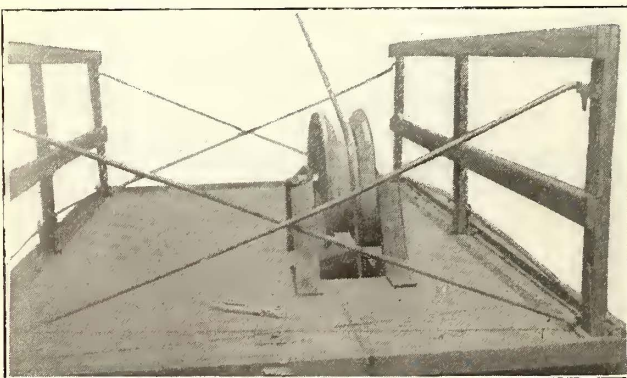
insulated the wire can be strung alive. As the wire inside the car is alive we made good use of this fact by tapping off the trolley base, running a lead to a circuit breaker (1, Fig. 3) located on cross-braces of the tower guide frame, thence to a trolley wheel back of the 16-in. inside sheave. This wheel makes contact with the wire coming off the reel. Thus by pulling down the trolley pole and closing the circuit breaker the car can be operated from the current drawn through this wheel. This is very convenient in stringing trolley wire where the track is laid but where no trolley wire has been placed.

In addition to the trolley-stringing apparatus the car contains a work bench, a hand drill-press, an emery wheel, a vise, bins for supplies, etc. This equipment makes the line force more or less independent of the shop and saves time waiting for drilling, etc.

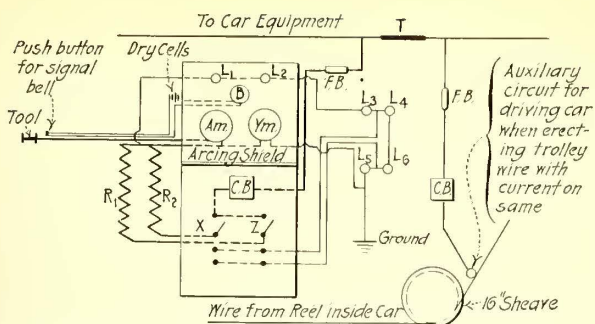
THREE-IN-ONE CAR AS A SNOW SCRAPER

In order to increase the usefulness of the car, which was not in constant demand as a line car, it was equipped with snow scrapers of the type shown in Figs. 5, 6 and 7. Applications have been filed for patents on this type of scraper, which has proved very satisfactory in operation. It consists of a plow made of 3-in. by 10-in. lumber and shod with 1/8-in. by 3 1/2-in. band iron at the bottom to take the wear. The plow is 6 ft. in length and 7 ft. wide at the back. The nose is rounded, and from the bottom of the nose an upward-curving toe projects to prevent catching on obstructions.

At the heel the plow is held in position longitudinally and sidewise by means of bolts which slide in slots in brackets attached to the truck frame. By cutting out three rivets on each side of the truck on both ends it



THREE-IN-ONE CAR—FIG. 4, PLATFORM OF LINE TOWER



THREE-IN-ONE CAR—FIG. 8, WIRING DIAGRAM OF ARC-WELDING OUTFIT AND AUXILIARY CIRCUIT

was possible to bolt on the flat brackets as shown in Fig. 6. These are made of 7/8-in. by 3 1/2-in. flat iron and are bolted firmly through the rivet holes. The slots permit the heel of the scraper to rise and drop when riding over high spots on the road.

At the nose a coiled spring under the platform presses the plow downward and an extension made of 7/8-in. by 3 1/2-in. flat iron projects outward to a point under the car drawhead for the purpose of supporting it on a rod which hangs from the bumper. This rod passes through a hole in the extension and a flat cotter key through it takes the weight of the front end of the plow. The rod passes up through the bumper and is bent over at the upper end to form a bearing for a cam-ended lever, by means of which the plow nose can be raised and lowered. At the heel chains are provided for raising the rear of the plow when it is out of use. The chains are hung over split hooks.

THREE-IN-ONE CAR AS AN ARC-WELDING OUTFIT

For the purpose of using the car as a welding outfit suitable resistance boxes were provided, a switchboard with measuring instruments was installed and provision was made for the necessary signals between the welding men and the switchboard operators.

There are four resistance boxes made up of regular car resistance grids, each measuring 42 in. in length. They are mounted on two 2-in. by 4-in. uprights running from the floor to the roof of the car, three being placed horizontally and one vertically. By the use of this method of mounting, a space 37-in. by 52-in. by 26-in. only was required.

Current for welding is taken from the trolley base

through a fuse box from which the fuse is removed when the welder is not in use. From the fuse box the line runs to a circuit-breaker on the switchboard, then through two operating switches to the resistance boxes and the ammeter and through a conduit out over the truck to the outside of the car.

The ammeter referred to has a capacity of 400 amp, and a 700-voltmeter is also supplied on the switchboard. On the board are also a signal bell operated by a push button on the handle of the welding tool, and signal lamps for indicating the condition of the circuit.

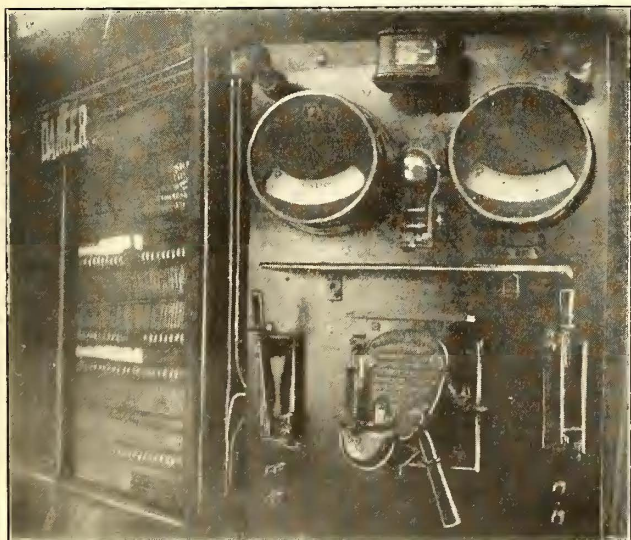
The terminal of the wire from the trolley has sweated on it one-half of a two-way clasp connector, and the lead wire connecting to the welding tool has the other half of the connector sweated on it. The ground wire from the truck of the car is similarly equipped.

In using the car in welding, the welding tool is connected up to the terminals either on the positive or the negative side as is desired, and the workman when ready to start welding signals the switchboard operator who closes the circuit-breaker. This lights up two indicating lamps located under the drip rail of the car on either side, and two others on the switchboard indicating that power is available. The outside signal lamps are so connected that when either one or the other of the resistance switches, X and Z in the accompanying electric circuit diagram, is thrown down, short-circuiting the auxiliary contacts, one outside lamp on each side of the car is extinguished. This indicates to the welder the amount of current which he may expect to get. The welder is able to signal for full current, half current or no current by means of the signal bell, and to know that the switchboard operator understands his signals. All of the electrical connections described are indicated in the diagram. By the arrangement described welding on overhead work can be done from the raised platform just as well as welding on the ground.

Cooling Plant at Bluestone

Some additional facts in regard to the cooling plant used in the power station of the Norfolk & Western Railway at Bluestone, described last week, and supplied by the Spray Engineering Company, Boston, may be of interest. The pond is used when the supply of river water is low or too muddy for boiler use, the water then being sprayed into the pond and then discharged into the intake canal. If there is sufficient cooled river water of suitable quality, the water from the condensers is not sprayed but is discharged into the pond from which it is allowed to flow into the river reservoir several hundred feet below the intake and circulates upstream to the intake, the complete circuit being about 1400 ft. The pond is 90 ft. wide, 296 ft. long and 5 ft. deep, and the basin is formed of a concrete retaining wall and an 8-in. bottom, laid on rolled ground. The basin may be drained by a sluicing gate.

The nozzles and pond are fed by three 24-in. pipe lines from the power station. There are four rows of concrete piers supporting branch arms, each carrying three or four sets of spray brackets. Altogether, there are 280 nozzles with space for 140 more. At the end of each of the four main branch lines is a bronze release valve arranged to open automatically when the water pressure exceeds a predetermined value. The valves discharge downward on concrete slabs which prevent the erosion of the basin bottom. With the exception of the 2 1/2-in. wrought iron spray brackets, all piping is of cast-iron, painted inside and out with tar pitch varnish. The nozzles are of bronze and are designed each to discharge 62 gal. per minute with a nozzle pressure of 5 lb. per square inch. The pond is capable of cooling 16,800 gal. per minute.



THREE-IN-ONE CAR—FIG. 9, SWITCHBOARD FOR ARC-WELDING OUTFIT

GE 240-C Motor and PC-2 Control

Information is now available of the GE 240-C motor and the PC-2 control with which six of the cars to operate through the Belmont tunnel in New York are equipped. This line, which is controlled by the Interborough Rapid Transit Company, though not now physically connected with the existing subway system, runs from Forty-second Street, Manhattan, at a point midway between Lexington and Third Avenues to Jackson Avenue in the Borough of Queens. The distance is about 6680 ft. Of the twelve cars six are being equipped with the 240-C motor and PC-2 control of the General Electric Company and six with the 302-F-2 motor and 214-A control of the Westinghouse Electric & Manufacturing Company.

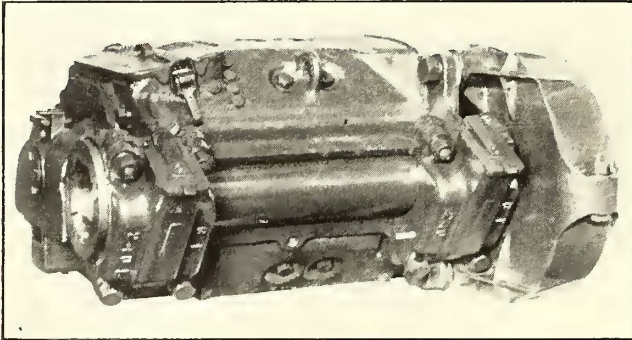
The GE 240-C motor is a recent design of the box type with nose for motor support cast integral with the frame. Its weight complete, with gear, gear case, pinion and axle linings is 4000 lb. A high continuous capacity is obtained by the use of the General Electric Company's system of double or multiple ventilation. A fan that has two sets of blades and that has a greater diameter than the armature, is made integral with the pinion-end armature head. Hooded openings are provided in the commutator end-frame head for

making the different electrical combinations for the motors are closed mechanically by means of cams mounted on a shaft which is revolved by a rack and pinion. The rack is operated by two air cylinders whose valves are electrically controlled by the master controller.

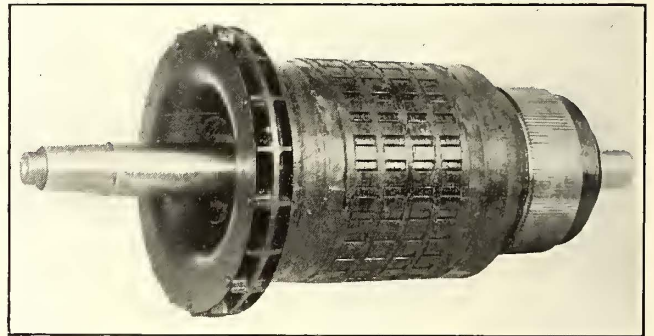
The construction of the contactor units will be understood from the view of one that is reproduced. To close the circuit a cam engages with the roller mounted on the lowest part of the hinged arm, and raises it until the contact surfaces come together, at the same time compressing the spring. When it is released, the spring returns the arm to its original position, thus breaking the circuit. The unit is of rigid and substantial construction, and special attention has been given to interchangeability of parts. The contactor is self-adjusting, the spring automatically taking up any wear.

All of the contactor arc chutes are grouped in one unit similar in construction to that used in the ordinary drum controller. This unit is suitably hinged so that it may be swung downwards, thereby exposing all of the contacts and operating mechanism of the contactors. Individual side burning plates are used in the arc chute, and these can be readily removed by releasing a simple spring catch.

The rack that controls the position of the cam shaft



BELMONT TUNNEL EQUIPMENT—MOTOR ASSEMBLED COMPLETE



BELMONT TUNNEL EQUIPMENT—MOTOR ARMATURE WITH MULTIPLE FAN

the entrance of cooling air. As the air enters it divides into two parallel streams, one passing around the field coils to the fan, the other being drawn through the commutator shell and the armature core. The streams unite after passing through the fan and are exhausted to the atmosphere through openings provided in the frame. Air at atmospheric temperature is thus introduced almost directly into the armature core, effectively cooling it and largely increasing the service capacity of the motor.

The control furnished with the motors is the Sprague, G. E. Type-PC-2 multiple-unit electro-pneumatic type, the apparatus consisting in general of two parts, a main or motor controller located below the car, and a master controller which regulates the operation of the motor controller.

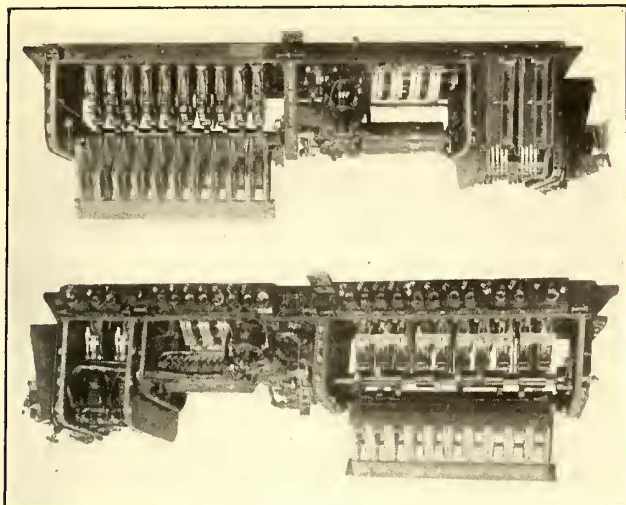
The motor controller is a series-parallel group of ten switches or contactor units, a reverser, two line breakers, overload, potential, and current limit relays, all assembled in a single case. The series-parallel connection of the motors is accomplished by the "bridge" method, the circuit through the motors not being interrupted during the transmission from the series to the parallel connection. The tapped field motor permits the use of a heavy accelerating current on full field, and a higher armature speed on tapped field, and in addition allows one resistance step to be cut out, the motors operating on tapped field on both series and parallel with a saving in rheostat losses. The contactor units

is mounted between two air cylinders. The valves controlling the admission of air pressure to the cylinders are controlled by the master controller.

The line breakers are also operated pneumatically and controlled electrically. In construction, they are similar in principle to the contactor units. In operation a movable arm carrying a removable copper tip makes contact with a similar tip. The arm is lifted to close the circuit by an air cylinder the valves of which are directly operated by the master controller each time it is turned on or off. When the control circuit is interrupted air is exhausted from the cylinder and a strong spring, together with the weight of the arm, causes it to drop, and open the power circuit. An overload trip is provided for the line breakers so that an excess current will cause the main current to be broken. The reverser is also actuated by air pressure, and is electrically controlled for throwing it into either position.

Current for operating the control circuits is furnished by a storage battery at a potential of 32 volts. This is charged in series with the air compressor whenever the latter is in operation. Air pressure for the cam shaft cylinders, line breakers and reverser, is obtained from the air brake system.

The master controller is similar in general construction to that used with the Sprague G. E. Automatic Type-M control, and consists of a single cylinder which energizes the various train wires for forward or back-



BELMONT TUNNEL EQUIPMENT—FRONT AND BACK VIEWS OF MOTOR CONTROLLER, WITH ARC CHUTE LOWERED

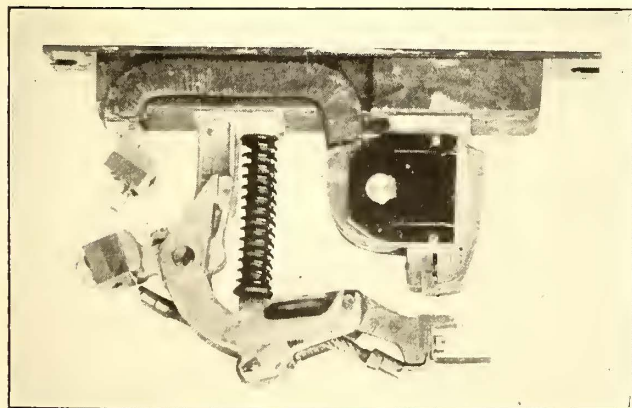
ward movement. The handle is moved in one direction for forward car movement and in the opposite direction for reverse.

There are four positions for forward movement: Switching point in series; accelerating point in series; lap point in parallel; accelerating point in parallel. There are but two positions in the reverse direction corresponding to the first two mentioned for forward motion. Switches are also provided for the control-circuit cutout, and line-breaker reset.

When the controller handle is turned to the switching position, all reversers in the train are first thrown for whatever car direction is indicated on the controller in use. The circuit controlling the operation of the line breaker is next established. To insure a correct sequence of operations the line breaker is not allowed to close and complete the motor circuit until the reverser has thrown to the proper position.

When the handle is moved to the accelerating points, the train accelerates automatically at a pre-determined current per motor. A current-limit or notching relay limits the accelerating current and stops the rotation of the cam shaft when the pre-determined current is reached. When the motor current drops to the correct value the progression is again started.

The controller handle is automatically returned to the off position by a spring so that power is cut off whenever the motorman releases his hold. The release of this handle permits a knob to rise and thereby actuate a small air valve in the controller for applying the



BELMONT TUNNEL EQUIPMENT—CONTACTOR UNIT FOR MOTOR CONTROLLER

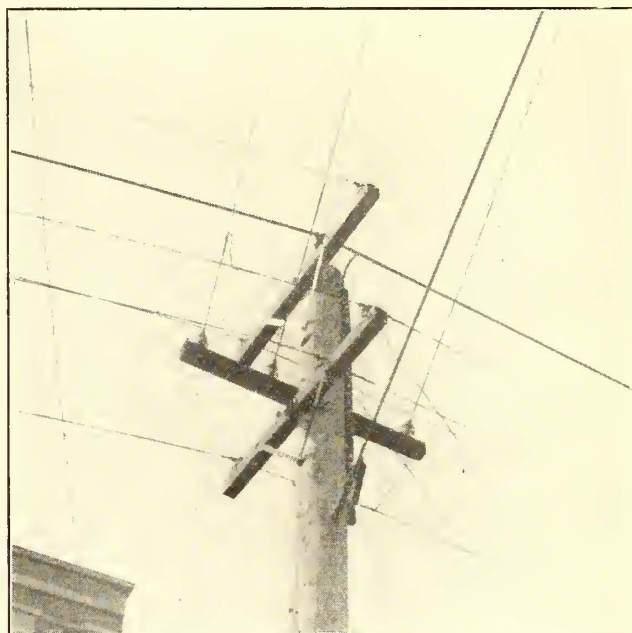
brakes simultaneously with the cutting off of power.

These two features are provided for the purpose of bringing the train quickly to rest in case the motorman becomes incapacitated. In the event of the line breaker opening, due to an overload, the motorman re-establishes the closing circuit by operating the resetting switch in the cab.

The special features of the new control are reported as follows: A definite sequence of contactor operation is established both when going off and on, due to the mechanical control of the contactor units, and this prevents trouble that might occur from improper functioning of independently operated contactors. Interlocks on the contactors are eliminated. The electric control circuits are simple. The simplicity and compactness of the apparatus permits the assembly of contactors, reverser, line breaker, relays, etc., in one box as a single unit, making the installation easy and reducing the possibility of improper connections. The arc chutes are grouped as a single unit which can be swung down, exposing all contactors. The design and grouping results in a considerable saving in weight of control apparatus.

Fiber Conduit Insulation for Feeder Taps in Dubuque

Fiber conduit instead of metal conduit is used by the Union Electric Company, Dubuque, Ia., to insulate its feeder-tap connections. The 550-volt d.c. trolley feeder is supported on a five-pin arm attached to the top of the wooden pole. On the same cross-arm with



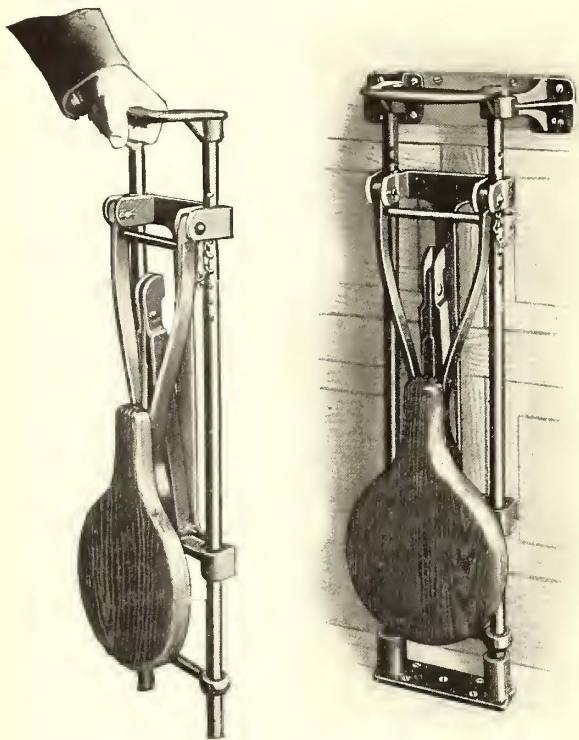
DUBUQUE RAILWAY—FIBER CONDUIT USED TO INSULATE A FEEDER TAP

this feeder and on another below it are 2300-volt and 110-volt a.c. lighting and power wires. In order to make a connection to the trolley wire by way of a span wire which is attached to the pole below the cross-arms, the feeder tap must pass down along the side of the pole for a distance of 5 ft. or 6 ft. To protect the linemen when working on the pole, a section of 1½-in. fiber conduit is slipped over the feeder tap and fastened to the pole with metal straps. In addition to furnishing full insulation, the conduit is light, inexpensive and neat-looking.

A feeder tap installed in the manner described is shown in the accompanying illustration.

Removable, Collapsible Motorman's Seat

A new removable type of Keystone motorman's seat is being manufactured by the Electric Service Supplies Company. This allows the seat proper to be transferred from one end of the car to the other with a minimum amount of difficulty. All of the quick collapsible and adjustable features of the standard Keystone seat are retained as will be noted in the accom-



REMOVABLE, COLLAPSIBLE MOTORMAN'S SEAT

panying illustrations. One pair of brackets for supporting the upper ends of the standards and one floor plate for securing their lower ends are the only stationary parts and these are so arranged that the seat can be readily disengaged by raising the standards a few inches. Special upper brackets are furnished to take care of the curvature of the inside of the dash or to overcome other existing obstructions.

A Truck Designed for Low Maintenance Costs

The maximum traction truck of to-day with its improved arrangement of bolster with swing motion and center-bearing principle has come to be widely used for city service, and to meet the demand for this design the

Taylor Electric Truck Company, Troy, N. Y., produced the Taylor maximum-traction double truck arranged for single motors, and providing from 65 per cent to 70 per cent tractive power on the driving wheels.

The details of this design received most careful consideration to include the latest and most up-to-date principles demanded in truck construction, and yet the important factor of simplicity has been retained throughout, especially in the brake mechanism as there are no offsets in brake levers or connection rods. The brake throughout is provided with case-hardened steel bushings and pins, and adjustment is easily and quickly made.

The easy riding qualities of the truck are not only due to the use of full elliptic springs, but to the one-piece, improved, bolster bale-hanger, the arrangement of which absolutely overcomes any side oscillation of the car body. The springs, both coil and elliptic, are manufactured at the Taylor plant, and are accurately proportioned and tested to insure the most satisfactory results in riding as well as in their qualities of endurance.

Reference to the accompanying cut shows that the pedestals are provided with improved wearing shims, and the deep-arched wrought-metal bolster and transom bars are arranged as well with easily-renewable take-up shims. The same simple means of adjustment of the truck side bearing with renewable wearing shoe is provided. As the truck is light in weight, yet carefully proportioned to sustain the maximum of overloading and frequent emergency braking strains that are common to city operation, it operates most satisfactorily with lowest maintenance costs.

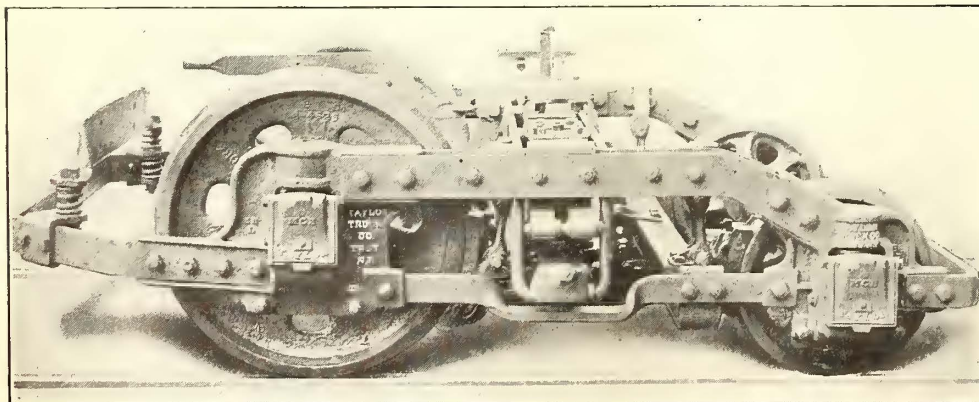
Carbon-Vanadium Forging Steel

To meet the modern demand for steel of high elastic limit, the railroads have recently turned to heat-treated carbon and heat-treated alloy steels in many cases notwithstanding the lack of equipment for heat treatment

TESTS OF PLAIN CARBON-VANADIUM STEEL

Analysis, n per cent		Carbon	Manganese	Phosphorus	Sulphur	Vanadium
		0.47	0.90	0.012	0.020	0.15
Physical Properties:		Yield Point, lb. per sq. in.	Elastic Limit, lb. per sq. in.	Ultimate Strength, lb. per sq. in.	Elongation in 2 in., Per Cent	Reduction of Area, Per Cent
7-in. axle	Natural	71,200	68,000	123,000	16.0	30.0
7-in. axle	Annealed 1450 deg. Fahr.	56,000	52,000	90,000	24.0	50.0
7-in. axle	O. Q. 1600; T. 1160 deg. Fahr.	85,000	82,000	112,500	22.0	55.0
11-in. axle	Natural	75,000	70,000	117,000	16.0	28.5
11-in. axle	Annealed 1450 deg. Fahr.	58,000	54,000	94,000	22.0	47.0
11-in. axle	O. Q. 1600; T. 1160 deg. Fahr.	87,000	80,000	115,000	20.5	52.0

in most of the railroad shops. This applies particularly to repair work, where for any reason the forging has to be locally heated, destroying thereby the effect of the heat treatment. In consequence, the American Vanadium Company has developed a type of simple carbon-vanadium steel which, without heat treatment other than annealing, equals all the requirements specified for heat-treated, plain carbon-steel forgings of like section. Furthermore, these results are obtained from steel with lower carbon than is generally used to obtain the physical requirements for heat-treated carbon-steel axles and forgings.



MAXIMUM TRACTION TRUCK DESIGNED FOR LOW MAINTENANCE COST

Through the elimination of alloys other than vanadium, the cost of this steel is only a little higher than plain carbon steel, although the strength is materially higher. This is indicated in the accompanying table, which gives results of actual tests on the new type of metal. The effect of the vanadium in this case has been to increase very greatly the elastic limit and strength of the steel without lowering the ductility.

In general it may be said that vanadium has a very strong influence chemically and physically through its combination with carbon, in retarding segregation. Vanadium steels are all remarkably responsive to heat treatment, and this simple carbon-vanadium steel is no exception. Where still higher strength is desired than can be obtained by simple annealing, results can be obtained from this simple carbon-vanadium steel that will approximate those obtained from the more expensive alloy steels.

The heat treatment recommended is to heat the forgings uniformly to about 1600 deg. Fahr. and quench in oil. In case water is preferred as a quenching medium the temperature should be about 1550 deg. Fahr. The forgings should then be drawn back or tempered by heating to a temperature between 1100 deg. and 1150 deg. Fahr.

An Original Application of Signals for City Service

The Chicago, South Bend & Northern Indiana Railway Company has made some installations of Nachod Automatic Signals, Type CD, on its city lines in South Bend which are worthy of note as showing how the company has applied the signals to peculiar situations. There are eight signals in service, and the accompanying cut shows the layout of two blocks. Signals are located at the bases indicated for the signal poles, and the trolley contactors are installed in the overhead construction as indicated by the centers of their respective symbols.

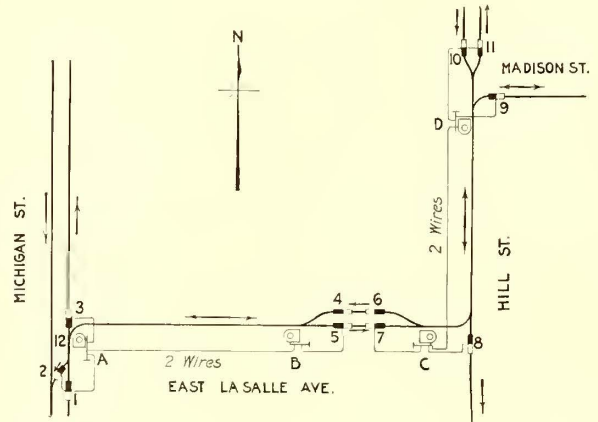
The first single-track block extends between Michigan Street and the through-type turn-out on East La Salle Avenue. The second block extends from the other end of this turn-out to the turn-out on Hill Street just north of Madison Street. Each of them includes a turn at right angles so that the ends of the same block are not mutually visible. It may be noted by the position of the contactors that part of the first block is also traversed by the North Michigan Street cars, and part of the second by the Notre Dame Line on Hill Street. The Madison Street Line also enters the second block at Madison Street, leaving the first block on Michigan Street. Contactors 1, 2 and 3 are wired to signal A, contactors 4 and 5 to signal B, contactors 6, 7 and 8 to signal C, and contactors 9, 10 and 11 to signal D.

A car of the Madison Line passing under contactor 1, northward, sets signal B at "stop," (red light and red disk), and signal A at "permissive," (white light and white disk), and clears both these signals at contactor 5. At contactor 7 it sets signal D red and signal C white, and clears both these at contactor 9. The return trip is made under the same contactors in the opposite order, except that the car passes under contactor 2 on the cross-over on Michigan Street, instead of contactor 1. The Notre Dame cars run on Hill Street only, entering the second block at contactor 10 and leaving at contactor 8.

The contactors at signal A are so planned as to permit the northbound Michigan Street cars to operate without being interfered with by the signals. These cars do not observe signal A at all. If that signal should be neutral because no car is in its block, passage under

contactor 1 would set signal A white and signal B red, but the same car continuing under contactor 3 will immediately restore both signals to their original condition. If this should be white, a following movement will be recorded by a second notch on the revolving switch, which will be stepped back again one notch by the car at contactor 3.

The control of the signals is such that even if signal A should be indicating red for the diverging route, a North Michigan car will merely count at contactor 1 without changing the signal indication, and will cancel that count at contactor 3. Contactor 3, therefore, may be regarded as a contactor to cancel the effect of running under contactor 1, which is, perforce, located on Michigan Street. It might be suggested that contactor 1 should be moved up past the switch on La Salle Street, but if such were the case a westbound car at contactor



ORIGINAL APPLICATION OF SIGNALS ON CHICAGO, SOUTH BEND & NORTHERN INDIANA RAILWAY

4 might set signal A red when the first car had just left Michigan Street and would be compelled to back up on a busy double track, a very inconvenient proceeding.

A selective method of protecting the same situation would be in combination with a Cheatham automatic switch to throw the switch-point marked 12. In this case contactor 1 would represent a Cheatham contactor. The Michigan Street car passing under contactor 1 with power off would throw switch-point for Michigan Street and the signal would not be operated. A Madison Street car, however, passing contactor 1 with power on would throw the switch-point and set signals for the diverging route on La Salle Street.

All of the signals in this installation are supported from cast-iron brackets on iron poles, and insulated from them by neat wood blocks with sunken bolt heads, the wires being run inside the pole. The wiring for wood poles is run in conduit which extends from the top of the pole to the fuse and control box located near the ground with an outlet branch at the signal. Locked fuse boxes give a manual control of the signals and also afford a convenient means of testing and disconnecting them. The trolley contactors are of the wiping type and the relay mechanism oil immersed.

Non-Splashing Track Switch

By a typographical error in the description of the non-splashing track switch on page 1084 of last week's issue, the location of the contactor employed was referred to as being on the "car" instead of on the "ear" in the overhead system. The accompanying illustrations showed the proper position of the contactor which is very simply mounted on standard ears without taking up any slack in the trolley wire.

News of Electric Railways

CHICAGO WAGE NEGOTIATIONS

Working Conditions Adjusted Satisfactorily. Question of Wages Still Being Considered

Negotiations leading to a new working agreement between the Chicago (Ill.) Surface Lines and its employees have reached the point where practically all questions regarding working conditions have been amicably settled. L. A. Busby, president of the company, in response to the demand for an increase in wages offered to readjust the existing graduated scale so as to reduce the difference between the maximum and minimum. Under the present contract the minimum wage is 23 cents and the maximum, after six years' service, is 32 cents. The new offer of Mr. Busby provides a 25-cent minimum with the existing maximum for the first year, a 25½-cent minimum for the second year and a 26-cent minimum for the third year, but no increase in the maximum. The company's records show that approximately 60 per cent of the trainmen receive the maximum wage. The employees requested a 33-cent minimum and 36-cent maximum, the maximum to be received after the first year of service.

Final answer by the representatives of the employees was delayed, however, awaiting the decision of Britton I. Budd, president of the elevated railroads of Chicago. These negotiations, like those for the surface lines, have resulted in disposing of the working conditions without difficulty, but the wage question is yet to be considered.

Mr. Busby wrote a letter to the employees in explanation of the company's position. Regarding the new working conditions he said that in 1912 the percentage of week-day straight runs was fixed at 27½ per cent and the new agreement provides for 40 per cent. In the old agreement the percentage of runs under fourteen hours was 62 per cent and the new agreement provides that 80 per cent of all week-day runs shall be completed within fourteen hours. In the 1912 agreement 14 per cent of all runs were more than sixteen hours, while all runs have now been brought within the sixteen-hour period. In the old contract the average time allowed for fallbacks was twenty minutes. The new agreement increases this allowance to twenty-five minutes. In addition the men have an allowance of thirty minutes for reliefs on the streets for meals.

Regarding wages the letter states that the management has acted not as individuals but as trustees. The last agreement was reached through arbitration. As a result the highest wage scale paid in any large city in the United States east of the Rocky Mountains was put into effect. To substantiate this a table showing the maximum wages paid in all the important cities was presented. Mr. Busby said that he did not believe it would be seriously contended that it cost more to live in Chicago than it does in New York, Boston or Philadelphia. On the other hand, the companies under the unification ordinance carried additional burdens in the shape of a universal 5-cent fare as against a 10-cent fare in some districts, and a universal transfer in lieu of cash fares formerly received in certain districts. This meant a loss in 1914 of not less than \$3,000 a day. Superimposed upon this, the increase in the gross earnings, which was approximately 6 per cent, succeeded in reducing the deficit to about \$500,000 in 1914. For the first four months of the current year the gross receipts showed a falling off of approximately \$200,000 as compared with the same period last year. In 1913 the average receipts per car hour were \$2.56, while the average receipts of 1914 per car hour were \$2.50. Mr. Busby closed his letter as follows:

"In submitting this proposition we wish you to understand that our offer in our judgment is in nowise warranted by the existing financial and traffic conditions in this city, or by reason of any expected improvement in these conditions in the near future. We have, however, endeavored to meet a very difficult situation in the spirit of the utmost fairness and in the hope that some time during the life of the agreement such improvement in existing conditions may come about as to afford some excuse or warrant for the offer we are now making. . . . If, however, the proposition is not satis-

factory we hereby offer to submit every question upon which we are not agreed to a board of arbitration."

On June 10 the surface and elevated railway employees refused the offer of the companies for increased wage and improved working conditions and also refused to submit to arbitration, stating that the experience of three years ago had proved that they would fail to secure their demands. Both Mr. Budd and Mr. Busby offer to arbitrate the differences. Mayor Thompson also urged arbitration. The ultimatum of the employees called for a strike at the close of all runs on June 11, but early on that day the strike order was temporarily revoked largely through the efforts of the Mayor. Adverse public opinion and failure to obtain the support of the press also influenced the last-hour truce. W. D. Mahon of the Amalgamated Association arrived in Chicago on June 11 to confer with the Mayor on the terms of arbitration.

HOPEFUL OUTLOOK IN DES MOINES

Mayor Hanna and other city officials are hopeful of an early settlement of the street railway franchise question in Des Moines. The ruling of the State Supreme Court gives until June 22, 1915, for the securing of a franchise by the Des Moines City Railway. A committee of the Des Moines Chamber of Commerce has been working with the City Council and representatives of the company for a settlement and an agreement practically has been reached. The capitalization of the company probably will be fixed at \$5,000,000 as contended for by the company, but there may be concessions as to fares. Under the proposed plan of settlement there will be a board of directors composed of business men of the city, with Emil G. Schmidt, president of the company, as chairman. Provision is made for the purchase of the company's property by the city if desired. The proposed ordinance will be submitted to a vote of the people as soon as the terms have been agreed upon by the company and the Council. If the franchise is granted at an early date an end will be put to court proceedings now in progress to protect the rights of bondholders of the company under the present situation, in which the company is operating without legal status, according to the ruling of the State Supreme Court. Three members of the City Council, enough to control, favor a speedy settlement of the controversy, and it is coming to be generally recognized that the industrial and commercial prosperity of the city is threatened because the company is held back from making necessary improvements and repairs on account of financial difficulties into which it has been plunged through its inability to negotiate a franchise with the governing body of the city.

CLEVELAND CHARGES DISMISSED

The Cleveland (Ohio) Railway and Peter Witt, street railway commissioner, were acquitted of the charges of favoritism in awarding contracts for construction work in the report of the special committee of the Council filed with that body on June 1. The committee made a thorough investigation of the charge of Roderick D. Grant that he had been offered \$12,000 to withdraw his bid on the Harvard Avenue carhouse a year ago. Representatives of the company accused claimed that the offer was for the purchase of the contract and that nothing was said in regard to withdrawing it. The report reads in part as follows:

"The weight of evidence seemed to be that the \$12,000 was not a bribe, but was an offer to purchase the contract of a competitor. The contract was awarded to the lowest bidder at a fair price. The charge that the street railway commissioner allowed excessive expenditures by the company is entirely without foundation. The office of the street railway commissioner is equipped to check the expenditures of the company and does fully check them."

The report was adopted by a vote of twenty to six.

The Ohio Supreme Court granted a temporary injunction on June 3, restraining the Cleveland Railway from building tracks on Euclid Avenue between East Twenty-second and East Fortieth Streets. The company was placed under a bond of \$500 for the faithful observance of the order until

June 30, when the Court will hear the case on its merits. Frank Billings and fifty-six other residents of this section of the street, known as Millionaires' Row, brought the suit and lost in both the Common Pleas and Appellate Courts.

LOS ANGELES TRANSIT PROBLEMS

Definite plans for solution of the transportation problems in Los Angeles, Cal., are outlined in a report which has been drafted by F. D. Howell, chief engineer for the transportation division of the Public Utilities Board of that city. The report will come before the Utilities Board at an early meeting, and then go to the City Council to be adopted formally and officially as the policy of the city. In general, the report presents three special features that are demanding attention. The first is the rerouting of cars to relieve congestion in the business districts. The second is further improvement of the city's subways, and the third is the entire elimination of grade crossings. All these three subjects, the report says, are interdependent. On the subject of interurban traffic, the report suggests that the electric interurban lines should be required either to elevate or depress their tracks from the city limits, the method being according to the topography and condition of the territory traversed. These tracks should lead to an elevated terminal or a subway loop without terminal. The street railway problem, the report says, is made serious because of the obstructions caused by surface interurban cars and grade crossings that must be flagged. In the business district the plan is to try rerouting, and if this does not relieve congestion the report favors subways in the shopping district.

THE KANSAS FLOODS

The Metropolitan Street Railway, Kansas City, Mo., and most of the interurbans operating into that city, were discommoded by the recent heavy rainfall. There was almost a cloudburst on May 26. Turkey Creek overflowed and the Southwest boulevard district was flooded. The water lacked fully 10 ft. of reaching last September's altitude, but it came within 50 ft. of the Metropolitan Street Railway's car-house. The company moved its cars, and later moved its office equipment, desks and chairs in a mail car to a dead track on Eleventh Street, between Wyandotte and Broadway. From these temporary headquarters the division was conducted for three days. No damage was done to the car-house or the equipment of the company. Cars were run on both sides of the flooded part of the street and passengers were transferred by wagon.

The flooding of the rivers caused little or no damage to the interurbans, other than washing mud and debris on the tracks. The Leavenworth line lost two trips through this cause. The Bonner Springs line lost a full half day on May 26, and service was irregular until Monday morning. The most serious damage in connection with this line was to the new work on the extension toward Lawrence. The completion of the extensions will not be seriously delayed, however, as no tracks had yet been laid.

Along the Kansas City, Clay County & St. Joseph Railroad there was one stretch of about a mile through a deep cut that had several bad washes, with mud from 2 ft. to 3 ft. deep on the tracks. A new ditch digger just equipped for service by the company plunged into the mess, and by Monday morning the track was comparatively clear.

On the Excelsior Springs division of this line, about 1200 ft., the tracks run between banks 20 ft. high. Mud covered the tracks nearly throughout the cut to a depth of 4 ft., being constantly replenished as shoveled away, from the high banks. Finally J. R. Harrigan, general manager, ordered two nose plows to be hooked onto the front ends of express cars and made to shove mud. They cleared the track.

The Kansas City, Lawrence & Topeka Railroad was held up in Rosedale, where the Southwest boulevard was flooded. The Missouri & Kansas Interurban Railway had little trouble.

Chicago Home Rule Defeated.—The measure to give Chicago home rule and grant to all cities in the State with a population of more than 2000 the option of regulating their own utilities was defeated in the Illinois Legislature.

Omaha Valuation Requested.—The State Railway Commission of Nebraska has received a request from Omaha for

a physical valuation of the Omaha & Council Bluffs Street Railway for use in the Federal court in the suit to require the company to establish fares at the rate of seven for a quarter.

Pennsylvania Starting Postponed.—Owing to the fact that it was impossible to complete the electrification of the Pennsylvania Railroad's line between Philadelphia and Paoli in time, the inauguration of service by electricity, scheduled to take place on June 1, was postponed by the officials of the road for a few weeks.

Demands of Providence Employees.—The employees of the Rhode Island Company, Providence, R. I., who are organized as a division of the Amalgamated Association, have requested that the agreement with the company, which is about to expire, be modified so as to provide for an increase of approximately 20 per cent in wages, a closed shop and a minimum guaranteed day of seven hours.

Washington Valuations.—The State Tax Commission, of Washington as a basis for the levying of taxes this fall, to be collected next year, recently fixed the valuations of the street railway and interurban holdings in the State, as well as the steam lines, at \$395,107,312, an increase of \$3,738,705 over the valuations last year. The electric lines have a total actual valuation of \$49,066,455 against \$49,211,280 a year ago.

Demand Municipal Line Be Run for Profit.—An editorial on the municipal railway in San Francisco which appeared in the *San Francisco Chronicle* of May 30 was concluded as follows: "At any rate, now that we have a municipal system, it should be run on business principles, for a profit. The talk about running public services for the 'general welfare' is rot. It means compelling one set of people to pay part of the transportation expenses of another set of people."

Compromise of St. Louis Suit Suggested.—A resolution introduced by Alderman Wyrick authorizing the public utilities committee of the Council of St. Louis, Mo., to confer with officials of the United Railways in an effort to compromise the mill tax cases has been adopted by the Board of Aldermen by a vote of twenty-four to three. The mill tax cases have been pending in the courts about nine years, and the accumulated mill tax due to the city now amounts to about \$2,500,000.

Dallas Investigation.—The annual city budget of Dallas, Tex., contains an appropriation of \$10,000 to cover an investigation of public service corporations as pledged by the platform of the present administration. Commenting upon the order, Charles F. Wallace, directing head of the local Stone & Webster interests, said: "The plan which has been adopted by the commission is the only sound one. We welcome the investigation, feeling that it will have the effect of establishing closer and better relations between the community and ourselves."

The New Cleveland Subway Line.—O. C. Barber, head of the Cleveland, Akron & Canton Terminal Railway, addressed the City Council at Cleveland, Ohio, on June 1, and endeavored to have the members take a more liberal view of the plans that have been made for an electric freight subway under East Fifty-fifth Street than they have heretofore displayed. Councilman Bernstein endeavored to secure an estimate of the cost of the subway. Attorney W. W. White for the company replied that it would be impossible at this time to give him exact figures, but that the cost would be about \$15,000,000.

Appointments to the West Virginia Commission.—Elliott Northcott, Huntington; William M. O. Dawson, Charleston, and Judge E. F. Morgan, Fairmont, were appointed members of the Public Service Commission of West Virginia by Governor Hatfield on June 6. Mr. Dawson is a former Governor of the State and has held many state offices during his career. Mr. Northcott is a close personal and political friend of Mr. Dawson and held the post of minister to Venezuela under President Taft. Judge Morgan is well known in his section of the State, but has not been engaged in state-wide politics to the extent the other two members have.

Detroit Purchase Negotiations.—James Couzens, chairman of the Detroit board of street railway commissioners, announced in the newspapers that negotiations with the De-

troit (Mich.) United Railway for the purchase by the city of the company's property within the one-fare zone had reached the point where it was likely that submission of the proposition to the electors could take place in August or September. Mr. Couzens stated that there were a few matters to be ironed out by the attorneys, but that he expected the contract between the city and the company would be completed in time for submission to the stockholders of the company on June 16. The present plan of municipalization provides for the fixing of the purchase price by the circuit court of Wayne County.

Suggestions Regarding Municipal Ownership in Toronto.—Mayor Church of Toronto, Ont., on May 31 made public a letter of Corporation Counsel Geary in reference to the taking over by the city of the Mimico and the Scarborough radial lines of the Toronto & York Radial Railway within the city limits. It confirms the report that the company would apply for running rights over the lines purchased by the city. Mr. Geary said in part: "This application should be disposed of at once. There should be no discontinuance of the traffic on purchase by the city. I would suggest, therefore, that the city determine its policy with regard to the two sections of radial line as to through traffic and as to local traffic. As to the remuneration to be paid by the company for running rights, the commissioner of works should be asked to consider this question."

Pennsylvania Compensation and Other Measures Signed.—On June 7 Governor Brumbaugh of Pennsylvania signed the six bills, effective on Jan. 1, 1916, which provide a complete system of compensation and State insurance. Shortly before signing these bills the Governor approved the Senate bills bringing the 600,000 coal miners of the State under the compensation system. This disposes of all compensation legislation save the resolution for a constitutional amendment making acceptance of the compensation laws mandatory instead of elective on the part of employers. This resolution, which must pass the next Legislature before it can go to the people, is in the hands of the Secretary of the Commonwealth. On the same day the Governor also signed the bills changing the periods of reporting by corporations, and other bodies subject to State tax, except banks, savings institutions, title insurance, trust companies, building and loan associations and foreign insurance companies. Under the new laws these reports are to be made for the calendar year instead of a year ending early in November. Provision is also made for enforcement of reporting. The Governor also signed the act enabling the Public Service Commission to name examiners to take testimony anywhere in the State and thus save complainants the expense of coming to the State capital. It also allows appeals direct to the Superior Court, instead of first passing through the Dauphin County Court.

PROGRAMS OF ASSOCIATION MEETINGS

Illinois Electric Railway Association

The summer meeting of the Illinois Electric Railway Association will be held on June 25. Arrangements have been made for a trip from Chicago to Milwaukee on the *S. S. Christopher Columbus* of the Goodrich Lines, returning by way of the Chicago & Milwaukee Electric Railroad and the Northwestern Elevated Railroad. The steamer is scheduled to leave Chicago at 9:30 a. m. and arrive at Milwaukee at 2:30 p. m. Dinner will be served on the boat. The expense of the trip is \$1.75 for each person. This is to be a get-together meeting. Members are urged to bring their friends with them. The only formal business will be the presentation of the reports of the engineering committee on the questions submitted to the members at the March meeting.

New York Electric Railway Association

As previously announced in the *ELECTRIC RAILWAY JOURNAL* the thirty-third annual meeting of the New York Electric Railway Association will be held at the Oriental Hotel, Manhattan Beach, N. Y., on Tuesday and Wednesday, June 29 and 30. The annual banquet is scheduled for eight o'clock on Tuesday evening, June 29, at which time several distinguished speakers will deliver addresses.

There will be business sessions, morning and afternoon, Tuesday, June 29, and a morning session on Wednesday,

June 30. The subjects of the papers to be presented for general discussion are as follows:

"The Proper Type of Car for City and Suburban Service."

"What Can We Give for a Nickel?"

"The Protection of Interurban Railway Highway Crossings."

"Jitney-Bus Competition."

In addition to the above-named subjects the following general questions will also be introduced for discussion:

1. What success have you had in arc-welding manganese and other special work repairs?

2. To what extent do you use hardened steel pins and bushings in brake rigging?

3. How often do you change your "Safety First" posters and other announcements to keep alive the interest of public and employees?

4. What is your experience as to the relative merits and fields of different classes of railway special work? Do you base your opinion on the number of wheels which pass over the work, the angularity of the crossing, the character of the foundation, etc.?

5. Is there any way of testing the contactor coils on type M control without tearing them down?

6. What is your experience with fittings for concrete poles?

7. What, in your experience, is the limiting car speed for which overhead contact signal systems are reliable?

Applications for hotel accommodations should be made to Joseph P. Greaves, manager, Oriental Hotel.

Pacific Claim Agents' Association

The seventh annual convention of the Pacific Claim Agents' Association will be held at San Francisco, Cal., on June 24, 25 and 26. Discussion of the following subjects will be presented in the form of papers, the name given in connection with each being that of the person to whom President A. M. Lee has assigned the same:

Collisions—

"The Prevention of Automobile Accidents," by S. A. Bishop, general claim agent of the Pacific Electric Railway.

"Investigating and Handling of Automobile Accidents," by J. S. Mills, assistant superintendent of the Key Route, Oakland, Cal., and H. H. Benton, district claim agent of the Northern Pacific, Seattle.

"Investigating and Handling of Collisions with Pedestrians and with Vehicles Other Than Automobiles," by Thomas G. Aston, claim agent of the Washington Water Power Company, Spokane, Wash., and W. H. Moore, claim agent of the San Diego (Cal.) Electric Railway.

Medical Department—How Organized and Managed to Be Most Effective:

To the Employees, by H. K. Relf, general claim agent of the Spokane, Portland & Seattle Railway, Portland, Ore.

To the Claim Department, by George Carson, general claim agent of the Puget Sound Traction, Light & Power Company, Seattle, Wash., and J. H. Handlon, claim agent of the United Railroads, San Francisco, Cal.

In Litigated Cases, by A. J. Falknor, trial attorney of the Puget Sound Traction, Light & Power Company, Seattle, Wash., and F. J. Lonergan, trial attorney of the Portland Railway, Light & Power Company.

Employment Bureau—

"How to Make It Most Effective," by H. G. Winsor, claim agent of the Tacoma Railway & Power Company.

"To What Extent and How Should the Claim Department Be Consulted?" by Mrs. Ida P. Newell, assistant claim agent of the Portland Railway, Light & Power Company.

"The Investigator and His Work," by C. F. Young, adjuster of the Puget Sound Traction, Light & Power Company.

"The Adjuster and His Work," by W. F. Every, general claim agent of the Northern Pacific Railway, St. Paul, and Thomas A. Cole, of the Los Angeles (Cal.) Railway.

Safety Committee Program—

"Mandatory Rules and Their Results in Accident Prevention," by F. M. Metcalfe, superintendent of efficiency of the Northern Pacific Railway, St. Paul, Minn.

"Organization of Public Safety Committees and Their Cooperation with Transportation Companies," by B. F. Boynton, claim agent of the Portland Railway, Light & Power Company.

Details of the entertainments remain to be arranged.

Financial and Corporate

ANNUAL REPORT

International Traction Company

The comparative statement of income, profit and loss of the International Traction Company System, Buffalo, N. Y., for the years ended Dec. 31, 1913 and 1914, may be shown as follows:

Earnings:	1914	1913
Gross passenger earnings.....	\$6,492,212	\$6,404,101
Receipts from other sources.....	268,368	290,341
Total	\$6,760,580	\$6,694,442
Expenses:		
Operating expenses	\$3,601,800	\$3,698,059
Taxes	423,632	392,613
Total	\$4,025,432	\$4,090,672
Net earnings from operation.....	\$2,735,148	\$2,603,770
Fixed charges:		
Interest	\$1,645,401	\$1,572,737
Rentals	45,379	32,185
Sinking fund and amortization of debt discount and expense.....	132,601	129,803
Total	\$1,823,381	\$1,734,725
Balance for renewals, replacements and dividends	\$ 911,767	\$ 869,045
Renewals and replacements reserve....	359,244	204,000
Surplus	\$ 552,523	\$ 665,045

The gross earnings of the system for 1914 were \$6,760,580, an increase of \$66,137 over the previous year, or approximately 1 per cent. The small increase in gross earnings was due to the business depression during the year. The actual operating expenses and taxes for 1914 were \$4,025,432, or \$65,240 less than the previous year. The actual maintenance expenses were \$103,347 less than the previous year, while the balance of the operating expenses increased \$7,088, making a net saving in operating expenses of \$96,259.

The taxes for 1914 exceeded 1913 by \$31,019, which was due to an increase in tax rates of the various municipalities, the assessments being maintained about the same as for 1913. The fixed charges for 1914 were \$1,823,380, or an increase of \$88,656 over the previous year. This was caused by the interest accrued on additional bonds and mortgages issued for improvements and acquisition of additional property and also by an increase of rental and amortization charges.

The balance remaining for renewals, replacements and dividends was \$42,722 more than in 1913. The renewals and replacements reserve shows an increase of \$155,244, which was due to the above-mentioned reduction in the actual maintenance expenditures, plus an additional allowance in respect to maintenance and depreciation amounting to \$51,897.

MR. HEULINGS ON TRADE CONDITIONS

W. H. Heulings, Jr., vice-president J. G. Brill Company, Philadelphia, testified before the Federal Trade Commission in New York on June 3, in regard to the desirability of legalizing combinations among American business men on foreign trade matters. Mr. Heulings said that the Brill company competes with all American builders and with those of France, England and Germany. The foreign business of the company has been increasing regularly and now comprises about one-third of its total. As a rule, when domestic business is poor, foreign business is better. The company feels the need of an adequate merchant marine so that it may have good shipping facilities to foreign ports for its products.

Mr. Heulings said he had a very keen desire to see something done that will promote a merchant marine and thinks that a subsidy or some other similar means should be adopted. He does not feel that his company needs cooperation in order to secure foreign business, but it would be a decided advantage. Being directly at the seaboard, it is situated more conveniently for shipping facilities than other concerns located in inland states. The company has a few agencies in foreign countries, but most of its business is done directly by its personal representatives. Mr.

Heulings said that in most cases when the company sells cars to foreign buyers, it receives payment in New York. It is not difficult for a foreign corporation of good standing to get credit in New York. The company has not had to extend credit in order to get business. Where it had long standing business relations with buyers, as in the case of the companies directed by the late F. S. Pearson, it had given credit.

In answer to an inquiry from one of the commissioners, Mr. Heulings said that if export combinations should be made legal there would be no difficulty about keeping foreign business separate from domestic trade. It had been his experience that in new foreign enterprises where German capital was used German apparatus was almost always bought. It is not so likely to be the case, if British or French capital is employed, that British or French apparatus is used.

Mr. Heulings thought that many companies in various and diversified lines of business in this country would profit greatly by combinations which would enable them to meet foreign competition on equal ground. The establishment of branch banks in South America is a decided forward step in the interest of manufacturers of this country.

SAN FRANCISCO-OAKLAND STATUS

Board of Directors Issues Statement Showing Why Fundamental Readjustment Is Desirable

The board of directors of the San Francisco-Oakland Terminal Railways, Oakland, Cal., has issued to security holders a general statement of financial conditions, setting forth various reasons why a fundamental readjustment of the present organization is essential. The outstanding obligations on which interest must be paid, sinking funds maintained and payment of principal provided for amount to \$20,724,000, upon which the annual interest totals \$1,133,646. The sinking fund requirements are becoming especially burdensome. In 1910 they amounted to only \$30,150, but by 1917 they will reach \$723,125. Other demands have been such that the company has been unable to meet the instalments of its various bond sinking funds maturing since Jan. 1, 1914. These payments are, therefore, now in default, and there is no prospect that this default can be made up out of earnings or that the heavy requirements of future years can be provided therefrom.

The road has suffered a decrease of approximately \$125,000 in earnings from the middle of last December to the present time on account of jitney-bus competition. The present management has effected economies in practically all departments of operating expense, except labor and taxes. By reason, however, of the loss from jitney-bus competition and the general business depression during the last half of 1914, gross and net earnings for the current fiscal year show a considerable decline as compared with the three preceding years. The net income will not be sufficient to pay interest charges and sinking fund requirements, disregarding entirely requirements for necessary capital expenditures.

In spite of the fact that the assets of the company exceed its outstanding debt by a considerable margin, it is stated that the values existing in the company's securities can be protected only by the correction of all of the following conditions:

(1) It is impossible for the company to make the sinking fund payments required by the several deeds of trust. These deeds of trust provide no method for modifying the requirements and relief can therefore be obtained only by the unanimous consent of the bondholders of all issues, or the issuance of new bonds to take the place of those now outstanding.

(2) It is absolutely essential for this corporation, as it is for every public utility, to be able to raise capital for necessary betterments and extensions. This is impossible under the present financial structure of the company. Its bond issues are so numerous and so involved and its existing defaults so serious that it is not able to sell new bonds, nor is it able otherwise to borrow money, except by way of accommodation and under the most urgent circumstances.

(3) The company is obligated to pay \$3,600,000 of notes,

which are now approximately two years overdue. Irrespective of any indulgence which may be offered by the note-holders it is imperative, from the company's standpoint, that these obligations be paid in order to save the securities which are pledged to secure the same, and re-establish the credit of the company.

(4) The \$1,121,000 of bonds of the Oakland Transit first mortgage issue will mature on July 7, 1918, and their payment must therefore shortly be provided for.

(5) The present financial condition of the company greatly hampers the economical operation of its property.

For the above it is concluded that "such a fundamental readjustment of the financial structure of the company as will put it on a permanently sound basis would appear to be to the interest of all security holders."

Barcelona Traction, Light & Power Company, Barcelona, Spain.—The Barcelona Traction, Light & Power Company is offering at 96 £900,000 of prior lien bonds, series A, of which one-half will be placed privately in the United Kingdom and the other half elsewhere. These bonds are part of an authorized issue of £2,000,000, to be used for completing the works and funding the interest on bonds as well as on various advances.

Camaguey (Cuba) Company, Ltd.—The stockholders of the Camaguey Company, Ltd., are to vote on June 22 in regard to an offer from the Electric Bond & Share Company to purchase the property for \$500,000, subject to outstanding bonds. The Cuban company has \$1,000,000 of capital stock and \$570,173 of first mortgage 5 per cent bonds.

Charleston (W. Va.) Interurban Railroad.—Robert Garrett & Sons and the Fidelity Trust Company, Baltimore, are placing at 99½ and interest \$450,000 of three-year 6 per cent collateral trust gold notes of the Charleston Interurban Railroad, dated May 1, 1915. The authorized issue is \$750,000. The notes are being issued to retire the floating debt contracted in building the interurban line to St. Albans and to construct a 24-mile extension to Montgomery.

Chicago & Milwaukee Electric Railroad, Highwood, Ill.—The reorganization committee of the Chicago & Milwaukee Electric Railroad is now said to be at work on plans to take the company out of the receivership which has existed since January, 1908. The plans are contingent on the raising of \$5,000,000 in cash to clear up all obligations of the company. This sum would be used as follows: To clear up underlying first mortgage bonds, \$1,080,000; to retire receivers' certificates, \$1,200,000; for other liens, \$500,000; for new construction and rehabilitation, \$1,500,000, and for reorganization and miscellaneous, \$720,000. It is reported that the committee is now negotiating with Chicago and New York bankers for the sale of first mortgage 5 per cent bonds of the new company to raise this cash.

Columbus, Delaware & Marion Railway, Cincinnati, Ohio.—Representatives of the consolidated bondholders of the Columbus, Delaware & Marion Railway have objected to the application of the receiver of the company to issue \$150,000 of receivers' certificates to pay \$55,000 of back obligations of the receiver, \$13,500 of back salary and \$40,000 of bond interest, due Aug. 1. It is declared that the road should be permitted to default the August interest and thus clear the way for a foreclosure and reorganization. Other bondholders have asked the court to authorize the payment of the interest. Previous reference to this situation was made in the *ELECTRIC RAILWAY JOURNAL* of May 1.

Fresno (Cal.) Interurban Railway.—The California Railroad Commission has authorized the Fresno Interurban Railway to issue 250 shares of capital stock and \$70,000 of first mortgage bonds. The order provides that the company may sell the stock at not less than 80 and its bonds at not less than 90. The company proposes to construct extensions and purchase new equipment with the proceeds. The application for these issues was noted in the *ELECTRIC RAILWAY JOURNAL* of May 15.

Interborough Consolidated Corporation, New York, N. Y.—The directors of the Interborough Consolidated Corporation, the company formed by the consolidation of the Interborough-Metropolitan Company and the Finance &

Holding Corporation, as noted in the *ELECTRIC RAILWAY JOURNAL* of June 5, are the same as those of the Interborough-Metropolitan Company with the exception of George W. Young, who has been succeeded by F. P. Frazier. The new directors have organized by electing the same officers as those of the Interborough-Metropolitan Company. August Belmont is chairman of the board of the new company, T. P. Shonts, president, H. M. Fisher, secretary, and J. H. Campbell, treasurer. It is expected that the directors will meet shortly to complete organization details, and it is considered likely that an initial dividend will then be declared upon the preferred stock. The new stock certificates are now being engraved. As soon as they are ready, the company will announce the details of exchange to the old certificate holders.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine.—E. W. Clark & Company, Philadelphia, and Ludwell L. Howison, Portland, have sold at 97¼ and interest \$614,000 of three-year 5 per cent second gold coupon notes, series C, of the Lewiston, Augusta & Waterville Street Railway. The authorized issue is \$750,000, the remainder of the notes being reserved for future use. The present issue was used to refund \$500,000 of 5 per cent two-year notes due on June 1 and for other purposes. The new notes are guaranteed by the Cumberland County Power & Light Company and are secured by a deposit of \$853,000 of first and refunding mortgage 5 per cent bonds of the railway.

Manchester Traction, Light & Power Company, Manchester, N. Y.—The New Hampshire Public Service Commission has authorized the Manchester Traction, Light & Power Company to issue \$1,000,000 of three-year 5 per cent notes at not less than 95. The proceeds of the notes will be used to retire floating indebtedness and to provide for new construction to plant. Tucker, Anthony & Company, Boston, have already sold the issue at 97½.

New York (N. Y.) Railways.—Frank L. Hall, Charles P. Howland and George B. Leighton have been asked by holders of New York Railways adjustment mortgage 5 per cent income bonds, owning and representing more than \$6,000,000 thereof, to consider the advisability of continuing the litigation against the company for the unpaid interest on such bonds. In a circular to bondholders the committee says that it is of the opinion that the litigation should be vigorously pressed and a judicial decision obtained as to the manner of determining income applicable to bond interest which will insure future payment of the full 5 per cent. The amount of unpaid interest involved in the litigation to date is said to be upwards of \$1,500,000. The committee states that its preliminary investigation of condition of the New York Railways should be reassuring to holders of adjustment bonds, for the company is in a strong financial condition with large cash reserves.

Northern Ohio Traction & Light Company, Akron, Ohio.—Hayden, Miller & Company, Cleveland, have purchased a new issue of \$500,000 one to five-year 6 per cent collateral trust notes of the Northern Ohio Traction & Light Company, subject to the approval of the Ohio Public Utilities Commission. They will be offered shortly at par and interest according to plans generally understood now. The collateral underlying the issue includes that deposited under a former issue, which has been greatly reduced by maturity. This issue of notes will cover fairly well the floating debt of the company.

People's Railway, Wilmington, Del.—The price paid for the purchase of the People's Railway by the Wilmington & Philadelphia Traction Company, as announced in the *ELECTRIC RAILWAY JOURNAL* of June 5, has not been made public, but the consideration is said to have been a substantial block of the latter company's stock. T. W. Wilson, vice-president and general manager of the purchasing line, says: "As soon as the proper consents can be obtained from the public authorities for the necessary track connections between the two systems, important changes will be made in the routing and headway of the various lines, and transfers, under proper regulation, will be given between the lines of the People's Railway and the lines of the Wilmington City Railway to persons paying the full fare. The conductors and motormen of the People's Railway will also be materially benefited, for

the Wilmington & Philadelphia Traction Company schedule of carmen's wages will be in force on both systems. This will mean an increase of about 3 or 4 cents per hour for the People's Railway carmen." The general offices of the People's Railway will be transferred from Wilmington to the offices of the Wilmington & Philadelphia Traction Company at 603 Market Street, Philadelphia.

Philadelphia Company, Pittsburgh, Pa.—The Philadelphia Company has sold through a syndicate headed by Ladenburg, Thalman & Company \$2,000,000 of one-year 5 per cent notes, due on May 15, 1916, the proceeds of which are to be used for general corporate purposes. S. D. Carson has been elected a director to succeed M. H. Furland, resigned.

Trenton, Lakewood & Seacoast Railroad, Trenton, N. J.—The Board of Public Utility Commissioners of New Jersey has authorized the Trenton, Lakewood & Seacoast Railroad to issue \$190,000 of bonds to be sold at 80, upon condition that stock to the amount of \$85,000 be subscribed and paid for at par. These amounts were deemed by the commission adequate to cover the acquisition of land not included in contracts for rights-of-way heretofore capitalized. The total application was for \$200,000 of stock and \$320,000 of bonds. Decision was reserved as to the balance.

United Light & Railways Company, Grand Rapids, Mich.—The United Light & Railways Company has sent out notices to its second preferred stockholders advising them that they are entitled to exchange their present holdings of second preferred 3 per cent cumulative stock for either first preferred 6 per cent cumulative stock or common stock of the company, par for par. This privilege takes effect on June 15, and extends for sixty days.

Dividends Declared

Boston & Worcester Electric Companies, Boston, Mass., \$1, preferred.

Brazilian Traction, Light & Power Company, Toronto, Ont., quarterly, 1½ per cent, preferred.

Eastern Power & Light Corporation, New York, N. Y., quarterly, 1½ per cent, preferred.

Indianapolis (Ind.) Street Railway, 3 per cent.

Tri-City Railway & Light Company, Davenport, Ia., quarterly, 1½ per cent, preferred.

United Light & Railways Company, Grand Rapids, Mich., quarterly, 1½ per cent, first preferred; quarterly, three-fourths of 1 per cent, second preferred.

Virginia Railway & Power Company, Richmond, Va., 3 per cent, preferred.

West End Street Railway, Boston, Mass., quarterly, \$2, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

		BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE				
Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '15		\$60,618	*\$31,101	\$29,517	\$17,620	\$11,987
1 " " '14		56,594	*25,931	30,663	17,541	13,122
12 " " '15		787,177	*378,258	408,919	209,792	199,127
12 " " '14		775,456	*352,822	422,634	208,192	214,442

		CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.				
Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '15		\$87,745	*\$58,533	\$29,212	\$29,291	†\$79
1 " " '14		90,429	*57,600	32,829	27,597	5,232
12 " " '15		1,049,582	*705,016	344,566	346,193	†1,627
12 " " '14		1,200,748	*717,501	483,247	311,573	171,674

		CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY, CLEVELAND, OHIO				
Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '15		\$96,217	*\$68,087	\$28,130	\$27,590	†\$780
1 " " '14		99,627	*65,412	34,215	27,339	6,875
4 " " '15		369,082	*258,101	110,981	109,821	†1,400
4 " " '14		373,925	*258,639	115,286	108,989	6,297

		COLUMBUS RAILWAY, POWER & LIGHT COMPANY, COLUMBUS, OHIO				
Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '15		\$247,363	*\$151,840	\$95,523	\$39,211	\$56,312
1 " " '14		248,748	*154,085	94,663	41,200	53,463
12 " " '15		3,074,166	*1,861,754	1,212,412	473,827	738,585
12 " " '14		3,040,893	*1,961,849	1,079,044	487,239	591,805

		COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY, GRAND RAPIDS, MICH.				
Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Apr., '15		\$1,093,746	*\$585,894	\$507,852	\$359,203	\$148,649
1 " " '14		1,108,399	*588,555	519,844	343,170	176,674
12 " " '15		14,016,905	*7,521,252	6,495,653	4,277,796	2,217,857
12 " " '14		13,882,485	*7,712,405	6,170,080	3,966,730	2,203,350

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

THE JITNEY BUS

Regulatory Ordinances Passed in Schenectady, Peoria, Des Moines and Portland, Ore. Action on Pennsylvania State Measures

Under the provisions of the amendment to the transportation corporation law the city of Schenectady has passed an ordinance to regulate the jitney. No person is to engage in the business of carrying passengers for hire in automobiles at a rate of fare of 15 cents or less for each passenger except as provided in the ordinance. Persons who desire to obtain licenses must deliver to the commissioner of public safety an application containing full information about their car or cars and file a map showing a route at least 3 miles in extent for the round trip, and a schedule which must be continuous for at least sixteen hours per day for at least six days a week. Together with such application there must be delivered to the commissioner a bond in the penal sum of as many times \$1,000 as the number of passengers each car is designer to carry, exclusive of the driver. In no event is the sum to be less than \$5,000. The commissioner of public safety is empowered to direct that the automobiles be presented at a place designated by him for inspection. If the commissioner is satisfied that the automobile is in safe condition, and that the route proposed is not supplied with adequate transportation facilities, and that the schedule and bond are satisfactory, the commissioner is authorized to issue a license authorizing the carrying of passengers for hire in the automobile designated in the application. In lieu of the bond the commissioner may accept a policy of insurance issued by a corporation satisfactory to the commissioner and binding such corporations in the same manner as prescribed for the direct bond from the owner. There must be paid to the commissioner of public safety for every public automobile license issued under the ordinance, a license fee equal to as many times \$5 as the number of passengers, exclusive of the driver. In no case, however, is this fee to be less than \$25. It is made unlawful for anyone to transport passengers for hire in Schenectady except over the routes set forth in the application pursuant to which the public automobile license was issued. The ordinance does not apply to or govern any automobile let for hire from a livery stable or garage. Any license under the ordinance may be revoked or suspended for failure to operate the automobile in accordance with the schedule set forth in the application. Conviction for violation of any of the provisions of the ordinance is punishable by a fine of not exceeding \$150 or imprisonment for one day for each dollar of such fine as is not paid. The measure goes into effect immediately.

Assistant Corporation Counsel Benjamin B. Cunningham, of Rochester, N. Y., has drafted an opinion on the legality of the jitney in Rochester, in which he holds that the licenses which have been issued by the city give the jitneys the legal right to operate there until Jan. 1. He bases his opinion on the alleged failure of the Thompson bill to provide any retroactive clause. He says that there is nothing in the Thompson statute to indicate that it has a retroactive effect or is intended to invalidate acts done under laws in existence previous to its enactment. No doubt is expressed by Mr. Cunningham that the licenses granted by the city are revocable, but he holds that while they are in force they give the holder the right to operate in the streets.

Governor Brumbaugh of Pennsylvania has vetoed the bill to permit electric railways to operate motor buses in opposition to jitneys. He said: "This bill destroys competition. It makes for monopoly. The jitney service is too young and too uncertain to warrant such legislative treatment. Better allow each community to work out this new problem in its own way until experience shows the way to state-wide regulation." The Governor has, however, signed the so-called Patten jitney measure. The bill says: "Each city may regulate the transportation by motor vehicles (not operated on tracks) of passengers or property for pay within the limits of the city or from points in the city to points beyond the limits of the city. In such regulation the city may impose reasonable license fees, make regulations for the operation of vehicles, the rates to be charged for transportation, and

may designate certain streets upon which such vehicles, if operated, must be operated."

The first real test of the legal standing of the jitney in Pennsylvania has begun before the Public Service Commission, which heard the application of the Jitney Service Company to carry passengers and freight in and about Williamsport. The company desires a charter, and it was opposed by the Williamsport Passenger Railway, the Vallamont Traction Company, the South Side Passenger Railway and the East Side Passenger Railway. N. M. Edwards, representing the jitney company, said about a thousand persons petitioned for the service. C. LaRue Munson, representing the traction companies, declared there is authority of law which provides for the incorporation of a company to operate motor-driven vehicles. A question to be determined, he pointed out, was whether the jitneys have the right to become rivals of long-established public service companies when they fail to set forth in their application every street and alley which they intend to traverse. He contended that the service furnished by the traction companies was adequate, and that the petitioners for the charter failed to disclose wherein the rights of the protestants were to be protected. Commissioner Pennypacker asked one witness whether, if the railway companies should be forced to surrender their charters because of lack of business brought about through competition, the people of Williamsport would be satisfied with a jitney service alone. The witness said he thought they would. The hearing is continued.

Announcement was made on June 2 that more than 100 jitneys had been registered with the Public Service Commission of Maryland. At the same time the plans for their regulations made by Chief Engineer Charles E. Phelps, were given out. These plans have not been acted upon, but will be considered later by the commission. Mr. Phelps' plan calls for the registration of all such public buses in the city and provides that the owner or operator of each be furnished with an identification card, which will contain comprehensive information about the machine, its owner, the number of passengers it may be permitted to carry, its route and schedule of operation. This card is to be presented for inspection on demand, and failure to produce it is to subject the owner of the bus to a penalty. If, in the opinion of the commission, any public bus fails to render satisfactory service or its service is inadequate, unsafe or improper its operation is to be prohibited. Provisions of the commission as to accidents that apply to electric railways are to apply to the buses.

Three sections of the Fort Worth, Tex., jitney ordinance have been amended. The most important change is in the insurance clause. This now requires jitney operators to furnish a bond of \$2,500. The amendment decreases the amount of insurance but substitutes an insurance which is more expensive and highly effective. The jitney owners formerly paid \$70 for insurance. It is estimated that the new bond will cost about \$150. It will be made payable to the Mayor and will be conditioned so that in any action brought for damages the principal in the bond and the surety may be joined in the same action. The insurance amending clause also authorizes personal securities. The city commission will pass upon the bonds before a license is granted. Another amendment brings the "donation" jitney under the law. The police arrested about fifty operators of donation cars and the cases have been held in the police court awaiting the action of the city commission on the amendments. The third amendment makes it unlawful to operate a jitney without having first executed the bond as provided under the amended ordinance. The amendments become effective on June 16. Attorneys for the jitney men have announced that they will apply to the Federal Court for an injunction to restrain the city officials from enforcing the new law. They will contend that the amended ordinance is unconstitutional; that the city has no right to revoke existing contracts entered into when licenses for one year were issued under the old ordinance, and that the city has no right to require individuals to insure against damages that are likely to arise.

The Dallas Transit Association was granted a temporary injunction by the Sixty-eighth District Court at Dallas, Tex., restraining the jitney ordinance which was to have become effective May 25, until a hearing could be had with a view to making the injunction permanent. Following the temporary

injunction several conferences were held between the jitney men and the city officials in an effort to settle the matter out of court by compromise. No agreement was reached and the case proceeded in Judge Whitehurst's court after he had invited Judge Foree of the Fourteenth District Court and Judge Muse of the Forty-eighth District Court to sit en banc at the hearing. The jitney attorneys contended that the ordinance was unreasonable because it was class legislation and that the license fee was exorbitant. The judges ordered the injunction dissolved and the jitney attorneys immediately gave notice of an appeal. The city attorney then announced that if the attorneys for the jitney men would at once perfect their appeal so the case may be advanced on the docket of the Fifth Court of Civil Appeals to be tried during this term of court, he would ask the City Commission to withhold the enforcement of the ordinance until that time. The jitney men intimated that the case would be prepared within a few days, which means that it would go to trial within the next four weeks as the term of that court then ends. It is understood that the case will come up June 12 and a decision will be reached by July 15, but if no decision is reached by that time the ordinance will be enforced. About 25 per cent of the jitneys dropped out after the decision of the District Court, but a number reinstated service after it was established that the ordinance was not to be enforced immediately.

An ordinance regulating the jitney was carried in Portland, Ore., on June 7 by a big majority. The measure was passed by the City Council last month and was then referred to the people at regular city election. The new measure contains all of the essentials of the measure passed on April 2, and referred to in the *ELECTRIC RAILWAY JOURNAL* of April 17, page 774. According to an investigation completed on June 1 by Municipal Traffic Engineer Kirkpatrick of Portland, there were more jitneys in Portland than at any previous time. On March 1 there were 350 jitneys in operation, while during the last week of May there were 445. The large buses had been reduced in number from twenty-one on March 1 to fifteen on May 31. The report states that in a twelve-hour day, 875 jitneys crossed the bridges spanning the Willamette River, and operated on the two principal west side routes. In summing up his report Mr. Kirkpatrick says that the jitneys operate on an average of 6.3 hours a day. Of the 445 in the city, only 115 are in service after 10 p. m. Eighty-five of the cars carry "For Hire" signs.

With a total of forty-six damage claims against jitneys during the last two weeks, the Pacific Coast Casualty Company has served notice on many bonded drivers in Seattle of the revocation of their bonds because of reckless driving and disregard of traffic regulations. The claims filed range from \$30 to \$600.

At the recent meeting of the sub-committee of the City Council of Richmond, Va., in charge of the proposed jitney ordinance, Attorney E. Randolph Williams, for the Virginia Railway & Power Company, said that the city is now confronted with the question of whether it is willing to sacrifice a universal service to all parts of the city and suburbs to foster a limited service, performed in a limited way, in a limited section of the city, from which comparatively few of the city's inhabitants derive benefit. Mr. Williams called attention to the failure of the ordinance to require an indemnity bond or some form of liability insurance to protect the jitney passengers or the pedestrian against injuries resulting from the negligence of the jitney driver or owner. Aside from the unjustifiable hazard which would be imposed upon the public, to relieve jitneys from this obligation would subject the street railway to unfair competition, since the jitney would be allowed to engage in the business of carrying passengers without being compelled to shoulder the risk inherent in the transaction of such business, a risk which the railway at all times assumes.

Judge Samuel B. Kirby, in joint session at Louisville, Ky., held recently that the city of Louisville is wholly within its rights in requiring a bond from operators of jitney buses "even, if necessary, to the extent of \$5,000." Judge Kirby granted the plaintiffs a temporary injunction, overruled the city's demurrer to the petition, and held that the jitney operators may run their cars until the litigation is terminated, "the plaintiff to execute bond in the sum of \$500." Judge Kirby said that while it may seem that a bond in a sum less than \$5,000 "would accomplish the purpose, the court is not authorized to substitute its views for the wisdom

and experience of the General Council acting within the scope of its authority."

Judge Charlton in the Superior Court at Savannah, Ga., has granted a temporary injunction restraining the Mayor and Alderman of Savannah from enforcing the jitney ordinance passed in that city. The injunction was granted on the ground that some provisions of the ordinance are "beyond reason and prohibitory."

It is reported that 100 jitneys ceased operating in New Orleans on June 1 when the ordinance passed recently by the Commission Council of that city to regulate the jitneys went into effect. The ordinance requires a \$5,000 liability bond.

Reference has been made previously in the *ELECTRIC RAILWAY JOURNAL* to the ordinance passed in Little Rock, Ark., imposing a bond of \$2,000 for each jitney operated in that city. When the city attempted to put the ordinance into effect, the operators of the jitneys applied to the Chancery Court for a temporary restraining order, which was granted. The case was tried on its merits on May 26 and the chancellor dissolved the injunction and gave the jitney and the motor bus operators twenty days in which to file their bonds with the city and comply with all the terms of the ordinance, or appeal to the Supreme Court. The twenty days will expire on June 15. From present indications it seems likely that the jitney operators will not carry their case to the Supreme Court, but that they will abide by the terms of the ordinance.

On June 8 the Georgia Railroad Commission rendered a decision taking full supervision over jitney buses in Georgia. Tentative rules for the operation of the jitney have been prepared by the commission and copies of them will be mailed to jitney operators, who will have an opportunity on July 13 to be heard in regard to the rules. The number of jitneys in Atlanta has been decreasing of late, except for sporadic increases on Saturday afternoons and fair Sundays. The maximum number of 105 in operation at any one time was reached about May 4. Of that number only thirty-five remained among fifty-five found in operation about May 24. Of the original jitney bus operators of last February apparently not one remains. The Atlanta Jitney Bus Company, which sought to organize on a permanent basis and exclusively among jitney bus interests in Atlanta and gave promise of dependable service, has found free-lance competition in its own field too much for it and went out of business on June 1.

The jitney was considered by the Board of Police Commissioners of Toronto on May 27 and a draft of the regulations which will be embodied in the jitney by-laws were discussed and passed by the board. No jitney will be allowed to carry passengers in excess of its seating capacity. Each person taking out a jitney license will be required to give a bond of \$1,000. In addition a monthly license fee of \$1 will be imposed. These regulations will come into effect as soon as the by-law is passed by the Council. The board decided to ask the Council to establish jitney stands at the terminals of all routes. Early action by the Council is requested.

An ordinance has been introduced into the City Council of Peoria, Ill., requiring that the jitney drivers of that city file liability bonds in the amount of \$5,000 each. The owners of the jitneys must also specify the exact terminals of their routes, a regular schedule must be maintained and the men must not work more than ten hours a day. The name, age, residence and State number of all jitney drivers must be filed with the city clerk. Stops for passengers must be made not less than 50 ft. nor more than 80 ft. from a "near" crossing. Each car must bear the name of the owner, the route traveled, the terminals, etc., and the interior must be illuminated at night. Penalties of from \$25 to \$200 for failure to comply with this ordinance are imposed.

The City Council of Des Moines, Ia., has passed an ordinance to regulate the jitney under the law passed by the State Legislature. Most important of the provisions of the measure are those requiring an indemnity bond of each driver and that jitneys shall follow designated routes. It will become effective within ten days upon publication. License fees higher than at present are required. Some important provisions of the ordinance are in brief as follows: A fine of not more than \$100 or imprisonment for not to exceed thirty days is the penalty for violation. Applicants for jitney licenses must file schedule showing time of depart-

ure from stated and fixed terminals, the size of the car, its horsepower, etc. Applications are to be referred by the commissioner of public safety to the Council, which may deny an application providing it appears that the driver is inexperienced or that the territory in which he desires to operate is already supplied with ample facilities for transportation. For a car with a capacity of five or less the license per annum is \$15; for more than five and less than eight, \$20; more than seven and less than sixteen, \$25; more than fifteen and less than thirty, \$30; thirty and more, \$55. Buses must be brought to full stop before crossing street railways, interurban, or steam railroad tracks. No more passengers may be carried than the actual seating capacity.

About 130 jitney licenses have been issued to date in Des Moines. Not all of these are now in use, however. The new ordinance provides that licenses now in force may be surrendered and a part of the license fee returned if application is made within fifteen days. The popularity of the jitney bus in Des Moines has been on the wane for several weeks, and the new ordinance may mean the end of all except the larger cars of which several already are operating as provided by the ordinance.

THE JITNEY IN ILLINOIS

Text of Order of Illinois Commission Restraining Jitney in Jacksonville

On June 3 the State Public Utilities Commission of Illinois issued a formal order in connection with the case of the Jacksonville Railway and W. B. Miser vs. L. F. O'Donnell, doing business as the Motor Transportation Company. The hearing before the commission on June 2 and the opinion expressed by Commissioner Owen P. Thompson were reported in the *ELECTRIC RAILWAY JOURNAL* of June 5, page 1093. The order entered by the commission follows:

"This cause came on to be heard upon the complaint filed by the Jacksonville Railway, in which W. B. Miser afterwards joined, and upon the answer of the defendant, L. F. O'Donnell, to said complaint, the complainants appearing upon the hearing by Messrs. Green and Palmer, their attorneys, and the defendant appearing by T. J. Condon, Esq., his attorney.

"It appears from the evidence that the defendant, L. F. O'Donnell, is the owner of a number of automobiles, which since about March 28, 1915, he has used for the transportation of persons for hire from and to points within the city of Jacksonville in this State, and that under the name of the Motor Transportation Company he has been furnishing what is commonly known as a jitney bus service.

"It further appears that the respondent has advertised in various newspapers and through printed circulars that he is engaged in the business of transporting passengers by motor buses over and along certain designated streets in Jacksonville and in such advertising has specified the routes to be taken by his motor buses, the rates of fare to be charged and a time schedule, and that the respondent has held himself out to the public as a common carrier for hire and offered to transport all persons desiring to ride along the routes taken by his said motor buses.

"From the evidence in this case, the commission finds that the respondent owns, controls, operates and manages within this State for public use, a number of automobiles which he is using for the transportation of persons for hire between points within this State, and that in the conduct of such business the respondent is a common carrier of persons and is a public utility within the meaning of the act entitled 'An Act to Provide for the Regulation of Public Utilities,' approved on June 30, 1913, and that as such public utility the respondent is subject to the provisions of said act.

"The commission further finds that said respondent was not engaged in such business, nor engaged in performing any public service of that character within this State prior to March 28, 1915, and that the said respondent has not obtained from this commission a certificate that public convenience and necessity require the transaction of such business.

"It is therefore ordered, that the said respondent, L. F. O'Donnell, cease and desist from carrying on the business which he is carrying on in the manner aforesaid, of transporting persons for hire between points within this State,

until he shall have applied for and obtained from this commission a certificate that public convenience and necessity require the transaction of such business."

UNITED RAILROADS PROTESTS MUNICIPAL SCHEDULE

The United Railroads, San Francisco, Cal., has protested to the Board of Supervisors against the excessive use of the outer loop at the foot of Market Street by cars of the San Francisco Municipal Railway. The original agreement covering this matter provides that the United Railroads divide with the city the cost of maintaining the outer track on lower Market Street. It is stipulated further that the United Railroads shall furnish power to the city at cost, or, at least at a rate not to exceed 1 cent per kw-hr., which is the rate the city pays the Pacific Gas & Electric Company. It is also stipulated that the United Railroads shall not operate cars over the tracks faster than one every ninety seconds; no limit is placed on the number the city may operate. At the time this contract was drawn up both parties to the agreement operated the cars of two different routing over the tracks in question. The arrangement was satisfactory until a second bond issue was voted and the Municipal Railway put the cars of two additional routes on the lower Market Street tracks. This has placed the city in the position of operating 1050 cars a day over the outer tracks as against the United Railroads 504, while the company still is paying one-half of the maintenance charges.

The United Railroads on May 25 petitioned the superior court for a permanent injunction to prevent the Municipal Railway from operating its Van Ness Avenue cars over the outer tracks and loop on lower Market Street, and from issuing or accepting transfers on cars operating on that line.

MISSOURI FARE REDUCTION RESTRAINED

Three judges of the district court of the United States who collaborated in hearing a petition for a restraining order against the enforcement of commutation rate orders directed to the Kansas City, Clay County & St. Joseph Railway, have issued the injunction, and incidentally suggested that the Public Service Commission of Missouri had no authority to compel an interurban to experiment with commutation rates on the supposition that the lower rates would bring increased revenues. For the purpose of determining rates, the commission had ascertained the value of the railway's property to be \$3,900,000, the net income from the first full year of operation \$242,488.22, or a return of 6.2 per cent on the determined valuation.

The court declared that it need not now consider the question of valuation, and proceeded to consider the rate order as based on the valuation. The court suggested that the returns on rates established by the commission under the law must be remunerative or at least adequate, but said that "the commission comes dangerously near holding the contrary." The court quoted from the decisions in the North Dakota and the West Virginia cases by the Supreme Court, and suggested: "It seems clear that that right (power of the State to require commutation rates in general) cannot be created by local public demand or interest; that it cannot be justified by the commission's views of the probable beneficial effects of such rates upon the company's business; because that would constitute an invasion of the right of the company to conduct and manage its own affairs, subject to a proper exercise of the power of regulation."

In reference to the increase of business from suburban incomers, the court suggested that if the rate were allowed, it would be several years before many suburban homes could be built; and if the rate was later found unjust, hardship would be done to persons who built with the confidence that the rates would be permanent.

The court, in granting the temporary injunction, declared that the views expressed must not be taken as forecasting the judgment of the court on final hearing.

One-Man Cars in Jackson.—The Jackson Light & Traction Company, Jackson, Miss., is operating three one-man cars.

One-Man Cars in Tulsa.—The Tulsa (Okla.) Street Railway has served notice upon the public that in consequence

of jitney competition conductors will be withdrawn from all lines except the Main Street line and that cars will be operated by one man.

Accident on Queensboro Bridge.—Several passengers were injured in a collision between cars of the Third Avenue Railway and the New York & Queens County Railway which occurred about 6 p. m., on June 6, at the underground loop at the Manhattan end of the Queensboro Bridge.

One-Man Cars in Salem.—Following a statement by T. L. Billingsley, superintendent of the Portland, Eugene & Eastern Railway, Portland, Ore., that the company is losing \$700 a month in the operation of its lines in Salem the City Council passed an ordinance authorizing the use of one-man cars.

Plan to Eliminate Stops in St. Louis.—The United Railways, St. Louis, Mo., plans to eliminate 686 so-called "useless stops" on its system, thus enabling it to shorten its running schedules from four to five minutes on each line. Application to abandon the stops has been filed with the Public Utilities Commission of Missouri.

Fare Increases Suspended.—The Public Service Commission of Massachusetts has suspended until July 1 the proposed establishment of 6-cent fare units by the New Bedford & Onset Street Railway and the Norfolk & Bristol Street Railway. By a previous order the increase on the Norfolk & Bristol Street Railway had been suspended until June 1.

Trail Cars Ordered on Interurban.—Trail cars must be carried by the Denver & Interurban Railroad between Denver and Boulder whenever the number of passengers requires extra cars, according to an order by the State Public Utilities Commission. Trail cars will be attached at Broomfield when the seating capacity of the original car leaving Denver or Boulder is filled.

Workmen's Fare Reduction.—The Public Service Commission for the Second District of New York has granted to the Fonda, Johnstown & Gloversville Railroad the right to reduce the price of the workmen's commutation tickets good for a trip between Gloversville and Johnstown in the morning, noon and in the evening, from 6¼ to 5 cents. The new rate has gone into effect.

Advertising Municipal Band Concerts.—By arrangement between the city and the San Antonio (Tex.) Traction Company, San Antonio is giving concerts at San Pedro Springs in the suburbs, while the San Antonio Traction Company advertises the concerts in the local papers. The railway does not mention its own name or trolley service, but this is needless since those who go to the concerts will use the trolley. The fact that a carhouse is also near the Springs makes it easy to meet any demands for service.

Decision in New York Suburban Fare Case.—The Court of Appeals of New York has unanimously affirmed the Appellate Division's order annulling upon certiorari an order of the Public Service Commission, Second District, for a reduction from increases in commutation rates established by the New York Central Railroad within the electrified zone adjacent to New York City. The court said that "the naked fact that a railroad has established and continued a rate for a limited time does not justify the conclusion that it was profitable."

The Twin City Pamphlet.—"The Twin Cities, 1915," has been issued. The publication is bigger, brighter and better than ever. Each year it seems that the last of the possible changes has been rung in the making of this booklet, but the next year rolls around only to bring forth a more striking combination than was contained in any of its predecessors. Of the publication 50,000 copies are printed each year. For the most part the circular is distributed within a radius of 300 miles of the Twin Cities. The Twin City publication is the *ne plus ultra* of electric railway vacation booklets. In this respect the majestic palm seems to be borne by A. W. Warnock, general passenger agent of the company, and borne by him alone.

Deciding on a Type of Car for Toronto.—Some months ago the Ontario Railway Board ordered the Toronto (Ont.) Railway to construct fifty new cars and have them in operation by June 1. Following the order, the union of electric railway employees asked the board to order the abolition of the running board on the open cars, and the railway board, in view of the fact that a new type of car is being

looked for, decided to leave the matter of the new cars in abeyance. The chairman of the board now says that it would be inconsistent to expect the street railway to build cars when the board has not decided what was the proper type of car to build. He also mentioned the fact that the engineers of the board, the city and the company had come to the United States to inspect a type of steel car which it was thought might prove satisfactory in service in Toronto.

Accidents in Greater New York.—According to a report by the Public Service Commission of the First District of New York, in January, February, March and April, 1914, there were thirty-seven fatal surface railway accidents in Greater New York. In the same period, for the current year, twenty-nine lost their lives through car collisions or accidents in which the trolley cars played the chief part. The record shows that in the first four months of 1914 there were 10,650 mishaps to persons and property on the surface car lines, and for the same period this year there were 8,597 accidents other than fatal. The total number of cars run at each period is not given in the report. During the current year the near-side stop has been in force.

I. C. C. Decision in Electric's Favor.—The Interstate Commerce Commission recently decided that the Crosby Transportation Company by selling through tickets over the line of the Grand Trunk Railway between Grand Rapids and Milwaukee and refusing to do so via the Grand Rapids, Grand Haven & Muskegon Railway (electric) unduly discriminates against the electric in favor of the steam road. The Crosby Transportation Company is an independent company, but is the exclusive carrier for the Grand Trunk Railway between Milwaukee and Grand Haven. The docks at Milwaukee used by that company are owned by the Chicago, Milwaukee & St. Paul Railway, but are leased by the Grand Trunk. The dock at Grand Haven is owned by the Grand Trunk. It was urged by the latter that its ownership of the dock at Grand Haven should give it the right to exclude its competitor from its use and enjoyment.

Accident in San Francisco.—A two-car train ran away down the Fillmore Street hill, San Francisco, Cal., on June 7, severely injuring several passengers. There were no fatalities, however. The accident was not caused by breakage, but by the train at the top starting before the train below connected with the cable. An investigation by the United Railroads places the blame on the starter and on the motor-man of the upper train for starting before receiving the signal from below. About fifty passengers were on the runaway. Some were injured in jumping, while others were hurt in the collision with the train standing at the foot of the incline. The passengers on the loaded train below had time to leave before the crash. The company is installing a device necessitating the throwing of the lever after coupling below and before the train above can start down. Car operation on Fillmore Street was described in the *ELECTRIC RAILWAY JOURNAL* of May 22, page 977.

Recommendations for Street Traffic Regulation.—The street traffic committee of the Safety First Federation of America, at its meeting in Detroit on June 4 and 5, prepared twenty recommendations concerning street traffic regulation for submission to the national federation at the fall meeting. These recommendations are to be included in the traffic ordinance that is proposed by the committee for adoption everywhere. The recommendations include the following: Standard code of traffic signals, parallel and angular parking of automobiles with fifteen to sixty minute time limit, frosted or colored glass in front of every reflected light, designated safety zones and crosswalks, red lights on rear of horsedrawn vehicles, authorized police control of pedestrian traffic, standard accident reports by all cities, and standardization of size, color, design and means of attachment of all street traffic signs, including those for schools, hospitals, churches, safety zones, railroad and street railway crossings, etc. The meeting was attended by commissioners of public safety, police department heads and other safety-first workers. Joseph A. McGowan, auditor of the Indianapolis Traction & Terminal Company; F. W. Bacon, vice-president of the Kentucky Traction & Terminal Company, and W. E. Cann, of the Detroit United Railway, represented the street railways at the meeting.

Personal Mention

Mr. C. J. Chadwick has resigned as general freight and passenger agent of Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn., and his office has been abolished.

Mr. L. G. Ireland has been appointed manager of the Brantford (Ont.) Street Railway in addition to the office which he has previously held as manager of the Hydro-Electric System of Brantford.

Sir Henry Lumley Drayton, K. C., who was knighted by King George on June 3, is chief commissioner of the Board of Railway Commissioners for Canada, and was formerly Corporation Counsel for the city of Toronto, Ont.

Mr. Frederick W. Whitridge, president of the Third Avenue Railway, New York, N. Y., returned from England on the *Philadelphia*, which docked in New York on June 3. Mr. Whitridge went abroad on the *Lusitania* on April 4.

Mr. R. V. Campbell has been appointed traveling freight and passenger agent of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn. Mr. Campbell formerly held a similar position at Des Moines, Ia., with the Minneapolis & St. Louis Railroad.

Sir John Strathhearn Hendrie, C. V. O., Lieutenant-governor of Ontario, was knighted by King George on June 3. He is one of the foremost figures in public life in Canada. From 1905 to 1912 he held the position of chairman of the railway committee of the Legislative Assembly and was also a member of the Hydro-Electric Power Commission of Ontario.

Mr. C. B. Fairchild, Jr., executive assistant, Philadelphia (Pa.) Rapid Transit Company, is the author of a paper entitled "The Opportunities of a Special Librarian," read this week at the annual meeting of the Special Librarians' Association at Berkeley, Cal. Mr. Fairchild refers to the demand from the administrative head of public service and private corporations and of city, state and national governments for specific information relative to special or specialized subjects. This is a growing need and is recognized in some of these corporations by the appointment of men working under such titles as executive assistants, special librarian, statistician, etc. Mr. Fairchild calls attention to the need for such work and to the increasing demand for it.

OBITUARY

John G. Mackintosh, a director in the Greenfield Gas & Electric Company, the Holyoke Street Railway, and the Springfield (Mass.) Street Railway, is dead. Mr. Mackintosh was born in Tariffville, Conn., in 1846. In 1876 he established the banking firm of J. G. Mackintosh & Company, Springfield, Mass., and in 1885 organized the Springfield Safe Deposit & Trust Company, of which he had since been president.

Charles F. Libby, formerly president of the Portland (Maine) Railroad, died at his home in Portland on June 4 at the age of seventy-one. He had engaged in law practice in his home city since 1866, was president of the American Bar Association in 1909-10, and had also been Mayor of Portland and president of the board of overseers of Bowdoin College. He headed the Portland Railroad Company for eight years, retiring about three years ago.

The report of the Hydro-Electric Power Commission of Ontario for the year 1914 on the electric railway department states that resolutions had been received from 138 townships, thirty-eight villages, forty-two towns, eleven cities, four police villages, and seven miscellaneous committees, such as boards of trade, etc., asking for surveys, reports and estimates on proposed lines. Two survey parties had been at work for almost the entire year making preliminary surveys of some 1200 miles of line. The information so obtained had been plotted and used for the purpose of preparing estimates on the cost of roadbed construction. In making the surveys topography was taken for approximately 400 ft. on each side of the traverse line. When this information was plotted the proposed lines were then projected and quantities figured along such lines.

Construction News

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

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

FRANCHISES

Monterey, Cal.—The Monterey & Pacific Grove Railway has received from the Commission a certificate of public convenience and necessity to operate under franchises granted by the city of Monterey and the city of Pacific Grove.

Chicago, Ill.—The Chicago Surface Lines has asked the Council in Chicago for a franchise to extend its Chicago Avenue line to the lake.

Quincy, Ill.—The Quincy & Western Illinois Electric Railway has received from the Council a three years' extension of time on its franchise in which to build its proposed line between Quincy and Niota. [Jan. 23, '15.]

Newton, Mass.—The Middlesex & Boston Street Railway has asked the Public Service Commission of Massachusetts for its approval of the relocation of its tracks on Woodward Street between Boylston Street and Lincoln Street, Newton.

Springfield, Mo.—The Springfield & Western Railroad has received from the Council an extension of time on its franchise to construct a line between Springfield and Carthage.

Columbus, Ohio.—The East Linden Electric Railway has received a twenty-five year franchise from the Council for the construction of two lines through the northern section of Columbus. One line begins at the Leonard Avenue viaduct and extends northeast through Shepard to the bank of Alum Creek. The other line begins at the Leonard Avenue viaduct and extends through Joyce Avenue and Acheson Avenue, Columbus, to East Linden. [June 5, '15.]

Urbana, Ohio.—The twenty-five-year franchise granted the Ohio Electric Railway in Urbana was approved in a referendum vote on June 1 by a majority of 258. At an election two months ago the franchise was defeated by five votes.

Toronto, Ont.—The franchise of the Metropolitan division of the Toronto & York Radial Railway on Yonge Street, north of the Canadian Pacific Railway tracks on Farnham Avenue, will expire on June 25. The franchise was granted to the company for a period of thirty-one years. The city has not yet laid down a policy in reference to the portion of the road which will fall into its hands. The Board of Control will take up the matter at once.

Providence, R. I.—The Rhode Island Company has received a franchise from the Council to lay a double track on North Main Street between Market Square and Waterman Street, Providence, to connect with the East Side tunnel.

Petersburg, Va.—The Council of Petersburg has adopted the ordinances introduced at a meeting recently, granting electric railway franchise rights on Bollingbrook Street and Wythe Street, asked for by the Petersburg & Appomattox Railway and the Petersburg & James River Corporation. These franchises will be sold to the highest bidder.

TRACK AND ROADWAY

Tucson (Ariz.) Rapid Transit Company.—Plans are being considered by this company to extend its University Avenue line on Park Avenue to and along the Speedway.

***Melbourne, Ark.**—Residents of Melbourne and vicinity have formed the Community Improvement Association with the object of promoting the construction of an electric line from some point on the Iron Mountain Railroad. It was voted to guarantee a right-of-way and a \$10,000 bonus. A. P. Golden, secretary.

Pacific Electric Railway, Los Angeles, Cal.—Plans are being considered by this company to extend its line from San Bernardino to East Highland and Del Rosa.

Jacksonville (Fla.) Traction Company.—Work will be begun at once by this company rebuilding the track on its South Main Street line from Michigan Avenue to the terminal at Nichols Park.

Jacksonville & Florida Railway, Jacksonville, Fla.—Financial arrangements have been made to build the first section of 10 miles of this company's line between Jacksonville and Providence, and construction has been begun. A. W. MacKinlay, president. [May 8, '15.]

Milton, Fla.—H. S. Laird, Milton, advises that, owing to financial conditions, the project to build an electric railway from Milton to Bagdad has been entirely abandoned. [Jan. 31, '14.]

Jacksonville & St. Augustine Public Service Corporation, St. Augustine, Fla.—T. R. Osmond, general manager of this company, states that bonds have been taken and a definite proposition for the construction of this company's line between Jacksonville and St. Augustine and the building of a power plant has been submitted to an engineering concern in New York. An estimate will be made by the engineering company of the cost of building and equipping the plant and as soon as this work is completed the contract will be signed and work will be begun. [March 13, '15.]

Waycross Street & Suburban Railway, Waycross, Ga.—Plans are being made to begin work at once on the construction of this company's extension to Gilchrist Park.

Freeport Railway & Light Company, Freeport, Ill.—This company plans to begin at once the construction of its extension on Galena Street, Freeport.

Chicago & Joliet Electric Railway, Joliet, Ill.—Work will be begun at once by this company on the extension of its Hickory Street line to Theiler's Park. The line will extend from its present terminus at Smith Street, east to Broadway and north on Broadway to Theiler's Park. Township officials have promised a franchise and the consent of property owners is now being obtained.

Chicago, Peoria & Quincy Traction Company, Peoria, Ill.—Plans are being made for the floating of \$3,000,000 of bonds for the completion of this company's line. Plans are also under consideration for the location of the company's shops at Quincy. [May 1, '15.]

***Salina-Northern Railroad, Kansas City, Kans.**—It is reported that this line now under construction in Kansas will use motor cars instead of steam equipment. Track construction on the line between Salina and Osborne will begin July 1.

Salina (Kan.) Street Railway.—Ties are being distributed by this company for its line to the new union station at Salina. As planned, the line is to branch off from the Ninth Street line at Park Street, extend to Thirteenth Street and thence north to the union station. The company has applied for a permit to run street cars on Park Street.

Arkansas Valley Interurban Railway, Wichita, Kan.—Plans are being made by this company to build an extension of its lines to Salina and one to Winfield, which will have a branch from Mulvane to Wellington. Following these improvements an extension to El Dorado will be built.

Kentucky Traction & Terminal Company, Lexington, Ky.—The Board of City Commissioners has ordered this company to proceed at once relaying its tracks on South Limestone Street, Georgetown Street and Dewees Street, Lexington.

Gretna, La.—Edward L. Slattery, New Orleans, reports that surveys have been begun and application for a franchise will be made for the construction of an electric railway from the intersection of Copernicus Avenue and Front Street, Gretna, extending on Copernicus Avenue to Eleventh Street, out Eleventh Street by reverse curve to Nicholls Avenue to Twenty-third Street, at which point the road will extend northeast and connect with the New Orleans, Southern & Grand Isle Railway. [May 29, '15.]

Bay State Street Railway, Boston, Mass.—This company is relocating its tracks on lower Broadway, Chelsea.

Fort Scott & Nevada Light, Heat, Water & Power Company, Nevada, Mo.—This company is rebuilding its line on North Washington Street, Nevada. Ties for the entire line have been ordered and work is progressing rapidly.

Albuquerque (N. Mex.) Traction Company.—Among the improvements planned by this company is the repairing of curves and switches and overhauling its track in general.

United Traction Company, Albany, N. Y.—This company plans to spend \$165,000 for new track this summer. Rails, ties and material have been ordered for a double track to be laid in Central Avenue from Lark Street west to Water-vliet Avenue, Albany, a distance of 8500 ft. Work will be begun as soon as the material is received.

Interborough Rapid Transit Company, New York, N. Y.—Construction work on the Steinway tunnel, connecting Manhattan and Queens, is approaching completion, and the Public Service Commission for the First District of New York expects to order the beginning of temporary operation through the tunnel about June 15. For the last year this tunnel has been undergoing reconstruction to fit it for operation as a part of the new subway system. It will be operated by the Interborough Rapid Transit Company, with free transfers to and from the existing subway. During temporary operation trains will run back and forth between the temporary termini at Jackson Avenue and Van Alst Avenue, Long Island City, and at a point under Forty-second Street between Lexington Avenue and Third Avenue, Manhattan. The tunnel is a two-track line, and at the Manhattan end passengers will be brought to the surface by an escalator.

Brooklyn, N. Y.—The Public Service Commission for the First District of New York has directed its counsel to apply to the Appellate Division of the Supreme Court for the legalization of the Bushwick Station, East New York route. This is the eastern part of the so-called Eastern District subway line. This line begins at Sixth Avenue, Manhattan, and runs under Fourteenth Street and the East River to North Seventh Street, Brooklyn, through North Seventh Street to Metropolitan Avenue, through Metropolitan Avenue to Bushwick Avenue, and thence through Johnson Avenue and the Long Island Railroad right-of-way to East New York. The western end of the line, covering the underground portion, has already been legalized, but the commission found it impossible to get the consents of two property owners necessary to legalize the elevated railroad portion of the route. The application to the Appellate Division will be made at once, and it is not thought that there will be any delay in the completion of the road as the elevated portion, upon which work has not yet been begun, can be constructed in much less time than the underground parts.

Cincinnati (Ohio) Traction Company.—Plans are being prepared by City Engineer Krug for the construction of this company's extension to Bond Hill. It has not yet been decided whether the track will be laid through Avon Field or on Paddock Road. It will cost \$70,000 to build a boulevard through the park property, and for that reason it is believed the Paddock Road route will be chosen. Work will be begun as soon as the Council determines on the route.

Toronto, Ont.—At a meeting of the Council on May 31 it was moved that the Board of Control report funds for the laying of a permanent street railway line on Bloor Street West, west of Dundas Street. The motion was referred to the Board of Control, as there is a legal difficulty in the way. The necessary legislation was not obtained and, as a result, the work has been tied up until a method of financing is devised.

Portland, Ore.—Steps are to be taken at once by the Council to confiscate a bond of \$10,000 furnished by George F. Heusner to guarantee the construction of an electric line from Kenton to the West Side business district of Portland under the provisions of a franchise received by Mr. Heusner. The Council recently received a request for an extension of time in which to build the line but by unanimous vote refused any extension. The bond was given to guarantee completion of the line within eighteen months after the granting of the franchise. The eighteen months expired on June 3. [Jan. 9, '15.]

Eastern Pennsylvania Railways, Pottsville, Pa.—This company reports that it expects to build 2 miles of track between Pottsville and St. Claire.

***Gallatin, Tenn.**—In connection with the project to build an electric railway from Gallatin, Tenn., to Horse Cave, Ky., it is stated that if the sum of \$100,000, which is needed to go ahead with the project, is raised, Nashville, Tenn., will supply a similar amount and the line will be built.

Dallas (Tex.) Southwestern Traction Company.—A subscription of \$3,000 has been raised for the purpose of surveying this company's extension from Glen Rose to Stephenville. This is part of a plan to build an electric railway from Dallas to Brownwood. [May 22, '15.]

Houston, Richmond & Western Traction Company, Houston, Tex.—Arrangements are well under way for the construction of this company's line from Houston to Richmond. Residents of Richmond have assured the promoters of a cash bonus of \$10,000, a right-of-way through the county and a terminus site of 3 acres. E. Kennedy, Houston, is interested. [May 29, '15.]

Salt Lake & Utah Railroad, Salt Lake City, Utah.—Plans are being considered by this company to build an extension of its lines from Fourteenth South Street, Salt Lake City, through Hunter, Granger, Pleasant Green and other points into the heart of the agricultural district, 10 miles.

***Beckley, W. Va.**—H. G. Scott, Charleston, has submitted to the Raleigh County Business Men's Association plans to construct an electric railway from Fayette Station on the Chesapeake & Ohio Railway to Beckley, 35 miles. The route extends via Mount Hope, Oak Hill, Glen Jean, Fayetteville and other points. A committee consisting of C. L. Beckner, T. E. Bibb and Ernest Chilson, all of Beckley, has been appointed to consider the plan.

Charleston (W. Va.) Interurban Railroad.—This company has sold \$750,000 of 6 per cent notes, the proceeds of which are to be used to build an extension of its lines from Charleston to Montgomery, 24 miles.

Princeton (W. Va.) Power Company.—Work has been begun by this company laying tracks on its line between Princeton and Bluefield, 12 miles.

***Superior, Wis.**—Plans are being considered to build an electric railway from Superior to Bayfield. It is said that more than half the money needed for the construction has been subscribed. L. E. Davis, Bayfield, is interested.

SHOPS AND BUILDINGS

Northern Massachusetts Street Railway, Athol, Mass.—Headquarters for the Gardner and Templeton divisions of this company will be established next week at East Templeton and the use of the carhouse at Westminster will be discontinued. A new switchboard has been installed in the carhouse at East Templeton and an addition built to care for the cars which have been kept at Westminster.

Twin City Rapid Transit Company, Minneapolis, Minn.—President C. G. Goodrich announces the purchase of a terminal site by this company in the heart of the Minneapolis business district for which a cash consideration of \$1,100,000 was paid. The new terminal block is 330 ft. by 330 ft. and is bounded by Marquette Avenue, Second Avenue, Seventh Street and Eighth Street. The complete terminal plan contemplates not only suburban line operation but a modification of the downtown lines and rearrangement of the loops so as to relieve congestion.

Brooklyn (N. Y.) Rapid Transit System.—The Public Service Commission for the First District of New York has awarded the contract for the completion of construction and station finish in portions of the Fourth Avenue subway, Brooklyn, to D. O. Serber for \$40,676.25. The work covered by this contract will be done in the next three months and will in no way interfere with the beginning of operation in the Fourth Avenue subway, which is scheduled for June 15. The work consists mainly in completing the station finish and other parts of the subway structure between Hanson Place and Butler Street.

Eastern Pennsylvania Railways, Pottsville, Pa.—This company reports that it expects to build a 208-ft. extension to its present carhouse in Pottsville.

Texas Traction Company, Dallas, Tex.—Officials of this company and the Southern Traction Company and Stone & Webster executive officers held a conference on June 2 at which plans were laid out for the construction of the new union terminal for interurban lines at Dallas. Under the terms of the franchise granted Stone & Webster by the city for the terminal, actual construction must be begun before Oct. 20.

Manufactures and Supplies

ROLLING STOCK

Boston (Mass.) Elevated Railway has ordered one flat car-body from the Laconia Car Company.

Ohio Electric Railway, Cincinnati, Ohio, has ordered one 63-ft. excursion type car from the Cincinnati Car Company.

Union Electric Company, Dubuque, Ia., is rebuilding eight single-truck cars into one-man cars in its own shops.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., has ordered one all-steel car, 32 ft. 6 in. over corner posts, from the Cincinnati Car Company.

Detroit (Mich.) United Railway has ordered two of its standard type 60-ft. limited interurban cars from the Niles Car & Manufacturing Company. The cars will be duplicates of the previous order.

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va., has ordered two additional all-steel interurban cars from the Cincinnati Car Company. These cars are exact duplicates of those placed in service some months ago by the railway company.

Sioux City Service Company, Sioux City, Ia., will build this year four cars of its standard, single-end, pay-as-you-enter type. These cars are 31 ft. over corner posts and 8 ft. 6 in. wide with a 5 ft. 6 in. front vestibule and a 6 ft. 8 in. rear vestibule. The framing is of semi-steel and the body is of the monitor roof type.

TRADE NOTES

McKay Company, New York, N. Y., bankers, have removed their offices from 55 Wall Street to the twenty-second floor of the Bankers' Trust Company Building, 14 Wall Street.

Edwin G. Hatch, New York, N. Y., has recently supplied the Chicago, Milwaukee & St. Paul Railway with a number of seamless copper splicing sleeves to provide the splices in its transmission lines under construction in the West.

Graphite Lubricating Company, Bound Brook, N. J., has moved its factory in Bound Brook to a larger location two miles from the old plant covering a plot of about 500 ft. x 200 ft., where it will manufacture its "Bound Brook" and Nigrum graphite and bronze oil-less bearings and bushings.

Frank Ridlon Company, Boston, Mass., electrical engineer, manufacturer and repairer of electrical apparatus has removed its New York office to Suite No. 307 Engineering Building, 114 Liberty Street. George L. Smead is manager of the vacuum cleaner and fixture department, Harry De Steese of the export and supply department.

E. G. Long Company, Inc., New York, N. Y., has appointed John A. Warris, formerly assistant treasurer, as secretary to succeed F. Van Anden, resigned. Mr. Warris has been associated with this company for over fifteen years. Robert C. Riddick, works manager at the Kingston foundry, has been appointed a director of the company, succeeding Mr. Van Anden.

Elcon Company, New York, N. Y., has received an order for porcelain enameled stanchions and Aero-metal fittings for the third lot of 100 cars ordered by the New York Municipal Railway, the same equipment as supplied for the previous 200 cars. This company has also received an order from the Interborough Rapid Transit Company for porcelain enameled barriers and Aero-metal fittings for its 478 new cars.

Alexander Milburn Company, Baltimore, Maryland, manufacturer of high power portable lights and oxy-acetylene welding apparatus, has acquired the business of the Wells Light Manufacturing Company, Jersey City, N. J. Repair parts for outstanding Wells lights will be manufactured and supplied in the future by Alexander Milburn Company, from its Baltimore factory, and complete Wells oil lights will also be furnished where desired, in conjunction with the standard Milburn acetylene lights.

ADVERTISING LITERATURE

Sangamo Electric Company, Springfield, Ill., has issued a catalog which describes its exhibit of electric meters in the Palace of Machinery at the Panama-Pacific Exposition.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 42552, on the subject of motor generator sets. The bulletin is attractively designed and includes numerous illustrations of various types of motor-generator sets, also a general description of this type of apparatus.

Alzheimer & Rawlings Investment Company, St. Louis, Mo., has reprinted in pamphlet form the talk of Richard McCulloch, president and general manager of the United Railways, St. Louis, before the Bond Men's Club of St. Louis in which he discussed the problems of the company.

Ohmer Fare Register Company, Dayton, Ohio, has issued a folder on its fare register system. The folder contains a long list of electric railways which use this system. Enclosed with the folder is a form sheet for the convenience of making estimates of this system by stating the various fares collected on the line and also other necessary operating data.

Fargo Manufacturing Company, Inc., Poughkeepsie, N. Y., has issued bulletin Nos. 400 and 800 which show a variety of the latest designs in its electrical wiring. These connections are designed to do away with the surging in the line owing to bad contacts at the joints and to prevent loss of service traceable to high resistance or broken joints. These connecting devices secure low resistance joints owing to the fact that they are three times the area of wire or cable at the joint.

Esterline Company, Indianapolis, Ind., has issued catalog No. 364 describing its various types of "Golden Glow" incandescent headlights. The catalog contains an illustration made from an unretouched photograph of a street well illuminated for a distance of four blocks by one of these headlights on a car of the Indianapolis Traction & Terminal Company. In this type of reflector the light from the bulb passes through the glass, strikes the silvered surface and is reflected back through the glass and out in front of the lamp. In passing through the glass the violet and blue rays are absorbed in the glass and subtracted from the beam, leaving a shaft of golden yellow light. Even in a dense fog the light can be seen at a great distance. For electric railway service dash type headlights are burned in series with interior bulbs and will give a projection of light from 350 ft. with a 23-watt bulb to 750 ft. with a 56-watt bulb. The interurban headlight can be operated in series with resistance or interior bulbs. It will project an intense but non-blinding beam sufficient to distinguish objects at a distance of from 900 to 1200 ft. Use of these headlights in series with tungsten bulbs greatly reduces the effect of fluctuating voltage and is a material economy in current.

Cook Railway Signal Company, Denver, Col., has issued a catalog describing and illustrating its safety automatic gate for highway crossings. This gate operates practically the same as an upper quadrant signal. For electric lines the most common method of control is by means of either track instruments or trolley contactors. The functions performed by the gate and the results obtained by these methods are the same as in the "track circuit" installations. The journal where the gate arm is attached to the mast is 13 ft. above the foundation. When the gate arm is lowered it assumes a horizontal position with "tell-tales" hanging therefrom, which come down to about 5 ft. of the roadway. These tell-tales are made of crucible steel wire, wound in spring form, so as not to catch or hang to any object. Since the rigid arm is 13 ft. above the roadway, it is in the clear, and will not injure any one if it should come down, for a vehicle is directly under it. The bell starts ringing as soon as the arm moves to the danger position. The arm moves to the danger position very slowly, taking about six seconds, so it will not frighten horses as it might if it should descend rapidly. In the top of the mast is a red lens which throws a ray of light parallel to the public highway, so that at night time it can be plainly seen from a distance. In the head is also arranged a shaded white light which shines down upon the arm and "tell-tales" and lights up the crossing, making it visible during darkness. The gate is substantially and heavily made. The mechanism operates by direct current or alternating current, whichever is available, or by low voltage storage batteries.