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THE SEMI-ANNUAL INDEX

With this number is published the semi-annual index covering the issues of the Electric Railway Journal since the first of the year, it being bound in with the regular issue and occupying the eighteen pages just in front of the editorial section. Although this practice has been followed for many years past some of our readers seem to have overlooked it, because during the past few weeks we have received several requests for the index from readers who wish to bind their back numbers. As a matter of fact, when the twenty-six issues for the half year are bound together the index is automatically included, for the reason that it always forms part of the last issue for each half year. We consider this plan more satisfactory to the reader, although it involves more trouble and expense to the publisher than that of mailing the index in loose form a week or two after the volume has closed. Those who have made extensive use of past indexes will notice in the present one an innovation which consists of a list of the keywords that are used for grouping references to articles in the index. This has been introduced to aid the occasional user of the index in locating promptly the various groups of articles in the index. In general these keywords are the same as have been used in the past, and those who have made use of the index extensively with previous volumes will find no cause for confusion on account of the innovation.

AN UNWISE SMOKING PERMIT

It has been a long-established and reasonable rule of American electric railways to permit smoking on two or three of the rear benches of open cars. We cannot but feel, however, that a bad precedent has been set by the Public Service Commission of the First District, New York, in ordering the Brooklyn Rapid Transit System to permit smoking on the four rear seats of its convertible cars. Such an order is a step backward at a time when electric railways are doing all that lies within their power to keep their cars sanitary. On the open-bench car, at least, one can avoid both smoke and a dirty floor by going directly to the forward benches; but on a drop-platform car with rear entrance a walk through the noisome section cannot be avoided. In issuing this anachronistic order the commission seems to have been misled by the clamor of a well-organized claque of tobacco dealers instead of showing a sensible regard for the public welfare. The same question is constantly coming up in other cities, and, as a rule, the proper policy for the railway companies to pursue is to allow the decision to be made by the constituted authorities, as in this case, or by a referendum vote of the public, as was done in Kansas City. At the same time, we believe that the best interests of both the company and the passengers, so far as city cars are concerned, is in the prohibition of smoking on all cars except upon open cars with a side running board, and we do not consider that a rule of this kind would work a serious hardship on anyone.

AGAIN THE QUESTION OF GEAR RATIO

Among the many interesting papers presented before the Central Electric Railway Association this week and abstracted on another page, that one which gave the results of power consumption tests with field-control equipment warrants more than passing comment, not so much because of its undoubted interest but because its figures, if taken too literally, may be the cause of misconception. In the test in question two cars were operated over the same route, one of them having field-control motors and the other standard motors. The cars were exactly similar with the exception of gear ratio, and this one point of difference was necessarily of such importance in the final result that the actual figures obtained in the test may be misleading. Of course, it is well known that field control can make savings in power. The fact is obvious and cannot be disputed. But it is not clear, in a comparative test, why the advantage should be accorded to field-control motors of a higher gear ratio than their competitors on a run where the stops average nearly nine per mile. Certainly a gear ratio of 15:72 is preferable to 17:70 where free-running time constitutes such a small part of the total time as it did on the line where the test was made, and when test apparatus is being operated under obviously unfavorable conditions it is manifestly unreasonable to set up its performance as a standard. It would be interesting to see what results would be obtained with the cars in question either on a run more suitable to the gearing or else with similar gear ratios that were suitable for the run.

MEGAPHONE ANNOUNCEMENTS

It is quite possible occasionally to apply to one business a scheme which was devised for an utterly different one. Some time ago the Pittsburgh Railways discovered that dental cement could be applied successfully to the, shall we say "decayed" teeth of commutators? More recently the Boston Elevated Railway has found something worth learning from a college football game, to wit: the use of megaphones for announcements. The possibility of using dental cement on a commutator may be regarded as a happy discovery, but the utility of the megaphone is so obvious that it ought

to have been a fixture in electric railway service long ago. A terminal or loop is generally a pretty noisy place where the voice of anyone but that of the famous Stentor would be lost. The most desirable method would be to display signs indicating the destination of the car next approaching, but where this is not practicable megaphone announcements would prevent confusion and insure a better distribution of passengers. An excellent field for the megaphone exists on a certain electric railway system where at several places passengers have the opportunity to board cars which have already been partly loaded farther down the line, or to get on empty cars which are operated over loops. Unfortunately, the boarding places for both classes of cars are so located that people waiting for the through car from downtown cannot readily see the loop car from uptown. Thus it is not uncommon for some of the passengers to crowd on to the through car until the loop car comes in sight and then for the remainder to make a mad rush through masses of people and vehicles for a car which is already in motion. Yet this practice could be readily ended if the starter was supplied with a megaphone and an elevated position from which he could survey all of the tracks.

RAIL ELEVATION AND PANTOGRAPHS

That electrification of a steam railroad line introduces additional responsibility for the maintenance of way department is a generally accepted fact, but frequently the vital necessity for maintaining the relative rail elevations when pantographs are used appears to be overlooked. The average length of 4 ft. for a pantograph shoe is, of course, ample to take care of any staggering of the contact wire and to provide a margin for the swaying of the cars or locomotives on the rails if the rails are level. But when the two rails are not maintained at the relative heights at which they were when the contact wire was erected it becomes a very easy matter for the pantograph to slide off the wire and wreck itself. In general, a superelevation of 2 in. in one rail, unless compensated for by moving the wire, will cause serious pantograph trouble. Theoretically, of course, if one rail is raised 2 in., the movement of the pantograph shoe, 22 ft. above the rail, will be but 10 in., so that, with the wire originally centered on a 4-ft. shoe, there remains a margin of safety amounting to 14 in. However, this calculation does not take into account either the increased compression of the truck springs on the low side of the car when it is tilted, nor does it take into account the swaying of a car passing at high speed, and the consequence is that many pantographs have been, in the past, wrecked from this cause, although the responsibility for the damage is by no means always properly placed. When the track and the line departments are not consolidated, as is the case on many roads, the influence of rail elevations on overhead work can very easily be neglected, and whenever pantograph damage takes place it would be well to have the subsequent investigation include consideration of the work of the track men as well as of those responsible for the overhead construction.

COMMON SENSE IN REGARD TO STRAY CURRENTS

A few years ago there was more or less prevalent hysteria in regard to the electrolytic corrosion due to stray currents from electric railway return circuits. This is disappearing as scientific information becomes more plentiful and accessible. There was and still is much mischievous current roaming at will in the earth-return circuits of many electric railways, but owners of pipes and cables are coming to realize that the distribution of this current follows familiar electrical laws whose application will control or eliminate it. In the application of these laws the main features are: How serious is the trouble? How much money can be spent to remedy it? How can this money be spent most effectively? Who shall furnish the money?

With the increase in the financial burdens which street railways are called upon to carry they cannot be expected to undertake large expenditures to prevent fancied injury to other users of the soil. If there is real injury and the course can be traced to electrolysis, then there is cause for arbitration. Electric traction is a public necessity just as are gas, telephonic communication, water or electric power. The courts have also held generally that the railways have certain superior rights in the streets, as they furnish the kind of transportation for which the streets were originally dedicated. However, we do not intend here to discuss the legal aspects but will take the view that all users of underground conductors in the highways are equally interested in keeping all leakage losses from the return electrical conductors within reasonable values.

We use the word "reasonable" because leakages are involved in the underground transmission in the streets of gas and water as well as in the return trolley circuit, but the other users of the streets have no right to throw more than a reasonable amount of the burden of correcting the trouble on one utility. Suppose, for example, that a high-pressure gas main paralleled an electric railway feeder subway and that gas leaked into the latter. The railway company might complain that work in its manholes was hazardous and that the burden was upon the gas company to prevent all leakage from its pipe line. But if the pipe line was in practically gas-tight condition and some slight leakage could be considered an operating necessity, the remedy to be applied should be that which at the least ultimate cost would give the necessary protection, whether the change was made in the gas pipes or in the conduit of the railway company. The cost ought then to be equitably shared in accordance with the facts.

In the case of electrolysis the facts can be determined with a fair degree of accuracy. The remedy to be applied is more difficult to decide upon. No one remedy can be applied economically to all cases. What is needed most just now is a development of the spirit of co-operation. Evidence of such a spirit is seen in the recent formation of the joint committee of representatives of national associations recently formed at the suggestion of the American Institute of Electrical Engineers. Of this Bion J. Arnold is permanent chair-

man. All of the interested societies have now joined this movement with the exception of the American Water Works Association which, it is hoped, will soon see the desirability of doing so. The joint committee is approaching its work with the desire to see all sides of the question in the belief that each case must be considered on its merits, and the results of its deliberations cannot but have a beneficial effect upon all of the interests which are concerned in the investigation.

THE CURE FOR RAILWAY ILLS

In any case of physical sickness the first matter of importance is a correct diagnosis of the trouble. The same rule applies in political matters. Relief may not come immediately after the cause of the trouble is determined, but at least the remedy may more easily be chosen. In the case of railway ills, the patient has at least one advantage over the individual. He cannot die. Whatever happens the railways will be kept in operation because they are a social necessity. But they can be so deathly sick that they will be of little benefit either to the owners or the public.

The question to determine is the proper relation between these two, the owners and the public. The old idea that these systems were a kind of personal property, and that the owners could have complete control over the service given and the fares charged has passed away. While no substitute plan has yet received general acceptance, a brief statement of the fundamental principles upon which any new plan must be based to be permanently successful was recently given by Ivy L. Lee, executive assistant of the Pennsylvania Railroad. The principles are so self-evident that they may properly be called axioms. According to Mr. Lee, there are three of these principles.

The first is an implied promise on the part of the public to pay for what it demands and receives. This seems to be only justice. Within certain limits the railways can give almost any class of service desired and charge either a high or a low fare, but the public should not expect either the good service or the poor service to be furnished below cost.

The second of Mr. Lee's principles is the establishment of a definite policy toward the railroads by all of the government agencies, so that the man who invests in a railroad security may know what to expect. At present, particularly with the interstate roads, there is a clash in authority, such as that between the Interstate Commerce Commission and the State commissions. Even with intrastate roads radical changes in policy may occur through a change in State administration or in the personnel of the regulatory commission.

Finally, and most important, there should be the restoration of popular faith in the good intentions, patriotism and fidelity of earnest and able railway men even when they are successful. As Mr. Lee says, "The time must come when experience and ability in the actual conduct of a railroad shall not of themselves disqualify a man for membership on a railroad commission. When these three factors are firmly and clearly established, our railroads can go forward. Investors will know what they can depend on, the public will not embark in ill-considered legislation, and railroad officers will experience that enthusiasm in constructive work which is bred of the knowledge that public service is recognized and appreciated."

HIGH ACCELERATING RATES ON SUBURBAN SERVICE

The advantages of large gear ratios and rapid rates of acceleration in city service are so generally accepted without question that the same theory seems occasionally to be extended to suburban service on electrified steam railroads where the stops may occur hardly once in 2 miles. To some degree the case of the electric locomotive versus the multiple unit train is affected by this reasoning, although, as a matter of fact, the increased schedule speed through the use of an accelerating rate of 1 m.p.h.p.s., as might be expected from a train of multiple-unit cars, involves but a very small decrease in running time from that required by the use of an accelerating rate of 0.5 m.p.h.p.s., such as would be obtained normally with an electric locomotive.

This may be easily demonstrated by considering a concrete case in which generally accepted values for the various factors are adopted.

Assuming a free running speed of 50 m.p.h., the period of acceleration for the locomotive and train would be 100 seconds and for the motor car train fifty seconds. As the distance covered during acceleration equals the product of the square of the time by half the rate of acceleration, the locomotive would cover 3660 ft. during the 100 seconds of acceleration. The motor-car train would cover 1830 ft. in fifty seconds and then would run at 50 m.p.h. for another 1830 ft. to reach the point at which the locomotive would also acquire a speed of 50 m.p.h. This distance would be covered in twenty-five seconds, providing a total time for covering the 3660 ft. equal to seventy-five seconds for the motor-car train as against 100 seconds for the locomotive. The net saving in time at each stop would be twenty-five seconds.

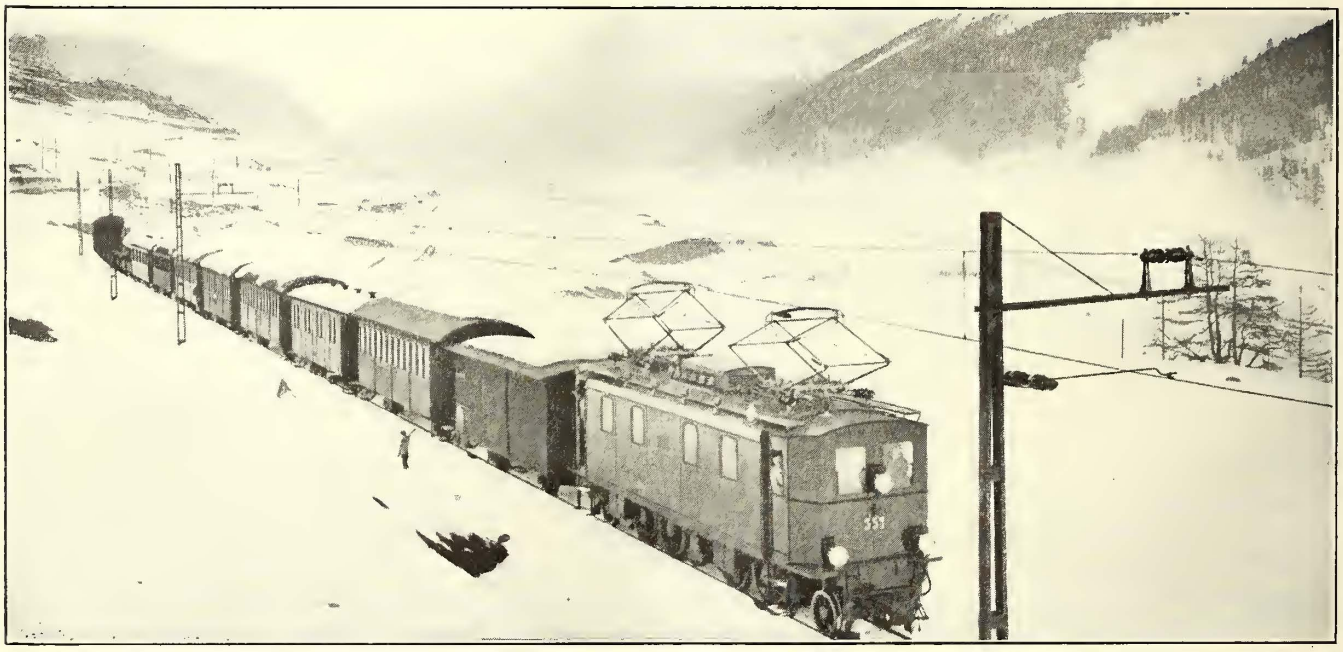
If the run was, say, 20 miles in length and ten stops were made in that distance, the total decrease in running time would amount to four minutes, and as it may be safely said that such a suburban run would be made in not much less than fifty minutes, the saving in time would amount only to 8 per cent. This is, of course, appreciable, but it is by no means extraordinary in view of the fact that double the tractive effort would have to be exerted to produce the higher rate of acceleration. Of course, this increased force, when installed in the form of d.c. motors on multiple-unit cars, could be obtained at a much lower first cost per unit of power than in the form of a locomotive, but this does not alter the fact that where stops are infrequent and trains are long the advantages of multiple-unit cars over locomotives are due to their economy in terminal movements rather than to their ability to produce high rates of acceleration.

Locomotives on the Rhätian Railway

These Single-Phase Locomotives for the Leading Narrow-Gage Line of Switzerland Are Equipped with Series Type Motors and Voltage Step Control Without Contractors

The Electric Railway Journal for April 4 contained a general reference to the 10,000-volt, 16 2-3 cycle single-phase electrification of the Rhätian Railway on 39 miles of meter-gage track, and a detailed description of the 600-hp 1-D-1 locomotive furnished by the Allgemeine Company. The data in the following paragraphs relate to a pair of 600-hp 1-D-1 locomotives furnished for this line by the Oerlikon Company. It may be added that Brown-Boveri & Company furnished seven 300-hp 1-B-1 locomotives and one 600-hp 1-D-1 locomotive. The catenary material was furnished by the Siemens-Schuckert Company and the high-tension and converter station equipment by the Alioth Company.

All Rhätian locomotives have frame-mounted motors and the same type of parallel rod drive, the only difference being that the 1-B-1 type has two driving axles and the 1-D-1 type four driving axles.



Rhätian Railway—View of Steel Pole Catenary Construction and Train with Passenger and Freight Cars

REQUIREMENTS OF LOCOMOTIVES

The principal data on the Oerlikon locomotives are given in the following table:

Line and Locomotive Data	
Average single-phase line voltage	10,000 volts
Voltage variation, + or —	10 per cent
Frequency	16⅔ cycles
Frequency limits	15 to 18 cycles
Gage	39.37 in.
Maximum grade	2.5 per cent
Minimum radius of curves on open track	525 ft.
Minimum radius of curves at switches	262 ft.
Maximum pressure on axles	11 metric tons
Maximum speed	31 m.p.h.
Maximum height of pantograph shoe above head of rails	20.7 ft.
Minimum height of pantograph shoe above head of rails	13.6 ft.
Diameter of driving wheels	42 in.
Diameter of trailing wheels	28 in.
Diameter of arc made by parallel rods	23 in.
Length over buffers	35 ft. 5 in.
Total wheelbase	26 ft. 11 in.
Rigid wheelbase	7 ft. 10 in.
Weight per driving axle	9.9 tons
Weight per trailer axle	4.85 tons
Total weight	49.3 tons
Weight available for adhesion	39.4 tons
Weight of mechanical parts	21.7 tons
Weight of electrical parts	27.6 tons

The locomotives must be capable of drawing a total weight of 200 tons. The hour rating of the locomotives was set at 600 hp. This corresponds to a speed of 17.36 m.p.h., a one-hour tractive effort of 12,672 lb. at the periphery of the wheels, or the pulling of a 180-ton load at 17.4 m.p.h. on a grade of 2½ per cent. The maximum tractive effort as exhibited during acceleration was specified at one and one-half times the hour rating. This corresponds to an acceleration of 0.33 m.p.h.p.s. on a maximum grade of 2.5 per cent. It corresponds also to an acceleration of 0.55 m.p.h.p.s. on level track. The motors must operate sparklessiy at all loads.

MECHANICAL PART

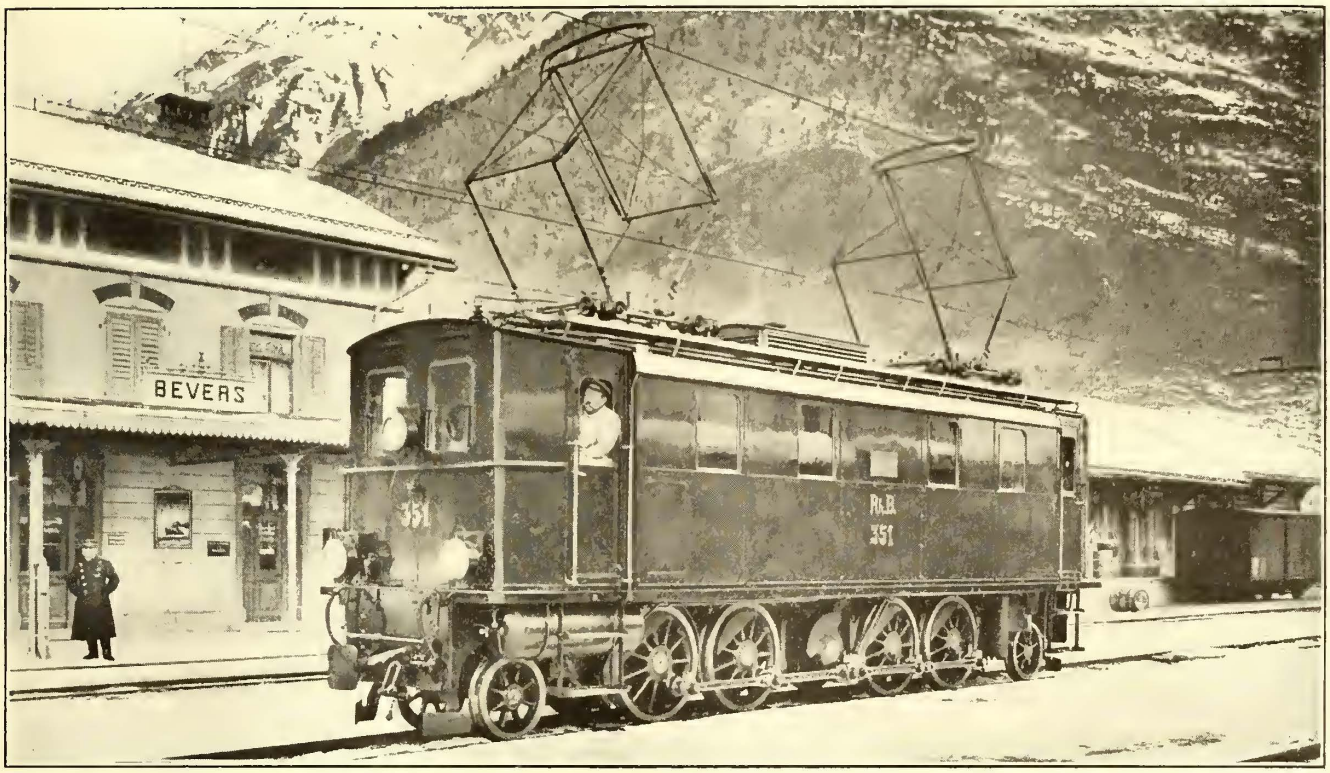
The number of coupled axles was fixed by the maximum permissible axle pressure of 11 metric tons and also by the maximum tractive effort. On account of the high elevation, which subjects the line to more unfavorable climatic conditions than a lowland railway, it was not held advisable to permit the coefficient of friction to fall below one-seventh. The two middle driving axles are rigidly fixed in the locomotive framing and are located 7.9 ft. centers. The end driving axles have a side play of 2 in. x 1 in. and are connected with the adjacent pony axle to form a so-called Bisell truck. Pony trucks were not considered necessary owing to the comparatively small pressure on the free axles, the relatively low speed and the low unbalanced weights. The Bisell trucks do not guide the locomotive on tangents but they ease the entrance to curves.

Power is transmitted from the motors to the driving axles by means of gearing in connection with a jack-shaft and coupled side rods. The pinions of both motors operate on a common gear. To prevent a displacement of the jack shafts relative to each other both bearings were placed in a heavy cast steel frame. These side rods are placed at an angle of 90 deg. to one another.

To conform with previous standards the Hardy

vacuum type was chosen for power braking. The vacuum is obtained from an electrically-driven pump which is regulated from the cab at either end of the locomotive. The maximum braking application is equivalent to 75 per cent of the weight of adhesion with a brakeshoe movement of 1 in. The eight brakeshoes are outside-hung. Owing to the use of vacuum braking a separate air compressor was required for the current collectors, whistle and sanders. This compressor has the usual automatic governor. A hand pump is used to raise the current collectors before starting the train.

The locomotive body consists of the two cabs and the machine room. The superstructure is made entirely of sheet steel, and the roof is formed into removable sections to permit the easy exchange of equipment. The vacuum and compressor equipment can be removed through openings in the side. The motor resistances are installed under a louver in the middle of the roof to get the benefit of natural ventilation. The folding ladder at one end of the locomotive is connected with the current collector circuits in such fashion that the air in the pipe to the collectors is exhausted, thus forcing them to drop away from the line, as soon as the ladder is used.



Rhätian Railway—Standard Single-Phase Locomotive, Showing Pantographs, Ventilating Louver in Roof, Character of Drive, Etc.

The mechanical equipment in each cab consists of a hand brake, valves for the current collectors, and sanders, hand pump, pressure gage, vacuum gage, speed meter, device for operating the signal whistle, sand box, tool box and time card. Special tools and facilities for hanging clothing are provided in the main machine room.

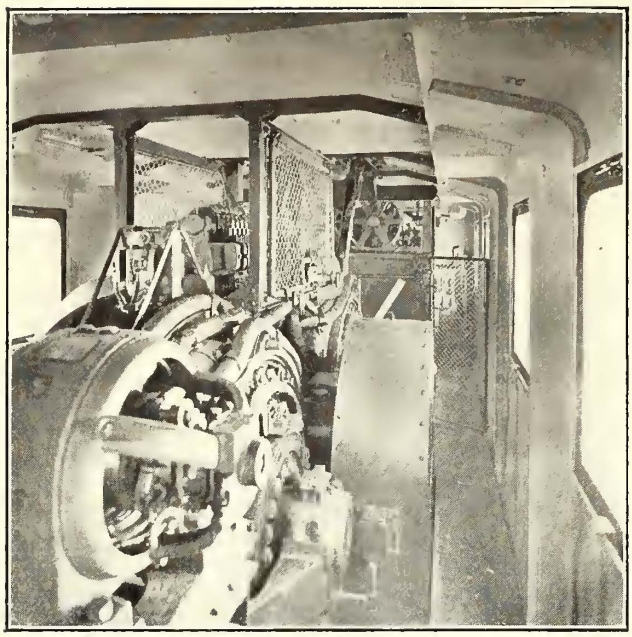
ELECTRICAL EQUIPMENT

The two current collectors are of the pantograph type with auxiliary bows capable of operating with a variation of 13.6 ft. to 20.7 ft. in the height of the trolley wire. It was feared that if only one collector was used interruptions at the point of contact would cause dangerous overvoltages at the end turns of the high-tension coils of the transformers, thus causing breakdowns between the individual windings and to ground. Furthermore, if such a single collector left the wire while going up a heavy grade the automatic no-voltage release high-tension switch would open, the motors would no longer receive current and the speed of the train would rapidly decrease. An appreciable loss in time would elapse before the motors could be placed in circuit again. This loss of time could be made up only by severely overloading the electrical equipment. The use of a second current collector also reduces the rate of wear. The pressure of the contact piece is the same at all heights, but by means of springs may be varied from 6.6 to 22 lb. Oil dash-pots are used to prevent the contact mechanism from rising too rapidly. The porcelain spool insulators used to insulate the pantograph bases from the roof were tested up to 50,000 volts. The roof of the locomotive also carries horn arresters and carborundum resistors in series therewith. The circuits on the roof are carried in bare metal pipe, but a substantial insulator is used at the point where the circuit passes to the high-tension compartment. Entrance insulators are also used above the motorman's cabs at the points where the pipe lines for the pantographs are carried.

After the high-tension line has passed the entrance insulators it must pass a choke coil and an automatic oil switch with overload and zero-voltage release. This switch can be cut in and out electrically from the motorman's cab, in addition to which an emergency mechanical cut-out is provided in the form of a lever and cable transmission. One cab is also furnished with hand-wheel control for the same purpose.

The high-tension oil switch is provided with a series resistor to minimize the current when the transformer is first cut into circuit. All parts about this switch may be grounded immediately in emergencies, and the pantographs cannot be lowered until this switch is cut out.

The transformer, which has an hour rating of 700



Rhätian Railway—Apparatus Room with Motor in Foreground and Screened High-Tension Equipment Beyond

kva, is of the dry, self-cooled type. It transforms the potential from 10,000 volts to a maximum of 390 volts. For the traction motors the secondary winding is divided into twelve steps with a maximum increase of 37 volts per tap. The heating circuit is connected to the 300-volt tap. The voltage regulator or step switch is mounted directly on the transformer and directly connected thereto with copper buses. This regulator replaces the individual contactor system hitherto generally used in locomotive service. The Oerlikon Company asserts that it was the pioneer in departing from the exclusive use of contactors for interrupting large currents.

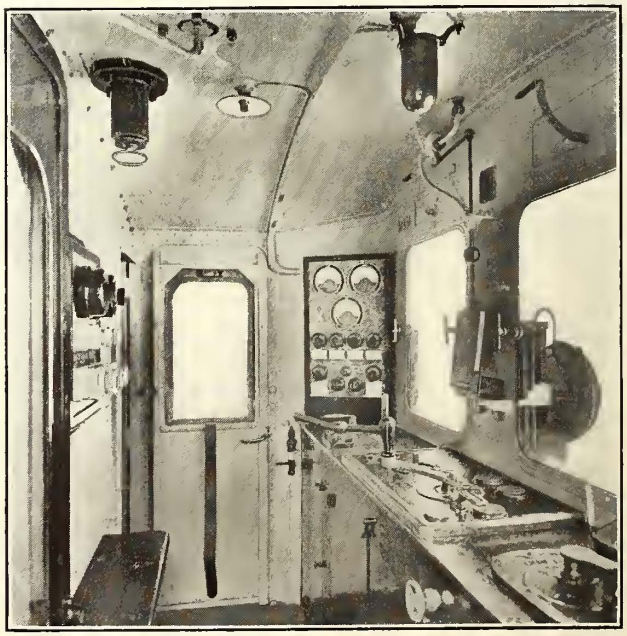
The step regulator is operated by remote control from the cabs through a mechanism which includes a servomotor to keep a catch in permanent movement. This catch is magnetically attracted to enter the gear of the regulator shaft and thus turn the shaft in the desired distance. Magnetic blow-outs are provided at two places to extinguish the arc at any step. The advantages of this form of switching as compared with contactors are stated to be compactness, short connections between the transformer and the step switch, possibility of hand operation of the switch, reliable successive backward and forward switching and confinement of arc blow-outs. The last advantage is considered particularly important because the circuit is not broken along a whole series of contacts. Choke coils are used to prevent interruption in current, as the circuit is changed from step to step, one coil being connected to the transformer at all times.

The two traction motors are of self-cooling series type with phase displacing auxiliary field. The stator windings are divided into an exciter, compensation and auxiliary field winding. The armature winding is of the ordinary d.c. type. The exciter winding generates the necessary flux for torque. The compensation winding serves only for the compensation of the cross-magnetization by the armature, and can be short-circuited on itself. The auxiliary winding, the current in which is displaced 180 electrical time degrees against that in the exciter winding, eliminates sparking due to transformer short-circuit voltages and commutating currents. In d.c. motors the commutating current would be compensated by auxiliary poles. The transformer short-circuiting voltage is peculiar to the single-phase motor. To suppress the two voltages mentioned, it is necessary to use in the stator an auxiliary field which is displaced 92 space degrees. In general, the auxiliary field of the Oerlikon single-phase motor is characterized by the condition that relative to the excitor field the time phase is displaced to the degree necessary to obtain the desired component in the direction of the exciting field and in space quadrature thereto. In this case the means for time-phase displacement is an ohmic resistance connected in parallel to the auxiliary winding. In theory, it would have been necessary to use this ohmic resistance as a regulating resistance to obtain sparkless operation at all loads and speeds. In practice this is not necessary because the auxiliary field is built for a certain load based upon the hour rating. Based upon the recent Seebach-Wettingen experiments, the armature slots have been cut at an acute angle to minimize the influence upon the neighboring weak current circuits. Change of direction is afforded by two electromagnetically operated reversers which are carried on top of the motors for remote control from the cabs, but they may also be operated directly by hand. Each reverser can be operated alone.

A special motor-generator set and storage battery was installed to have the lighting independent of the frequent variations in voltage and interruptions in current collection, and also to have direct current for control. Voltage variations which would affect the lighting are prevented automatically by a light regulating apparatus. In addition to the heaters in the cabs, means are provided to furnish electric heating for train service.

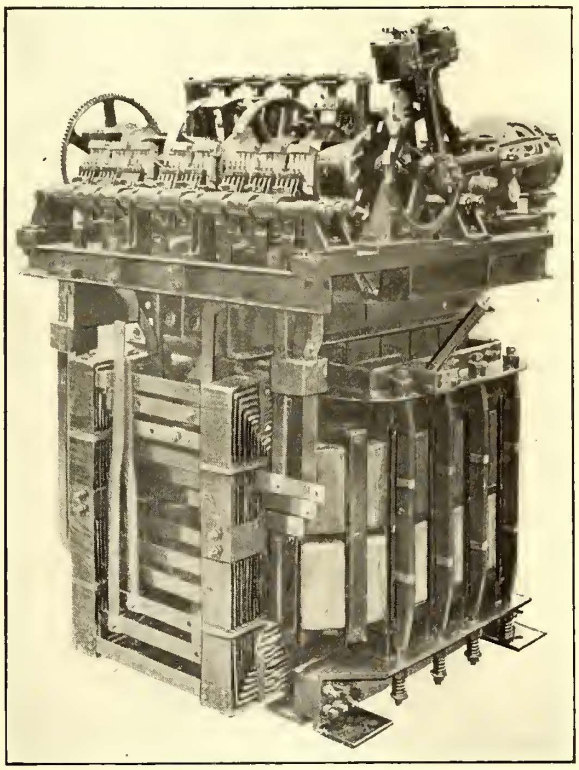
The transformer and high-tension apparatus, as well as the step regulator, is separated from the rest of the machinery equipment by partitions and wire screens. It is impossible to touch any live parts of the high-tension gear accidentally. The high-tension room can be entered only by means of a key, the use of which causes the cylinders of the pantograph mechanism to exhaust and thus break the circuit. Contrariwise, the pantographs cannot be raised until the high-tension room is closed. When the high-tension doors are opened all parts of the high-tension equipment are grounded.

All circuits are in conduit under the floor of the locomotive. The cabs, as previously noted, are isolated



Rhätian Railway—Motorman's Cab with Main Control and Braking Apparatus in Table, Showing also Location of Snap Switch and Meter Panels

from the machine room, so that the motorman is not disturbed by the operation of the machinery. From the view of a cab as reproduced it will be observed that one side is taken up by a table through which the master controller and brake handles project. As is customary, the reverser cannot be operated except on zero position of the main cylinder. The position of the reverser is indicated by a pilot lamp built in the deck plate of the controller. The zero position of the step regulator is also indicated by a pilot lamp in the deck plate of the controller. A lever, the vertical prolongation of which is connected to the pantograph mechanism, serves to raise or lower the pantographs. At the position mark "pantograph down" air escapes from the cylinder and the pantograph goes down. The high-tension oil switch always cuts out first so that the break in the circuit is not made between the collector and the wire.



Rhätian Railway—Transformer and Main Controller Combined

Other apparatus in the cab consists of measuring instruments, snap switches for auxiliary circuits, etc., mounted on two panels, one alongside the motorman and one behind him.

OPERATION.

Competitive tests of the different types of locomotives were made between St. Moritz and Schuls from Oct. 1 to Oct. 10, 1913. While the Oerlikon Company states that it would be unfair to anticipate the official report of these tests, it announces that the present locomotives showed the least energy consumption, and that the motors operated practically without sparking under the heaviest starting conditions. The motor heating was also proved to be below the permissible limits. The rates of acceleration were exceeded both on level tracks and grades.

One of the most meritorious features of the motor system described is that an appreciable drop in line voltage can readily be compensated merely by connecting the motor to a higher tap of the step transformer. The motors also are not influenced by variations in frequency. Normal speed is obtained at three to four times synchronous speed. To start with normal tractive effort calls for about one-third the normal motor voltage, at which voltage the full tractive effort may be exerted continuously, a feature which gives the motor an appreciable overload capacity at the higher speeds.

As the line voltage at starting and at full tractive effort is also one-third of normal, the conditions for the power station are most favorable. The voltage conditions are of particular importance in switching service. It is asserted that, other conditions being equal, three switching locomotives equipped with motors of this type would not make a greater demand on the power station than one switching locomotive equipped with repulsion motors.

REPLACING A BROKEN BRIDGE PANEL POST UNDER TRAFFIC

An interesting piece of repair work on a bridge while in use was recently carried out by the Illinois Traction Company. The bridge in question spans the Sangamon River at Riverton, Ill., and through a derailment one panel post in the third panel of the 116-ft. 10-in. pin-connected iron span became broken, two main diagonals became bent and three counter diagonals were broken. The eight 14-ft. 7¼-in. panels are 22 ft. center to center of pins vertically, and the trusses have a clearance between them of 16 ft. The top chord and end posts are made up of channels and cover plates, with lattice work below. The panel posts are two channels latticed together, while the lower chord and all diagonals are eyebars.

To make immediate temporary repairs, two sets of blocking were set across the bottom chord bars and on this blocking were erected 8-in. x 8-in. timber shores each side of the broken post; these were wedged to take the sag out of the top chord. This expedient enabled the bridge to carry the traffic for about ten days while the new post was being made. In the interval falsework was placed under the damaged truss.

The removal and replacement of the pins was a difficult proceeding, as they were rusted and coated with dry, hardened paint. Replacing the lower-chord pin was particularly arduous, as high water continually scoured the river bed around the base of the falsework, which consisted of 6-in. x 16-in. shoes or sills bolted to the 12-in. x 12-in. posts set in the river bed as nearly as possible under each panel point. The posts were braced and capped in line with the damaged truss, a set of wedges being placed under each floorbeam. With these wedges the truss was raised several times to a true camber line before it was possible to insert the pin. But finally, by jacking and wedging the truss above a true camber pin was inserted.

While the pin in the lower chord was out two pull jacks with chains were connected to the pins in the first panel on each side of the damaged post. Ratchet jacks were used to force the end posts in.

To obviate the difficulty of removing pins on either side of the broken post for replacement of the broken diagonals, a U, or yoke, was hooked over the pins and connected to the old counter at the turnbuckle. The main diagonals were straightened with a clamp and ratchet jack at the bend. To reinforce the bent main diagonals temporarily to carry the traffic after the new post was in and the falsework had been swept away, two pull jacks with chains were attached to the top chord in the second panel and to the pin in the lower chord of the third panel.

The work was carried on by G. A. Wright, division foreman of bridges and buildings, under the general supervision of L. B. Martin, engineer maintenance of way for the Illinois Traction Company.

Overhead Charges in Valuations*

An Analysis and Description of the Overhead Charges in Valuation, Based Upon the Classification of Overhead Charges of the Accountants' Association

BY HARRY G. ABENDROTH, VALUATION COMMITTEE, THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.

Overhead charges to be included in appraisals, such as our company is at present attempting, are one of the most discussed problems of valuation. Every accountant and engineer knows that these costs exist, but, unfortunately, we are not always so certain as to how large they are. Like any measuring device, any cost accounting system has its shortcomings and like every machine, it does not have 100 per cent efficiency. This accounts for the difference between costs on the books and actual costs.

But there are differences other than the discrepancy between book costs and actual costs, which must be considered in a valuation. Frequently book costs are not available and we must estimate the cost. Our company's engineers are confronted with this task of estimating in requisitioning work orders. Finally, there are the omissions in inventory for which the overhead charge in any fair valuation of property must compensate. Have you ever attempted to inventory every bit of furniture in your home? If you have and have attempted to recheck it, you have probably been sufficiently impressed with the impossibility of a perfect inventory. Imagine, then, the difficulties surrounding the inventory of a great public utility property, the continuous operation day and night, the heat of the power plant, the danger of live equipment, the miles of area covered and the network of pipes, conduits and cable carefully concealed from inspection. Suppose also that the work of inspection covers a long period of time and is done by a large number of appraisers, whose assignments are not sufficiently definite to insure against the omission of frequent miscellaneous items. It is inconceivable that under such conditions the inventory can be even substantially correct although many commissions have so assumed in passing upon the inventories submitted by engineers. Observations under such conditions contain large probable errors, and these must be covered by the overhead charges added to the valuation.

Just what items are classified as overhead charges and their actual amount, as disclosed by recent investigations carried on by the company, are best explained in the order outlined in the classification of overhead charges adopted by the American Electric Railway Accountants' Association at its last annual meeting. Under this classification overhead charges were grouped under the following main divisions: promotion, organization, construction, appraisers' omissions, and intangible values. Only those overhead items will be referred to as affect the appraisal of tangible property.

1. Promotion.—Under the head of promotion we find initial engineering expense. This includes salaries of surveyors and assistants, meals and lodging, livery, railroad fare, instruments, tools, etc. On $1,500,000 worth of interurban road construction, these costs amounted to approximately 2.7 per cent of the total tangible property or cost, including right-of-way. In the construction of the power plants, 4 per cent of the total work order cost was expended for salaries of company's engineers and inspectors, for architect's service, draughting, consulting engineers' services, traveling expenses, telegrams and telephone calls, surveying, blue prints, petty expenses and general office expenses. Expenses such as these are necessary before work on any undertaking can be attempted.

Another promotion charge, which becomes a part of tangible property, is initial legal expense. In the construction of an interurban line on highways in this State, the company is required to obtain the consent of abutting property owners. The property owner is generally reluctant to give his consent, and large payments for releases and easements are incurred before the right to operate is granted. Suits entailing large court costs are not uncommon, and to have work literally held up by the man with the gun is no myth. Before a transmission line can be constructed tree trimming rights and privilege to set poles must be obtained. In the acquisition of right-of-way, condemnation proceedings with their attendant costs are of frequent occurrence. The overhead charges for these items vary with different portions of the property.

2. Organization.—Under the head of organization, the second main topic, are grouped incorporation expenses including fees and expenses incident to organization and the securing of certificates of public necessity and convenience. Costs for legal advice and attorney's services, railroad fare and miscellaneous expenses are overhead charges associated with this step in the procedure. Underwriting expense forms another group of organization charges. Before any construction project can be commenced there must be funds on hand to secure payment to the contractors. Financial institutions must be retained to issue securities. In times of a stringent money market large discounts must be offered in order to interest investors in the undertaking and thus secure the necessary funds preliminary to construction. Where utility properties are originally built up through a merger of several properties it is difficult to ascertain the total amount of organization cost. In instances where records are available this overhead charge has exceeded 15 per cent.

3. Construction.—Under construction, the third group of overhead charges as found in the outline of the American Electric Railway Association, are a large number of items which are here discussed in the order in which they are listed in the report and are illustrated with concrete examples from the experience of this company.

a. Engineering—While a piece of track or a building is under construction, men are on the job to superintend the work and to see that the specifications are followed. Experts are hired to inspect and test the material used. These precautions are necessary to insure first-class construction and to forestall payments for neglected or omitted services or payment for work never done. In practice it is difficult to separate this item from administrative expenses.

b. Administrative Expenses—These include payments for the services of timekeepers, material clerks, dirt clerks, cost of clerks, paymasters, watchmen, and the necessary office supplies and expenses, such as heat,

*Abstract of paper read at meeting of American Electric Railway company-section of Milwaukee Electric Railway & Light Company, Milwaukee, June 11, 1914.

light, stationery, printing, rent, etc. The timekeepers are necessarily employed that the construction crews may receive the proper compensation for their services. Material clerks facilitate the delivery and order of material, keep a check on the quantities used and prevent premature and delayed deliveries of material. Watchmen, in addition to protecting the constructed property at night, are a necessary safety precaution against injury to the public. Street barricades and danger signals must be maintained. Lumber is needed for the barricades and oil for the lamps. Since teaming contractors are generally paid by the load, dirt clerks are necessary to check the amounts of excavated material removed. A paymaster, cost clerks, stenographers and an office, together with the necessary supplies, are all requisites to construction work. In our experience[1] these items generally exceed 5 per cent and may approach 10 per cent of the total work done in the way and structures department construction.

c. Stores Expenses—The term stores expense explains itself. Any expenses incident to the handling of material in the storerooms and yards, loading and unloading construction supplies, storekeepers and stock clerk's time in pricing of material requisitions from stock, care of stock cards and purchase of necessary supplies are a part of construction costs. An addition of 5 per cent to 10 per cent to the cost price of the material has been found necessary to cover such storeroom expenses.[2]

d. Utility Expense—Any large traction company operates a utility department, whose function it is to deliver material to the job. This company delivers by utility train, auto truck and by wagon. To maintain this service requires labor to operate vehicles, dispatch them when needed, and provide for them. Expenses must be incurred to keep utility equipment in operating condition. Stables, garages and sheds must be provided to house the equipment. Such a portion of this expense as is devoted to construction should be included in capital expenditures. The percentage of overhead charge to be added to material for this item will vary with the bulk and ton miles carried. Extensive investigations covering these items have been made by the company and the rates per car hour for different kinds of equipment determined.[3] These rates have formed the basis for determining the schedule of utility charges to various jobs.

e. Labor Expense—The overhead charges incident to labor are many and various. Extensive construction work such as the building of an interurban line frequently necessitates the importation of labor from other cities. Employment agencies are often called upon to assist in securing a large construction gang. Railroad fare and sundry expenses are necessary to transport the men to the job. Housing and sleeping quarters and commissary must be provided. Stables and shelters for contractor's and company's horses must be erected and moved as the work progresses. Another unavoidable expense always associated with construction work is the unproductive charge for layoffs on account of sickness and weather, on pay. The analysis of the payroll for one of the company departments for the year 1913 shows that the value of time off for sickness, vacations, etc., amounted to 3.49 per cent of the total payroll. In another department the percentage in 1912 was 1.51 per cent and in 1913, 2.38 per cent of the total. The total percentage for this group will vary with the size of the job, nature of the work, and its geographical location with reference to the base of supplies.

f. Contractor's Expense—Contractor's profit has been a disputed item in overhead charges. Some appraisals have included this item and others have excluded it. Experienced contractors generally allow a large margin above actual costs to insure against losses due to unusual and unforeseen difficulties, and to care for their profit. Unless adequate provision is made for similar contingencies elsewhere in the overhead charges, a similar percentage must be included under this heading where construction work is not done by contract.

g. Equipment and Tools—With regard to equipment and tool expenses the experience of a subsidiary construction company is submitted. This company did the greater part of the track construction for our company during the year 1913. An accurate record was kept of all tools used. Their value was determined at purchase and an appraisal made at the close of the season. The expenses for maintenance and depreciation amounted to 9.15 per cent of the total payroll charges. Investigation discloses that the care and depreciation on track tools is higher than in other departments. Generally considered, about 5 per cent of the total payroll charges will cover the use of tools. This does not cover shop expense on material used in process of construction, which ranges from 25 per cent to over 100 per cent.

h. Preliminary Construction—Every type of construction undertaken by a traction and light company involves some preliminary and protective construction. Stretches of interurban track are built and later are moved because of operating and legal necessities. In tunnels and large buildings thousands of feet of lumber are used for false work which later is usually worth its value as fire wood. Circumstances frequently arise which change plans completely, and parts already constructed are torn out to conform with new specifications.

i. Injuries and Damages—Through the operation of adequate safeguards the cost of injuries and damages during construction can be reduced to small proportion of the total cost. This item is present, however, and no appraisal purporting to determine the actual value can disregard it. From an analysis of claim department charges for this company for the years 1911, 1912 and 1913, the total costs of claims and releases, physicians' fees, attorneys' fees, claim department salaries and expenses, etc., chargeable to construction ranges from 0.08 to 0.28 per cent of the total capital expenditures. If the construction job involves great risks such as are involved in the erection of a large building, bridges, tunnels and tower lines, the proportion will of necessity be greater. The operation of the workmen's compensation act has generally raised the costs over those obtaining in prior years.

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[1] An analysis of twenty-three separate jobs discloses the following figures:

Median	5.03 per cent	Includes switchmen and flagmen and temporary track, but excludes timekeepers, material clerks and dirt clerks.
Maximum	9.30 per cent	
Arithmetic average	5.12 per cent	
Minimum	2.12 per cent	

A five-year average for all construction was 4.17 per cent for general administration, that is, the salaries of the general officers and clerks, the office supplies, rent, etc., and 2.65 per cent for local administration.

[2] A table showing the average overhead charges on all material in percentage of material cost follows:

	A— per cent	B— per cent
Purchase and receipt of material—total	2.24	2.67
Teaming, auto and utility service	0.59	0.64
Salaries and wages	1.65	2.03
Care and disbursement of material—total	2.98	3.17
Salaries and wages	1.77	2.00
Light, heat and janitor service	0.04	0.04
Breakage, obsolescence and shrinkage	0.85	0.92
Insurance	0.32	0.21

These percentages do not include delivery of material to the job.

[3] The following rates per hour have been determined for different classes of equipment:

	Cost per Car Hour
Motor car	$0.60
Double truck flat car	.60
Dump car	.30
Single truck flat car	.30

j. Legal Expenses During Construction—It frequently happens that during the construction of a transmission line, suits are instituted relating to removal of poles and alleged damages to property. The violation of contract provisions also entails litigation, and claims for unpaid wages or shortage frequently necessitate attorneys' services. This item will also vary with different parts of the construction about to be appraised.

k. Taxes During Construction—When work is in process of construction for a number of years, as in the case of several of our power plants, the terminal building and the interurban lines, taxes are payable on the parts completed. Such properties are not operating for long periods, and before operation begins and earnings accrue substantial sums have been expended for this item.

l. Insurance During Construction—As a protection against fire, cyclones, lightning and floods, property constructed and materials delivered on the job must be insured. Employees handling money and material, such as timekeepers, cashier, superintendents, etc., must be bonded. These precautionary measures, whether covered by insurance in outside companies or carried by our company, involve costs, which any adequate overhead charge must include.

m. Interest During Construction—This item has been generally agreed upon as a proper overhead charge. The Wisconsin Railroad Commission has allowed from 3 per cent to 4 per cent of total construction cost for this item. If the construction period does not cover more than one year this allowance is adequate. However, attention may be called to the time it frequently takes to construct some of the properties of our company.[4] One item necessarily involved from the very inception of the property is land. Long before any part of the property can operate, money has been lying idle in land investments, and this value assumes large proportions in such extensive properties as those cited. The discounts and necessary cost involved in handling a bond sale have been alluded to.

n. Unforeseen Contingencies—The unforeseen contingencies allowance during construction is probably the most disputed and least understood item of construction cost. It is always difficult after work is completed to appreciate the existence and consequent cost of unusual items included in this group. Generally speaking, contingencies are those unexpected and unusual difficulties or incidents arising during construction which it is difficult to anticipate and which cause a departure from the estimated costs. Because an appraisal will not reveal these departures in the estimated costs, an allowance must be made in the overhead charges. The character of these contingencies is varied, as will be apparent from the following illustrations:

On the interurban line No. 1, the right-of-way at a certain point could not be obtained, and the track was constructed on a curve to the north. Later the railway company gave a deed of land sufficient to make the line straight, and the track was constructed as it now exists. Bridges were strengthened and reconstructed and settlement had to be made for damages to land in numerous instances all along the line. Near one of the lakes a very large sink hole was encountered. The grade at this point when first established was about 15 ft. high, and one morning it was probably that many feet under water. The spot was graded three times, hundreds of piles were driven, and more or less filling has been going on ever since.

On interurban line No. 2 the company practically graded a street for six blocks due to the construction of the subway under the tracks of the steam road. One sink hole on this line probably caused three times as much grading work to be done as would have been necessary under ordinary circumstances. At another sink hole the ground sank until the original culvert entirely disappeared and the company had to excavate across the entire width of the fill and put in the present existing iron culvert. The right-of-way at another spot revealed an underground lake. When the grade was established the line began to settle, and efforts to stop it were futile. Piles were driven until it was found impossible to hold the grade. All the available timber in the vicinity, used in preserving the fill, is now probably many feet underground. Fully five years intermittent work was necessary to stop the settling.

On interurban line No. 3 another costly sink hole developed. Double sections of piling were driven; about forty acres of trees and underbrush was cut and spread over the top of the marsh over which hundreds of train loads of refuse, dirt and cinders were dumped.

This type of contingency, which might be called the contingency due to uncertain foundations, has been elaborated upon largely because it illustrates costly

[4] The accumulation of charges on the construction of two large power plants and the terminal building lasted over six years, on interurban lines over five years, etc.

Table Showing Overhead Charges Used in Various Traction Appraisals

	Total	Promotion and organization	Legal	Engineering and superintendence	Interest during construction	Contractor's profit	Taxes and insurance	Contingencies	Brokerage and commissions
1. Chicago Surface Railways, 1906..... B. J. Arnold, M. E. Cooley and A. B. Du Pont.	21.7	...	...	[1]11.7	...	...	...	[2]10.0	...
2. Puget Sound Electric Railway..... Washington R. R. Commission.	15.7	...	0.5	5.9 and 1.7	4.6	...	...	3.0	...
3. Appraisal of Street Rys. for Massachusetts Valuation Board, 1911.....	29.0	...	4.0	5.0	10.0	...	...	...	10.0
4. Chicago Consol. Traction Co., 1910..... B. J. Arnold and George Weston	38.4	...	...	[1]14.6	[3]5.8	...	...	...	18.0
5. Metropolitan St. Ry. System, Kansas City, Mo.	[4]33.0	8.0	7.0	...	7.0	...	...	...	...
6. Coney Island & Brooklyn R. R.— Pub. Serv. Comn., First Dist., N. Y.....	24.81	5.15	...	5.15	...	9.36	...	5.15	...
Ford, Bacon & Davis.....	34.0	...	...	...	...	...	...	...	...
7. Cleveland St. Railway— U. S. Dist. Judge Robert W. Tayler.....	22.18	...	...	...	...	...	...	...	...
Ford, Bacon & Davis.....	17½-35.0	...	...	[5]5-10	...	7½-15	...	5-10.0	...
William Barclay Parsons.....	[6]30.0	...	...	5.0	...	10.0	...	10.0	...
Stone & Webster.....	...	...	...	10.0	...	...	...	...	...
8. Brooklyn Rapid Transit System.....	[7]21.0	...	...	...	...	...	...	...	...
9. The Mil. Elec. Ry. & Lt. Co..... Prof. M. E. Cooley.	[8]28.0	2.5	...	4.0	6.0	...	0.5	5.0	...
10. G. T. Bishop, President Washington, Baltimore & Annapolis Elec. Ry.....	[9]20.0	...	...	...	...	...	...	...	...
11. Reorganization Third Ave. Ry., New York. Henry Floy.	40.0	...	...	...	...	...	...	...	...

Notes—
[1] Includes organization and incidentals.
[2] Includes legal expense, interest and brokerage.
[3] Includes legal expense and contingencies.
[4] Eleven per cent average of additions to separate departments.
[5] Includes organization.
[6] Five per cent for miscellaneous.
[7] Contractor's profit, incidentals, engineering and administration.
[8] Acquiring land, 10 per cent.
[9] Considered an underestimate.

construction work which an appraiser viewing the right-of-way at this time is certain to omit.

Contingencies due to weather often play havoc with construction work. Cloudbursts and washouts in this country are not infrequent occurrences. Where trenches are dug in the city, ready to receive the track structure, it often happens that a heavy rain will fill the trenches sufficiently to cause serious delay and consequent expense. On interurban lines heavy rains have washed away miles of newly constructed fills and ballast. Floods have caused great damage to bridges. Work in progress has been seriously impaired by breaking cofferdams.

Contingencies due to labor difficulties are more frequent occurrences than is generally anticipated. Strikes or sudden stoppage of work by unskilled laborers, ranging from a day to longer duration, disarrange the schedule of completion and cause costly delays.

Contingencies due to public requirement are not uncommon. The delays due to securing necessary permits are frequently costly. In our experience changes in grade have on numerous occasions been ordered while work was in progress, causing a substantial increase above the estimated or normal cost.

Contingent expenses due to trespass cover many unexpected incidents of construction. In the building of transmission and distribution lines, trimming trees and the evident trouble in securing the right to trim, are common occurrences. Property owners are not always disposed to allow the stringing of wires and the erection of poles near their premises. Sometimes poles after being placed have to be moved on complaint of the property owners abutted.

Unforeseen physical obstructions to the progress of the work are particularly common in underground excavation work. In running conduit the obstructions encountered are conduits of other companies, tunnels, storage vaults, gas and water pipes, manholes, steam and water mains. Additional tunneling, recompense for damages to private properties, and repairs to other properties, are but a few of the contingent costs. In the building of manholes, old pavement, heavy boulders and often solid rock are encountered. Frequently long runs must be made to make the necessary sewer connections. In running services, besides such contingencies as mentioned, large trees inside the curbline, cement sidewalks and retaining walls must be contended with. When pulling in cables, ducts are sometimes shattered due to gas explosions, and ducts in which dirt has piled up must be cleaned out. In building excavation and foundation work, difficulties of a more or less serious nature are cave-ins, the falling of concrete walls due to the removal of the false work, the freezing of mortar in freshly-laid brickwork, necessitating extensive rebuilding of the same, and the shifting of walls.

The items which have been illustrated or referred to are not mere fancies of some creative imagination. They are isolated instances of contingencies which have actually occurred, and when assembled represent the expenditure of large sums. Many can be separately substantiated by vouchers, others cannot be segregated from the total construction charges, but serve to explain what a mere estimator of figures would term "abnormal costs." Every construction engineer can probably add his testimonial to the list. In an effort to arrive at some figure showing what the contingency item alone amounts to, a comparison was made of the bare physical reproduction new value of certain properties of this company as determined by separate appraisal, and the value as shown by the original cost records. In isolated instances where such a comparison was possible, the excess of actual costs over the appraisal ranged from 8.55 per cent to 12.7 per cent.

While this paper does not attempt to decide the question of overhead charges, it is submitted in an effort to determine what the term embraces and to assist in arriving at some definite conclusions as to how such allowances must be calculated. Overhead charges submitted in appraisals of traction properties cover a wide and conflicting range. On page 1436 is a table of some of them. What is particularly needed is an historical study by engineers and accountants of the actual overhead costs. In no other way can much of the doubt as to actually existing costs be dispelled and all past outlays for property be recognized.

REPORT OF PUBLIC UTILITIES COMMISSION OF CONNECTICUT

The Public Utilities Commission of Connecticut recently issued its second annual report for the year ended June 30, 1913, stating the general conduct and financial condition of all public service corporations in the State as ascertained by it during the year. During the year the commission entered seventy-nine general findings and approved eighty-nine applications for construction or reconstruction of tracks of railway companies. During the period in which the commission had been in operation only one bill has been taken to the courts from its decisions, and this, according to the report, has apparently been abandoned. The report of the chief engineer of the commission for the year on the subject of street railway lines indicates in general that the physical condition of the properties improved during the period. The number of operating railway companies increased from thirteen to fourteen during the year. There was a net increase in the amount charged to construction and equipment of lines owned of $1,097,333; of lines leased, $486,831. There was an increase in investments held by street railways of $496,962. Operating revenues increased $664,970 and operating expenses increased $437,333, all divisions of each group showing increases. The results of operation showed an increase in net operating revenue of $227,638. The taxes increased $35,919, and dividends declared decreased $4,537. The grand surplus for all companies showed a decrease for the year of $134,352. The total number of fare passengers reported for all roads, with the exception of the Rhode Island Company, was 220,019,829, and the total increase was 11,814,631. The total average fare revenue for all passengers on lines charging 5-cent fare was 4.35 cents.

ELECTRIC STREET RAILWAY PROGRESS IN PERNAMBUCO, BRAZIL

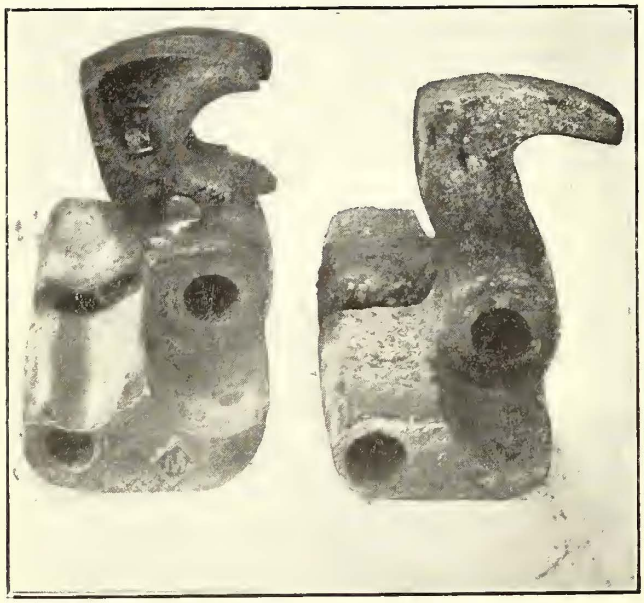
The street railway at Pernambuco, Brazil, was placed in operation on May 13, 1914. The electric cars will be operated only to the ends of the first pay divisions, from which points, until the different lines are in operation, horse cars will continue to convey passengers to their destination in the suburbs. The main power station when completed will generate 4400 kw and will be equipped with four 1000-hp boilers (B. & W. marine type), four 1000-kw turbines, and a 400-kw engine set. The electrical equipment is American and English. The carhouses are being built of steel imported from England. The cars are English and American, about fifteen of which have been set up and are ready to run. All the steel rails have been imported from the United States. The city at present is being partially lighted by a plant temporarily erected. The suburban car lines are being extended and the entire work is expected to be completed by Jan. 1, 1915.

Oxy-Acetylene In an Electric Railway Shop

This Article Describes the Great Variety of Welding and Cutting Jobs Possible with Oxy-Acetylene Equipment, from Broken Gear Teeth and Chipped Wheel Flanges to the Shafts of Large Machine Tools—The Descriptions and Costs Apply to Work Done on the Illinois Traction System

Through the courtesy of the Illinois Traction System several interesting welding and cutting operations were recently performed in the presence of a representative of this paper at the large interurban shops of the Illinois Traction System at Decatur. These operations included such work as repairing cracked air-compressor castings, building up gear teeth and armature shafts, and several other filling-in and patching jobs. Repairs were made to cast iron, cast steel, wrought iron and wrought steel. One of the most interesting jobs was that of making a cut across the underframe of a large interurban car.

The means employed was the oxy-acetylene welding and cutting equipment supplied by the Prest-O-Lite Company, Inc., Indianapolis. This equipment is of the portable type. It consists of one cylinder of acetylene gas, one cylinder of oxygen, one oxygen regulator, one acetylene regulator, one welding blowpipe with interchangeable heads and one cutting torch. The welding



Oxy-Acetylene Welding—Fig. 1—M.C.B. Knuckles with Worn and Built-Up Faces

blowpipe had a series of welding tips suitable for all classes and thicknesses of work likely to be met in electric railway shop practice. These welding tips ranged in capacity from 1.5 to 35 cu. ft. of free acetylene per hour, the consumption of oxygen being approximately 1.2 parts to one of acetylene.

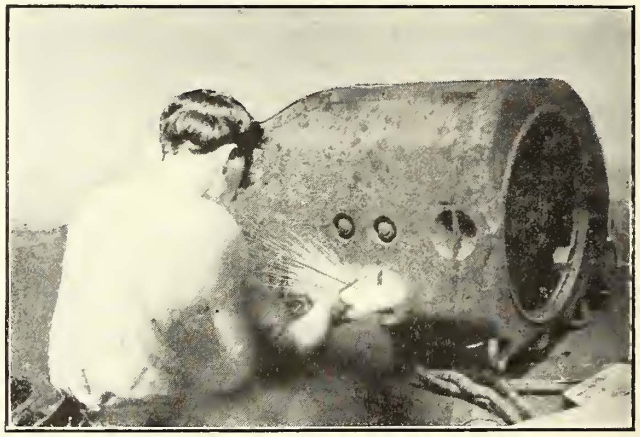
The entire equipment was mounted on an ordinary two-wheel truck, and one man could easily take it to any part of the shop or shop yards. The extreme portability of this type of apparatus is one of the advantages asserted for it by the manufacturer. It is pointed out that in general shop and track use the cost of making repairs will be reduced considerably if a portable welding outfit is employed. Then the outfit can readily be wheeled to the work for much less cost than that for transporting heavy castings about the shop.

A brief description of the essential features of each of the welding and cutting jobs done at the Illinois Traction shops will be presented. In connection with the costs, as given in these descriptions, it should be noted that these are based on a charge of 2 cents per cubic foot for oxygen, 2 cents per cubic foot for acetylene, at atmospheric pressure, and 30 cents per hour for labor. The cost of filler metal is small, so small in fact that ordinarily it can be neglected because scrap found around the shop can be used; or if new filler metal is desired it can be purchased at 3 cents per pound.

One advantageous feature in connection with blowpipe welding using the oxy-acetylene flame is that it does not affect the skin. The glare, of course, is injurious to the eyes unless properly tinted glasses are used. These glasses, however, need not be very dark. It is unnecessary to protect the face and hands as in electric arc welding, where the injurious rays destroy the skin.

BUILDING UP COUPLER FACES

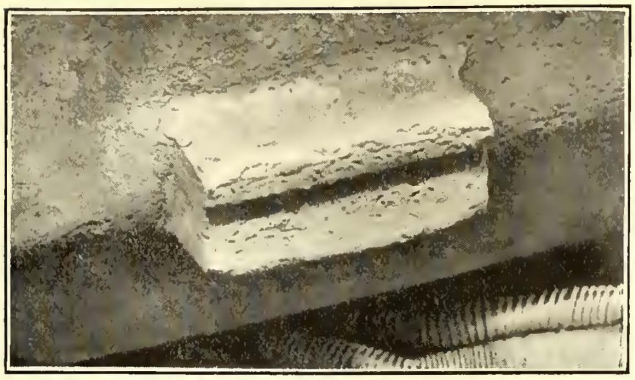
All of the interurban rolling stock of the Illinois Traction System is equipped with the Bosenbury type M.C.B. radial couplers. These couplers conform strictly to M.C.B. requirements, except that they are



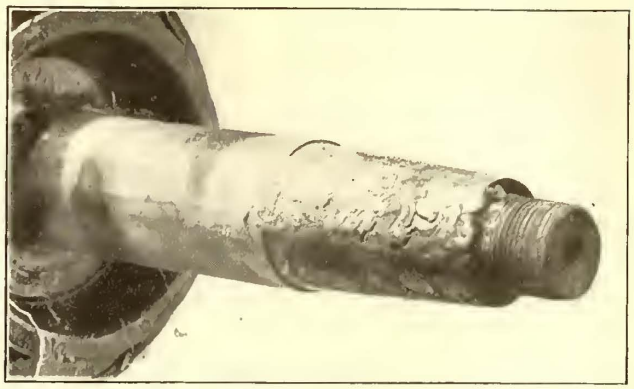
Oxy-Acetylene Welding—Fig. 2—Applying Steel to a Motor Nose

radially mounted, and those on the passenger cars have extra high knuckles. The total height of the I. T. S. passenger car knuckles is 16 in. Freight car knuckles are M. C. B. standard, and as the road has more than 1200 cars and locomotives, practically all of which are in train service some part of the day, the couplers get considerable wear. Hence their maintenance is a regular feature of shop work.

Fig. 1 shows a worn passenger car knuckle and a knuckle after new metal had been applied to build up the engaging face. These knuckles are of cast steel. Their cost new is $3, and their exchange value 60 cents. They have a scrap value of about 30 cents. The worn part of the knuckle had an area of 13 in. x 3½ in. to which new metal was applied to a depth of approximately ½ in. This new metal is a tough steel which will withstand more abrasion than the original face of the knuckle. The total time for building up the face



Oxy-Acetylene Welding—Fig. 3—Half Inch of Hard New Steel Built on Motor Nose



Oxy-Acetylene Welding—Fig. 6—Flame-Welded Steel Filling Armature Shaft Keyway

of this knuckle was twenty-five minutes for welding and ten minutes for preheating with an oil torch. The cost (gas and labor) of adding the new metal was 69 cents.

BUILDING UP WORN MOTOR NOSE

In order to demonstrate the ease with which new, hard, tough metal can be applied to large steel castings without any preliminary preparation, the nose on a GE-73 motor was built up by the addition of ½ in. of new mild steel. Fig. 2 shows the operator at work, and Fig. 3 shows the appearance of the nose directly after welding. The top face of the nose is 6 in. long by 2½ in. wide. Ordinarily a mechanical patch would be put on by first dressing off the nose, then drilling it and riveting on a ½-in. piece of steel. Without any preheating new metal to a depth of ½ in. was added with the Prest-O-Lite welder in sixteen minutes' welding time and at a cost for labor and gas of but 76 cents. The new metal so applied is tough and has a smooth surface and required no grinding before it was put in service.

BROKEN LUG ON COMPRESSOR FRAME

Fig. 4 shows a lug which was broken off the corner of a GE type CP-22 compressor case. This lug was welded in place for 29 cents. The appearance of the lug after welding is shown in Fig. 5. It was finished and redrilled in ten minutes. The lug had been broken evenly along the axis of the bolt hole. The welder operator first chipped and ground the faces of the break to make them V-shape. Then the broken part was set in place without any fastening, and the torch was applied. The welding required but five minutes, and the total time for doing the job was less than nine minutes. A mechanical patch would have cost about $5 and would have required the forging of a yoke as well as drilling and tapping the casting.

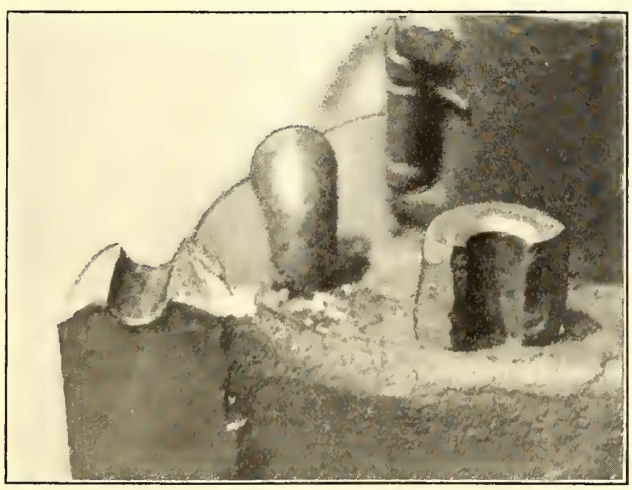
FILLING WORN KEYWAY

Fig. 6 shows the new metal applied to fill the worn keyway of an armature shaft of a GE-57 motor. This keyway, 4¾ in. long x ¼ in. deep, originally was ¾ in. wide. It had been worn to a width of 1⅛ in. This slot was filled with new steel in twenty minutes. But two minutes was required to get the shaft ready for welding. The only preparation necessary was that of cutting a piece of sheet asbestos to fit over the shaft and protect the end of the armature from sparks.

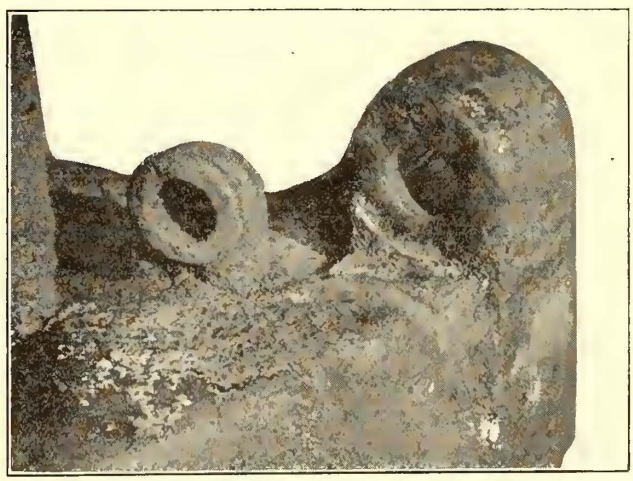
The cost of filling in this new metal was 44 cents for gas and 10 cents for labor, a total of 54 cents. It was found that the weld was quite soft and easily machined. The comparatively smooth surface of the weld simplified the making of the roughing cut, and the character of the new metal was such that the new keyway could be cut at any point on the perimeter. This illustrates a feature for which the advocates of flame welding make strong claims, namely, that with flame welding a molten bath is obtained into which the new metal is melted, and thus when a weld has been made there is no line of demarcation between the new and the old metal.

WORN EQUALIZER BAR

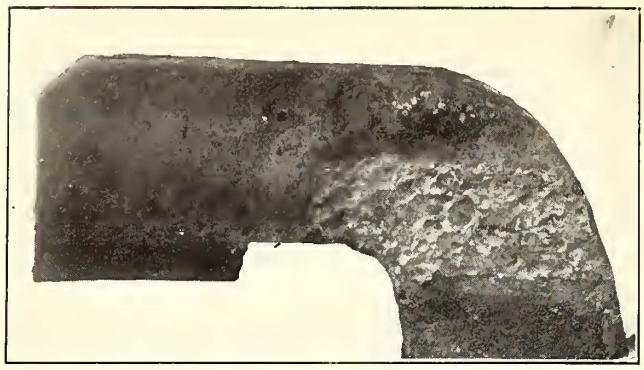
Heretofore when equalizer bars have been badly chafed by the top of the pedestal jaws it has been the practice to repair them in the blacksmith shop. The worn ends have been cut off and new ends welded on at a cost of about $1.50 per equalizer. The repair shown



Oxy-Acetylene Welding—Fig. 4—Compressor Frame Lug Ready for Welding



Oxy-Acetylene Welding—Fig. 5—Lug Welded on Compressor Frame



Oxy-Acetylene Welding—Fig. 7—Worn Area on Equalizer Filled with Welded Steel

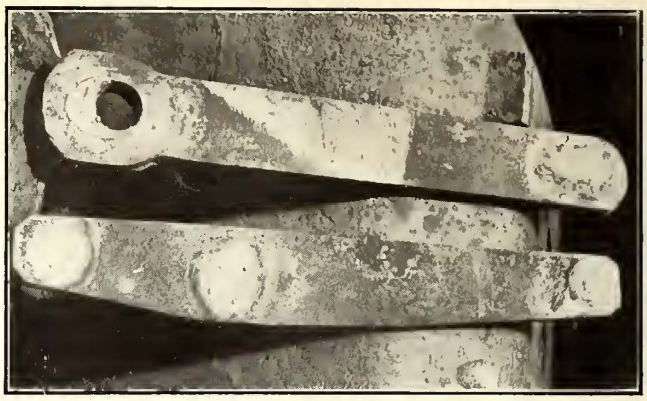
in Fig. 7 was made with the welder complete and ready for putting back into service in eighteen minutes at a cost of but 48 cents. This equalizer had been worn at both ends. At one end the depression was 5½ in. x 2 in. in area x 3/16 in. deep, and at the other end the depression was 6½ in. x 3 in. in area x ⅜ in. deep. Both of these depressions were filled in with new steel which, while still hot, was hammered flat with a machinist's hammer, so that when the welder had finished the equalizer was ready for use without grinding or machining.

CHIPPED FLANGE OF M.C.B. WHEEL

An interesting repair, which meant the salvage of a new 625-lb. cast iron M.C.B. freight-car wheel was made by filling in a chipped place with new cast iron. This wheel had been chipped in unloading. The missing chip in the back of the flange was 5 in. long x 2½ in. wide and had a maximum depth of ½ in. This new wheel could not be put into service because it would not pass M.C.B. inspection. The money loss of this wheel, unless the repair had been made, would have been about $4.

New metal was built into the chipped place until the flange was full, and this was done at a cost of 42 cents for labor and gas, in addition to the cost of twenty minutes' preheating with an oil torch. The cost of dressing was 20 cents. Fig. 8 shows the chipped flange before filling, and Fig. 9 is a close view of the repair.

No special preparation was necessary for making this repair. The wheel was lifted with the shop crane and laid flat on four fire brick, so that the oil-torch flame could heat it moderately. Care was taken in the preheating and in the welding not to remove the chill in the tread. The filler used in welding was a cast-iron rod containing a percentage of ferro-silicon. Thus the new metal is practically uniform with that of the body



Oxy-Acetylene Welding—Fig. 10—Holes Plugged in Link and Lever

of the wheel, and after the surface of the weld was ground off the wheel was put into service.

WORN BRAKE LEVER AND SWING LINK

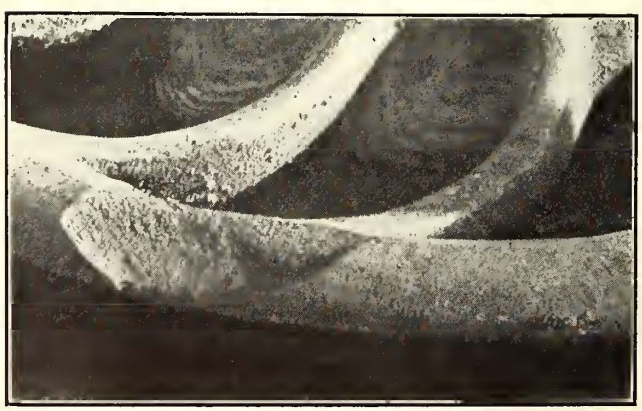
Fig. 10 shows the welds made to a brake lever and a swing link for a Baldwin truck. The hole in the link had been worn until it had a long diameter of 2¼ in. The thickness of the metal was 1½ in. It was repaired by the addition of ½ in. of new metal, which made the hole slightly smaller than its original diameter. The slot at the other end of the link was also completely filled with new metal. The total welding cost for this job was 37 cents.

All of the brake lever holes were filled with new metal. As in the case of the swing link, the brake lever was set upon fire brick, and the holes were filled with new metal which flowed into a close weld with the sides of the old hole. The cost for filling these holes was 42 cents. Both the brake lever and the swing link were preheated for five minutes in an oil furnace so that the welding time would be reduced and the amount of welding gas thus kept at a minimum.

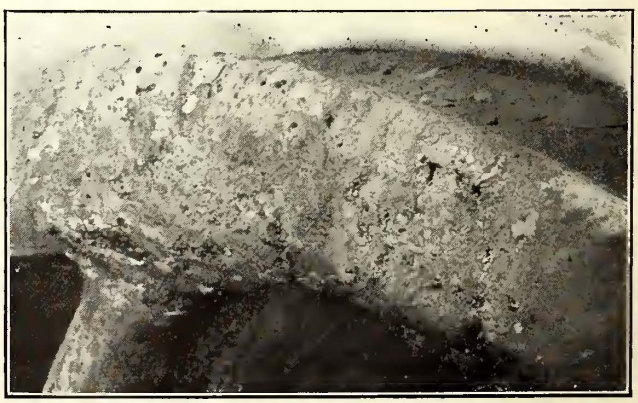
PATCHING A GEAR CASE

Fig. 11 shows the repairs made to the lower half of a worn GE-69 gear case. This had been worn through to a length of 9 in. where it had formerly been patched. This patch had been torn off in service. The case also had a crack 8 in. long at one corner of the 6-in. x 9-in. hole, and six ¼-in. rivet holes were to be filled, so that the case would be made oil-tight. The cost of the new case was given as $10.77, its scrap value 25 cents. The cost for welding on a patch, plugging the six holes and filling in the crack to make the case ready for service was but 49 cents.

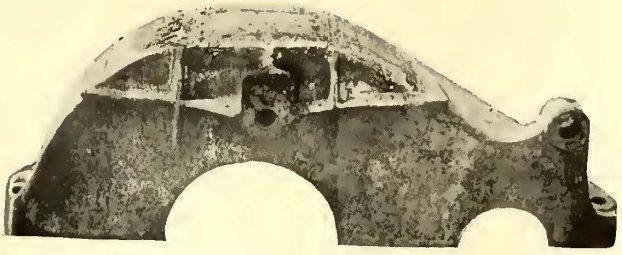
On this job the cutting blow pipe was first used. In less than two minutes the operator had squared out a



Oxy-Acetylene Welding—Fig. 8—Broken C.I. Flange



Oxy-Acetylene Welding—Fig. 9—Repaired C.I. Flange



Oxy-Acetylene Welding—Fig. 11—Gear Case with Patch Welding In and Crack and Holes Plugged

6-in. x 9-in. hole. In the meantime a patch of that size had been cut in the tin shop. This patch was welded on in fifteen minutes, and the crack and six holes were filled in in another minute. This job could have been completed in a much shorter time if the gear case had been preheated, but it was welded without preheating to permit a study of its contraction and expansion characteristics.

BROKEN MAIN SHAFT OF BOLT CUTTER

On the day previous to the arrival of the welding apparatus at the Decatur shops the main shaft of the shop bolt cutter broke. This shaft was welded and put back in operation with less than two days' loss of service. If this repair had not been made at the shop the bolt cutter would have been out of service about three weeks while the new part was being ordered and delivered. Further, the renewal cost would have been about $20 as compared with a cost of 84 cents for welding and $1.50 for machining.

Fig. 12 shows the shaft, which was of hollow cast iron. It had an inside diameter of 2 in. The metal was ¾ in. thick. It was broken close to the fillet of the end flange. A large gear was keyed onto the other end of the shaft, and the repair was made without removing the gear.

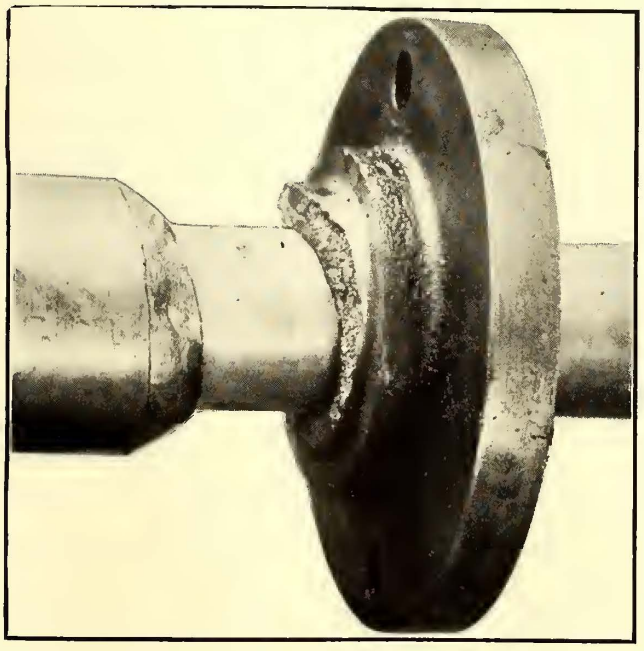
The first step was to grind one end of the break to a bevel, so that the blowpipe flame could reach the full surface of the break. Next, the two parts were slipped onto a mandrel and a clamp was placed against the face of the flange to hold it square with the shaft. Before welding, the parts were heated in an open oil flame for four and one-half minutes. Then new iron was welded in, Fig. 13, and the break was over-filled so that there would be plenty of metal for machining. It is stated that this shaft machined very nicely, free from flaws and that it has been in severe service since.

BROKEN GEAR TOOTH

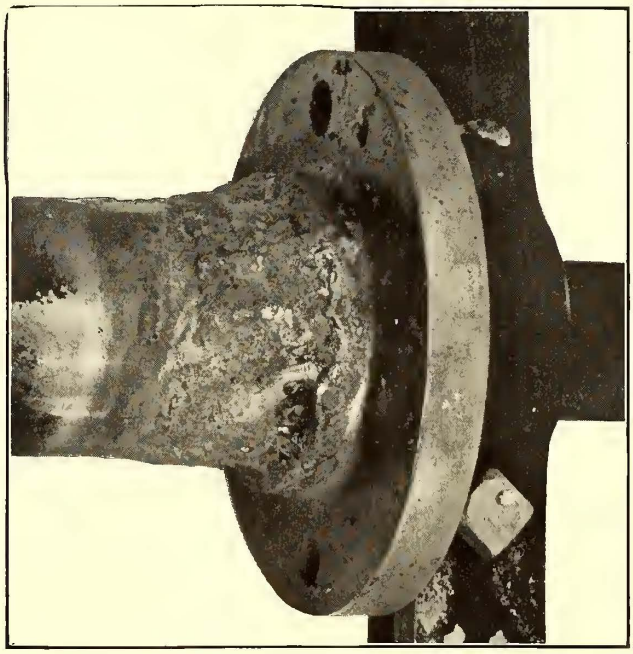
Fig. 14 shows one broken tooth in a GE-69 motor gear. This gear has sixty-eight teeth and a 5¼-in. face. It consists of a steel rim shrunk on a cast-steel center. The tooth was broken in unloading and therefore the new gear could not be used. This tooth was built up ready for grinding, Fig. 15, at a welding cost of but 42 cents. No special preparation was required other than that the broken tooth was heated with an open-flame oil torch for about ten minutes. In adding new metal a nickel-steel filler was used, and especial care was taken to match the metal of the gear and to manipulate the temperature so that the new metal would correspond closely in characteristics with the other teeth. The tooth was built up to full contour ready for grinding in fifteen minutes and with the use of but 8 cu. ft. of acetylene and 9 cu. ft. of oxygen. The total welding cost, exclusive of preheating, was 42 cents.

CUTTING UP CAR UNDERFRAME

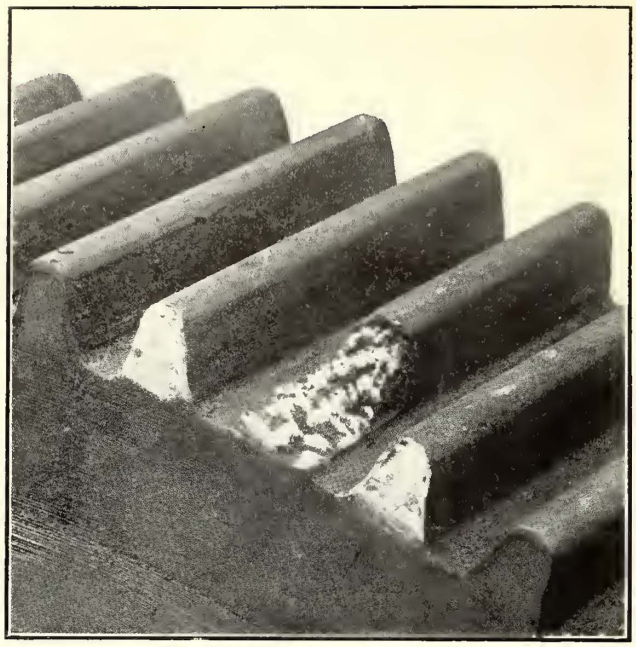
Figs. 16 and 17 show how the Prest-O-Lite cutting apparatus was used at the Illinois Traction System shop to cut up a car underframe for scrap purposes. This underframe was that of a large interurban car which had been burned. The underframe was in the scrap yard near the shop, and as it was unwieldy and difficult to break up, the cutting torch was used to disassemble the principal members. The underframe included four 6-in. I-beam center sills, four 3-in. x 3-in. x ¼-in. angles attached to two 18-in. x ¼-in. plate side sills, eight ¾-in. tie rods and four 2½-in. x 5/16-in. truss bars. The foregoing is an inventory of a section across the frame near the middle. This section was cut through and the frame entirely severed with the oxy-acetylene cutting torch in twenty minutes, even though some delay was occasioned by wood filler blocks on the four center sills, the wood preventing the torch from blowing the metal away from the cuts. After the frame had been cut, as shown in Fig. 16, the tie rods were cut so



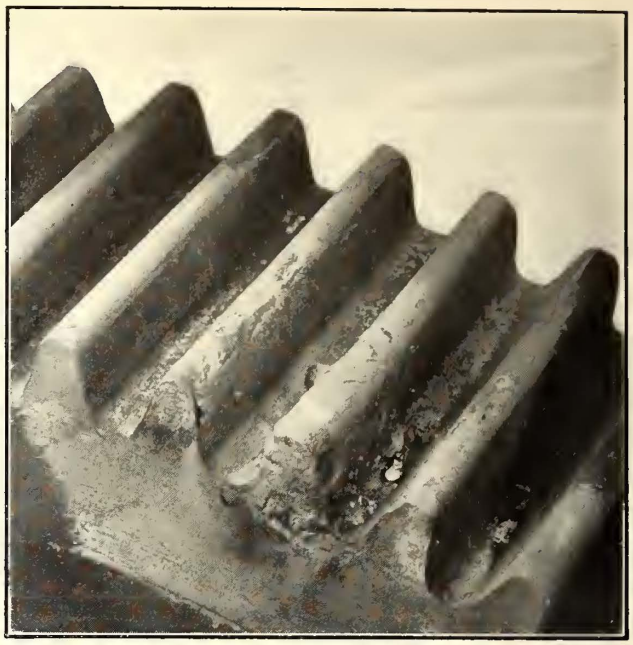
Oxy-Acetylene Welding—Fig. 12—Broken Cast Iron Shaft Ready for Welding



Oxy-Acetylene Welding—Fig. 13—Shaft with New Cast Iron Welded in Place



Oxy-Acetylene Welding—Fig. 14—GE-69 Gear with Broken Tooth



Oxy-Acetylene Welding—Fig. 15—New Nickel Steel Tooth Built in Gear

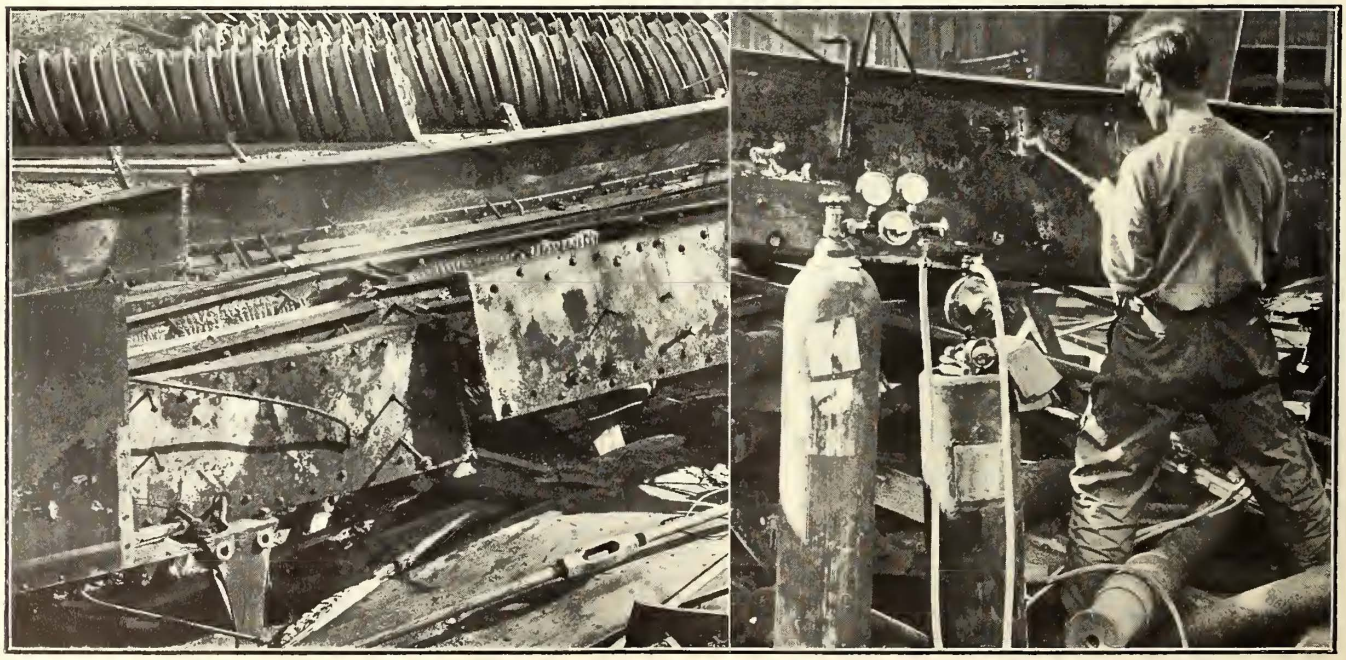
that the side sills and the four center sills fell apart. The cost (labor and gas) for making the cut across the center of this underframe was $1.02. Fig. 17 shows the operator at work in making a cut on one side of the 18-in. side sills. All of the apparatus required for the job is shown in view.

Another job which demonstrated the large saving by the use of the blow-pipe was that of cutting off the heads of the bolts and rivets which hold the coupler anchorages between the steel sills of 80,000-lb. capacity freight cars. This task ordinarily requires three men's work for ten hours, but one man with the oxy-acetylene torch did the same stint in forty minutes.

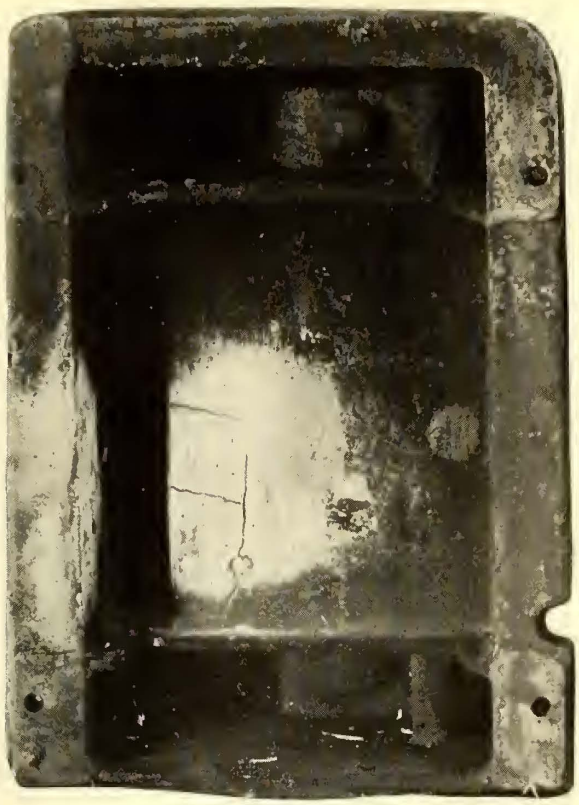
CRACKED MOTOR-COMPRESSOR CASTINGS

Figs. 18 and 19 show a National B-2 motor-compressor case before and after repairing with the blow-pipe. This case, which costs new $37.50, has a scrap value of about 75 cents and was repaired ready for reassembling at a cost of 30 cents, exclusive of a few cents worth of oil and labor required for preheating. The case had four bad cracks in the bottom and side of the oil well just below the cylinders. The ordinary way of repairing would have been to rivet on a steel patch, but this would have been exceptionally difficult to make tight, because the cracks were on two sides of the oil well. The repair was made with the blowpipe in twenty-five minutes.

The case was stood bottom-side up on the shop floor and an inclosure of loosely piled fire brick was built around it. The bricks were piled so that a hole was left through which an oil torch flame could be directed into one of the cylinder openings for preheating the casting. A sheet-iron cover was laid over the brick inclosure and the preheating was carried on for twenty-five minutes until the compressor casting had been brought to a dull red heat. Then the sheet-iron cover was removed and the four cracks were welded in eight minutes. A

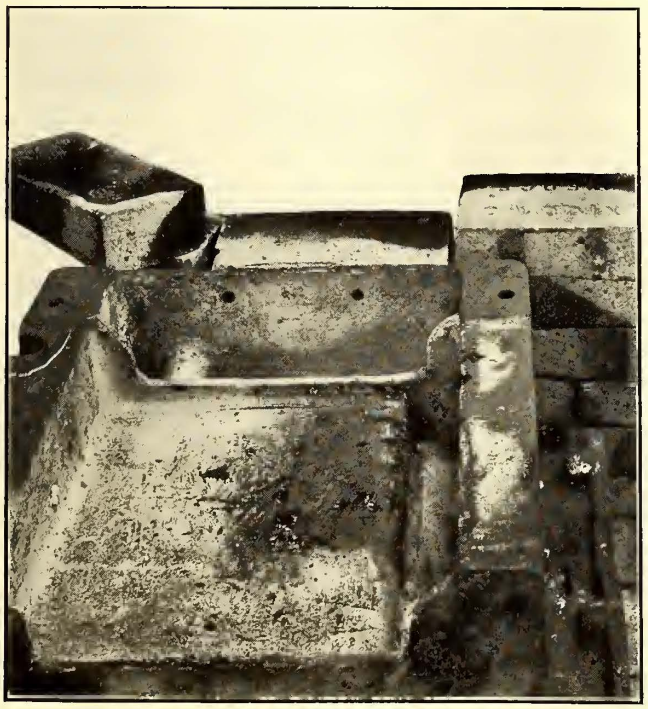


Oxy-Acetylene Welding—Figs. 16 and 17—Interurban Underframe as Cut Across with Blow Pipe, and Operator with Outfit Used in Cutting Underframe



Oxy-Acetylene Welding—Fig. 18—Cracks in Bottom of Compressor Case

small blowpipe nozzle was used in this work. This nozzle discharges 15 ft. of acetylene and 17 ft. of oxygen per hour at atmospheric pressure. Thus the approximate amount of gas consumed for repairing this casting was 4 cu. ft. of acetylene and 4½ cu. ft. of oxygen at a cost for gas of not more than 17 cents. The labor cost was 13 cents. The total cost of repairing this expensive casting and of making it oil-tight and ready for reassembling was less than 50 cents.



Oxy-Acetylene Welding—Fig. 19—Compressor Case After Welding Cracks

STUDY OF TRAFFIC CONDITIONS IN NORFOLK

The Chamber of Commerce of Norfolk, Va., has recently been making a study of the traffic conditions in Norfolk. The matter came up through a request of the Virginia Railway & Power Company to the City Council for a modification of its franchise provisions which are complicated largely because the present system is a consolidation of a number of smaller lines. Among other requests the company asked to be relieved of the obligation to carry passengers for three cents and sell tickets at the rate of 2½ cents on one of its lines between the hours of 5 a. m. and 8 a. m. and between 5 p. m. and 7 p. m., also from the obligation to sell twenty-five tickets for $1. On other parts of the system the company sells six tickets for 25 cents, and the company proposed to make this fare standard on all its lines. It also agreed to increase the number of transfer points, to change the gage of all of its lines to that of the greater part of them, namely 5 ft. 2 in., and make other improvements. It also suggested that the license tax on lines in Norfolk, which was not definitely fixed in the existing franchises, should be established on an equitable sliding scale. The company also requested a renewal of its lighting contract with the city.

This proposition has been before the Council for more than a year but no action has been taken. Some time ago the Chamber of Commerce engaged Delos F. Wilcox of New York to investigate the situation, and his report has recently been rendered. On the question of fares, he gives the following distribution of earnings on the different classes of tickets for an average day:

ANALYSIS OF AVERAGE DAILY PASSENGER EARNINGS

Transfers and complimentary..	9.5 per cent =	6,080 =	$0.00
School tickets at 2½ cents.....	1.1 per cent =	704 =	17.60
Labor tickets at 2½ cents.....	3.1 per cent =	1,984 =	49.60
Labor fares at 3 cents.....	3.3 per cent =	2,112 =	63.36
Book tickets at 4 cents.....	3.9 per cent =	2,496 =	99.84
Strip tickets at 4⅛ cents.....	22.4 per cent =	14.336 =	597.33
Cash fares at 5 cents.....	56.7 per cent =	36,288 =	1,814.40
Total daily passengers....100	per cent =	64,000 =	$2,642.13

Mr. Wilcox says that he cannot say whether any particular rate of fare is reasonable without a further examination into the investments and operating costs of the system, but he does recommend a uniform rate of fare on all city lines and at all hours of the day. He also criticises the complexity of the present car license system and recommends one which is simpler and less arduous in the following words:

"Careful students of public utility problems are pretty well agreed that the policy of 'soaking' the companies with heavy license fees and franchise taxes, to be used in helping to run the city government, is not conducive to a proper adjustment of the relations between the public and the utilities. What far-sighted public policy demands of a public utility from the financial standpoint is, first, good service; second, the maintenance of the physical property in first-class operating condition, with adequate provision for depreciation and the writing off from capital account of all portions of the investment representing superseded or discarded property; and third, reasonable and uniform rates."

Mr. Wilcox's recommendation as to gage was that all lines should be changed to 4 ft. 8½ in. He further urged the city to enter into negotiations with the company for a resettlement of the relations between them so far as street railways are concerned on the basis of a new thirty-year franchise with uniform provisions covering all lines, adequate protection for investment, effective supervision and a reasonable scheme for insuring the construction of immediate extensions in the future.

Meeting of Central Electric Railway Accountants' Association

This Meeting Was Held in Toledo, June 24—E. L. Kasemeier Read a Paper on "Compiling Operating Expenses" —Reports Received from Committees on Passenger Accounts and Freight Accounts

The meeting of the Central Electric Railway Accountants' Association was held at the Hotel Secor, Toledo, Ohio, on June 24, preceding the meeting of the Central Electric Railway Association. The president, L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company, called the meeting to order.

Mr. Hixson reported that no answer had been received to a letter addressed to the Secretary of the Treasury on behalf of the association, requesting an early construction of certain parts of the income tax law. This letter was drafted by a committee composed of Henry J. Davies, secretary Cleveland Railway; H. B. Cavanaugh, auditor Cleveland, Southwestern & Columbus Railway, and E. L. Kasemeier, auditor Ohio Electric Railway. The letter was sent to the Secretary of the Treasury on Jan. 12, 1914.

H. B. Cavanaugh, chairman of the compiling committee, reported in regard to the work of that committee.

COMMITTEE ON PASSENGER ACCOUNTS

The report of the standing committee on passenger accounts was read by the chairman, Walter Shroyer, auditor, Union Traction Company, of Indiana. The other members of this committee are C. E. Thompson, Chicago & Milwaukee Electric Railroad; F. Pantel, Chicago, Lake Shore & South Bend Railway; E. D. Gault, Reading, Pa., and E. O. Reed, Western Ohio Railroad. An abstract follows:

The committee held a meeting at Fort Wayne, Ind., on May 21, 1914. Various matters were taken up and acted upon, as follows:

The committee received a complaint that its recommendations in regard to reporting C.O.D. baggage checks was at variance with the instructions printed on the back of the checks. The committee recommends that the present method of reporting be continued and that the instructions printed on the backs of the checks should be changed to conform therewith as soon as new checks are printed.

The committee recommends, further, that when baggage is forwarded under a C.O.D. to a point on the line of a foreign carrier, the accounting department of the forwarding carrier should promptly notify the accounting department of the terminal carrier on standard blank form, giving full information to enable the terminal carrier to make proper collection and distribution of the revenue.

Further discussion of the C.O.D. baggage proposition by the two members of the committee present resulted in a final conclusion that in their opinion, the association should by resolution record itself as being in favor of discouraging C.O.D. baggage shipments, recommending that all charges should be settled for at the starting point before baggage is forwarded. The exceedingly small number of these checks used would indicate that the traveling public does not demand this service and their use only adds to the burdens of agents and the auditor's office.

Another suggestion was that the date of rendering the interchangeable mileage statements be changed from the fifth to the tenth of each month, but the committee recommends that no change be made. It also recommends that the mileage bills and coupons should be addressed to the auditor of the company instead of to the company only, as heretofore.

No mention was made of exchange orders in the last report of this committee. This is a form used in isolated cases by electric lines interchanging passenger business with steam roads, and then only in case of absolute necessity. Such orders consist of going and return coupons for use on the issuing line between the issuing station and point of exchange with the steam road, together with the usual form of agent's stub and form of order on the agent of the connecting steam line for a ticket to destination. On presentation of the order to the agent of the foreign line at the point of exchange, the same is taken up and a ticket to the destination shown and return to the point of exchange is issued. The initial carrier sends to the carrier on which orders are drawn a report of all such orders. The total of the amount column is added to the regular interline ticket report to the exchanging carrier for the current month. If orders are drawn for tickets to points beyond the line of the exchanging carrier, such carrier will report the proportion accruing to each connecting carrier.

The report of the committee was adopted.

COMMITTEE ON FREIGHT ACCOUNTS

The report of the standing committee on freight accounts was read by the chairman, E. L. Kasemeier, auditor Ohio Electric Railway. The other members of this committee are: George L. Ford, Evansville Railways; H. E. Vordermark, Ft. Wayne & Northern Indiana Traction Company; C. B. Baker, Toledo, Bowling Green & Southern Traction Company, and H. W. Bradtmiller, Ft. Wayne & Northwestern Railway.

The report of this committee recommended a number of changes and additions based on the existing recommendations of the association in regard to interline billing. In addition to the definite changes recommended, the committee considered various other matters which were referred to it. The committee concluded that in its judgment, no changes should be made on the following items: Time limit on corrections, separate tracer for each unreported waybill, astray freight waybill, holding open received abstracts for several days after end of month to get in all waybills dated in that month, and moving up date for sending in reports to other roads.

The committee was unable to make a report at this time on trail car rates, reports, records and payments and asked for further time for the consideration of this subject, stating that it would include this in its next report.

The report was discussed in detail. Among those who took part in the discussion were: F. T. Loftus, Indianapolis & Cincinnati Traction Company; L. T. Hixson, and Walter Shroyer. The report of the committee was accepted with slight changes.

Mr. Cavanaugh reported that no questions had been submitted to the query box committee.

AFTERNOON SESSION

At the afternoon session, W. B. Wright, assistant business manager of the Toledo *Blade*, made an address

on "Some Accounting Problems—Not Electric." Mr Wright was a charter member of the association and is now an honorary member.

E. L. Kasemeier then made an address on "Compiling Operating Expenses." An abstract of this address is published below.

In answer to a question Mr. Kasemeier stated that he tried to get bills on one voucher for each firm. In the case of discount bills this, of course, was not possible. It was sometimes simpler to make vouchers immediately than to delay them for other bills. He also said that he found it was better to make all corrections on bills in one entry at the end of the month.

Mr. Shroyer referred to his experience with payrolls. He has found that the most satisfactory results have been obtained since he began to keep the time in his office.

Mr. Cavanaugh explained the accounts payable ledger which he uses. As soon as invoices are received from the purchasing agent, they are entered in the ledger. A balance is taken every month.

President Hixson said that he had received letters from F. J. Pryor, Jr., American Railways Company, chairman of the committee on education of the American Electric Railway Accountants' Association, in regard to the course of education in accounting which is to be introduced under the auspices of that association.

After discussion, it was decided that the secretary should send a letter to members, describing the plans of the American association and expressing the approval of the Central association in regard to the movement. A motion formally endorsing the work was passed.

The new classification of accounts of the Interstate Commerce Commission was discussed briefly, so far as information in reference to it was in the hands of the members. It was stated that the latest advices from Washington were that the classification would reach the electric railways affected by June 24.

T. P. Kilfoyle, auditor Cleveland Railway, said that he would be glad to send copies of his forms in case they should be finished before copies of the new classification reached all members.

The meeting then adjourned.

COMPILING OPERATING EXPENSES

BY E. L. KASEMEIER, AUDITOR OHIO ELECTRIC RAILWAY

This subject embraces many thoughts and ideas, and a number of them will be briefly referred to.

Taking up first the contracts, we have those with: (1) Supply firms for purchases of material in large quantities, such as cross-ties, steel rail, etc.; (2) Railroads for joint arrangement for stations, power, use of tracks, etc.; (3) Contractors, for construction of tracks, buildings, bridges, etc.; (4) Sundry individual firms or companies for many reasons, the originals of which are usually filed in the vault of the company in custody of the secretary or auditor. Copies of these contracts should be made for each official of the company interested, and particularly should the auditor be furnished with a copy of each contract affecting the receipts or disbursements of the company. These contracts, or copies, when received in auditor's office, should receive consecutive numbers, filed in that manner and indexed under party and place so that they can be instantly referred to. Extracts in condensed style should be made of such contracts that provide for payment of money to or by the company, and such extracts furnished to the various clerks interested.

The clerk handling the voucher payable or the collection voucher desk will file these extracts alphabetically, or in numerical order and indexed, so that bills from other companies or bills against other companies will be checked against the contract extract. A rubber stamp should be used to indorse each voucher payable or collection voucher stub, somewhat as follows:

"Checked Against Contract No. —— by ————."

It is preferable to have the vouchers payable and the collection vouchers made in other departments and passed to the auditor's office, although for the sake of economy the vouchers payable may be prepared in the auditor's office from bills approved by superintendents, chief engineer, storekeepers, etc.

FORM OF VOUCHER

In my opinion, the best form of voucher is one with perforations at top between the face or pay part, and the stub or carbon copy, both the pay portion and the stub being made at one writing by the use of carbon paper. The lower half of the face of the voucher should be a check or draft and should be separated from the upper half by perforations. On the upper half should be written an explanation of what the payment is intended to cover, such as list of invoices, showing dates, numbers, order numbers, etc. This upper half should be retained by the party to whom payment is made, he tearing off the lower portion or check, indorsing it and placing in bank for collection. Both the upper half and the lower half of the face should be numbered so that when the payee retains the upper portion, he can properly show the voucher number on his books and keep a detailed list of items covered by payment in his files.

On the back of the stub portion is placed the number, name, amount and distribution. The bills or other memoranda are fastened to the face portion of the stub, which is folded and becomes a cover or protection for such papers. Vouchers are numbered consecutively and so filed temporarily in an upright position in wooden boxes, made to clasp the papers easily and tightly and to be quickly opened when vouchers are to be extracted. After a few months, the vouchers are transferred to permanent covered pasteboard boxes. If sufficient numbers are allotted to take care of any month, the numbering can be easily done for any month, before all are made for previous month; that is, if vouchers run from 1500 to 2500 per month, 3000 numbers should be allowed, beginning the first month with 1, the second month with 3001, the third month with 6001, and so throughout several years.

ENTRY OF VOUCHERS

After the vouchers have been properly verified as to rate, calculations, distributions, etc., they should be written on a voucher payable register. On the left-hand side of the book is shown the number, in whose favor, address, for what period covering, total of voucher, date paid. On the right-hand side of the page is the distribution, columns for each group of operating expenses, such as ways and structures, equipment, etc., material accounts, outside parties, betterments, and general ledger items. After all vouchers for the month's account have been entered in the register book, a recapitulation is made and from such recapitulation, a journal entry, charging operating expenses, material or other accounts and crediting the vouchers payable account.

Vouchers payable, after being recorded in the register book, should also be entered in an index book. This index book should be loose leaf, and the names should be entered thereon in alphabetical order so that no page index is necessary. Both sides of the sheet can be used and four names written on each side. Some companies use a card index for this purpose, but I prefer

the loose leaf ledger, because it can be handled more quickly and reduces the work of indexing 25 per cent. The amount for any name can be found much more quickly than if on a card, when reference is necessary, and the danger of losing a card is not present. This is an index only showing month, voucher number, amount and for what. The ledger account is kept on the register book, already mentioned. When the vouchers are paid, the column headed "date paid" is stamped with a band dater, and all items unstamped are drawn off as a detailed statement to balance with the general ledger item.

COLLECTION VOUCHERS

Collection vouchers, or bills against individuals, other roads or companies, should be prepared in duplicate; that is to say, the auditor's office should retain a carbon copy of the portion sent out for collection. The auditor's stub should have a place for distribution on the back of the stub, just as with the vouchers payable referred to.

Collection vouchers should be numbered consecutively, or in the same manner as outlined for vouchers payable, with the exception that usually less numbers will have to be allotted for each month. They should be recorded in a register book somewhat like the vouchers payable register, this book showing, on the left-hand side, number, name, address, date mailed out, to whom, for what period and amount. On the right-hand side, the distribution is shown.

After collection vouchers are entered in this register, they should be posted into a loose-leaf ledger. The cash items should also be posted into this ledger and the closed-out items checked in red ink. Trial balance from this ledger should show an analysis of the general ledger balance for the collection voucher account. This ledger shows sufficient information to make "dun" statements at the end of the month or when desired. A series of numbers should be allotted for dun files, and a number should be given to each account, this number being placed on the ledger sheet near the party's name for quick reference to the file. All copies of statements, letters sent and also those received should be put on this dun file so that complete correspondence in regard to the account is at hand when needed.

On most large roads where a great many collection vouchers are returned for correction (this especially for steam roads' car repair bills), it is advisable to make one journal entry each month to increase or decrease the amount of all bills. This is very conveniently handled by listing these changes on a sheet of paper under the following headings: Bill No.; Against whom; Original total; Changed to; Increased amount and account credited; decreased amount and accounted debited.

In making the journal entry, only the figures under the columns "increased" and "decreased" are taken into consideration.

PAYROLLS

Payrolls should be divided into classes, such as: general officers and general office clerks; superintendents' offices, dispatchers, etc.; agents; roadway; power house and substation; linemen; mechanical; trainmen.

A recapitulation should be made of sheets for each class by each superintendent's office for its district, and a distribution sheet for each recapitulation sheet. From the payroll sheet is written up a payroll register. Rolls should be numbered and recorded on these sheets in the same order each month so that they may be instantly turned to after being bound. A total for each roll is shown, and the distribution entered in columns to the right, the same as on the voucher register book, one journal entry being made for all the rolls, charging operating expenses, etc., and crediting payrolls or the pay check account.

DIVISIONAL ACCOUNTS

On roads, where it is necessary to keep a separation of earnings, operating expenses, etc., between sundry divisions or districts, this is done on what may be called detailed sheets. They also serve as a quick reference for locating the increases in operating expenses for the present month compared with previous year. A sheet, half sheet or necessary part of a sheet is allotted for each account number. On this sheet is first entered the payroll distribution items, next the vouchers payable, then the charges from material or store issues, fuel issues, sundry other journal entries, both debits and credits, then the credits from the collection vouchers. Debits are entered in black ink and credits in red ink.

For a small road where the expenses are not kept separate to operating divisions or districts, this detail sheet for comparative purposes should be made on one form which will cover an analysis of the account for an entire year and indicate very quickly where the increases arise.

DISTRIBUTION OF CHARGES TO OPERATING EXPENSE ACCOUNTS

To avoid mistakes in getting the various charges to the proper operating expense account numbers, also to enable the clerks to close up the expenses promptly when all the journal entries are finished without having to look for possible mistakes, the following method is used in my office. You will note the voucher payable register book has a small column for the account number under each of the general and operating heads or groups and that the vouchers are entered on the register to show the exact account numbers. In the same manner, we register the collection vouchers and also the payrolls. About the tenth of the month, or after all the payroll distributions have been entered on the register sheet, a pick-off is made from these sheets to a large sheet to get the total charge to each operating account number. These total charges to each account are checked against the total of items entered on the detailed sheets. Any differences can be quickly located and adjusted. Then these charges from the payrolls are entered on a large sheet, under the vertical column headed "payrolls," opposite the corresponding expense account number at the left. The same procedure is used with the vouchers payable and the collection vouchers. Then the store issues and fuel issues are entered in their respective columns, and the various debits and credits from all other entries are abstracted on a separate sheet of paper to get the totals for each account which are entered on a large cross-ruled sheet. This large sheet is then added horizontally for each line or account number, and the figures standing in the last column, net debit, are checked against the totals of accounts shown by detailed sheets and are the proper expenses for the month. By the use of this method, mistakes cannot easily be made in arriving at the total charge for each account, and if an error has been made somewhere, it is surely and quickly caught. The totals of the groups as shown by this form are checked with the general ledger before being recapped.

At first glance, this method may appear to be too cumbersome and expensive, but the work of picking off the items from the register book, the collection voucher book and payroll register and putting them on this form takes very little time, and is by far the quickest way of verifying the correctness of the charges to each account as shown by the detail sheets.

Papers at The C. E. R. A. Convention

Abstracts of Three Papers Read at Toledo Meeting on June 25 — They Relate to "Credit of Public Utility Companies," "Field Control Equipments" and "Central Electric Railway Traffic Association."

FIELD CONTROL TEST IN TOLEDO.

BY F. E. WYNNE, WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY.

Last month some tests were made on the Long Belt Line of the Toledo Railways & Light Company for the purpose of determining the relative energy consumptions of similar equipments with and without field control. The line is a loop, 7 miles in length, and in general is level. There are three railroad crossings, and the observations taken during the test showed that there were twenty-two points at which the cars always stopped.

Duplicate, single-end, double-truck, pay-as-you-enter type cars, Nos. 669 and 670, were tested. Both were built by the company. Car No. 669 had a double equipment of 310-C motors, 17:70 gear ratio, and K-36-J controller. Car No. 670 had a double equipment of 310-C-3 field control motors, 15:72 gear ratio, and K-51-A controller. The 310-C motors were geared 17:70 in order to match with the speed of previous equipments, this being found necessary for maintaining the schedules on certain lines where a considerable amount of full speed running was secured. Car No. 670 was given a gear ratio of 15:72 in order that its speed on normal field might match that of the 310-C, with 17:70 gear ratio, as nearly as possible.

Each car weighs 41,000 lb. completely equipped, exclusive of load. Car No. 670 was tested on May 6, and car No. 669 on May 7 and 9. On each of the first two days, thirteen complete consecutive trips were made, and on the third day twelve such trips were made.

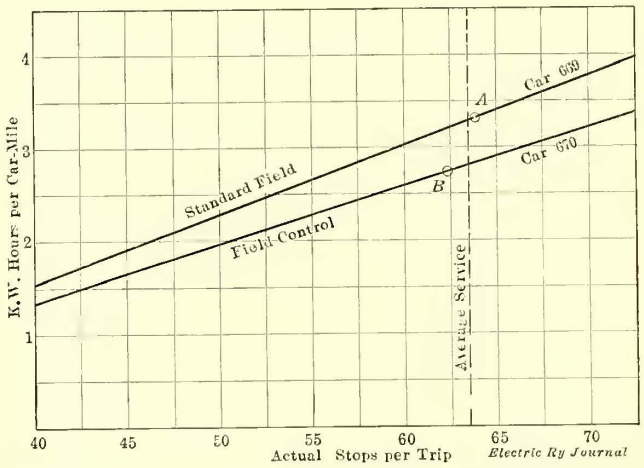
The table gives in condensed form the service conditions as derived from the three days' tests. It was deemed unnecessary to take voltage readings on all of the trips, therefore voltages are marked approximate. The remaining items are averages for ten daily trips on which complete observations were made, with the exception of number of stops, slow-downs and kilowatt-hours per car mile which cover the total number of trips made. In deriving the equivalent number of stops, two slow-downs were considered equivalent to an actual stop of zero seconds duration.

AVERAGE RESULTS OF FIELD CONTROL TEST BY TOLEDO RAILWAY & LIGHT COMPANY

	No. 310-C Standard Equipment	No. 310-C-3 Field Control Equipment
Voltage—Power on*	505	494
Voltage—Power off*	522	512
Passengers and crew—Average No. per trip	38.11	35.24
Average weight of loaded car—pounds	46,335	45,934
Time of trip, excluding lay-over—minutes	50.58	50.45
Schedule speed—m.p.h.	8.52	8.54
Actual stops per mile	8.90	8.70
Average length of actual stop—seconds	9.44	8.53
Slow-downs per mile	1.28	1.70
Equivalent stops per mile	9.54	9.55
Average length of equivalent stop—seconds	8.80	7.82
Kilowatt-hours per car mile	3.34	2.76
Watt-hours per ton mile	147.2	119.9

*Approximate.

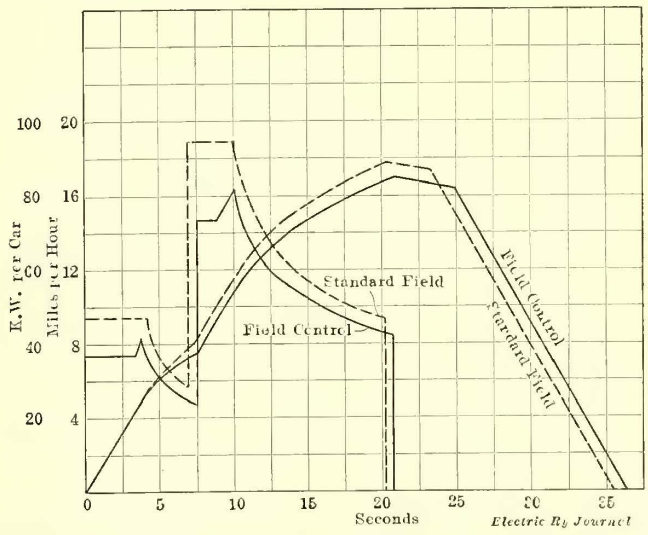
From this table it will be seen that the voltage, total weight of loaded car, schedule speed and number of equivalent stops per mile were almost identical, the principal difference in the services of the two cars being the average length of stop. The next to the last line in the table shows that the kilowatt-hours per car mile for the total thirty-eight trips indicate that the motor without field control takes 21 per cent more energy for its operation than the motor with field control. The figures in the last line as derived from the thirty trips on which complete observations were made indicate that the watt-hours per ton mile for the motor without field control were 23 per cent greater than for



Field Control in Toledo—Fig. 1—Comparative Energy Consumptions

the motor with field control. These percentages were higher than would be obtained with identical service for the two cars because the service conditions for the field control cars were less severe than those for the car without field control.

Fig. 1 shows the average power consumptions of both cars plotted on the same sheet for comparison. The point *A* corresponds to the average service conditions for car No. 669, while point *B* corresponds to the average service conditions for car No. 670. The broken vertical line is drawn through the point of average service for all thirty-eight trips with the two cars. While the energy consumption at *A* is 21 per cent higher than at *B*, as shown by the table, the difference between the values at which this average service line

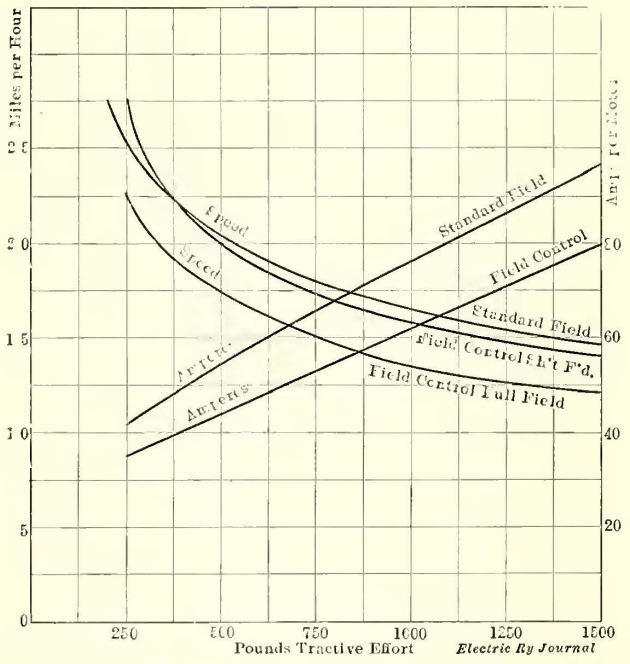


Field Control in Toledo—Fig. 2—Speed Time and Speed Power Curves of Both Motors for Average Runs

cuts the two curves is 17 per cent. This checks very closely with the calculated difference for this service. It is, therefore, safe to state that, under the average service conditions on the Long Belt Line in Toledo, the equipment without field control requires 17 per cent more energy than the field control equipment.

Fig. 2 gives calculated speed-time and energy curves for the average observed services with the two cars and shows clearly that the greater length of stop for car No. 669 on the days when the tests were made was responsible for the fact that this car actually used more than 17 per cent more energy than car No. 670.

The inherent advantage of field control is due to the difference in motor characteristics as illustrated by Fig. 3. This curve shows that the short field characteristic of the field control motor with 15:72 gear ratio is very close to that of the standard motor with 17:70 gear



Field Control in Toledo—Fig. 3—Comparative Speeds, Currents and Tractive Efforts

ratio. In fact, the two are as close as can be secured with standard gearing. It will be seen that the field control motor runs slightly faster than the other so long as the tractive effort is less than 375 lb. per motor. With the car used in Toledo 375 lb. per motor corresponds to a tractive effort of 32.5 lb. per ton, which should be sufficient to propel the car at maximum speed on any grade up to 0.75 per cent. On heavier grades, it will be seen that the field control motor is slightly slower than the other, the maximum difference being 5 per cent. In city service where the stops are frequent, this slight difference in speed at the higher tractive effort is immaterial, so far as maintaining the schedule is concerned.

The full field speed curve for the field-control motor is also given in this figure, and shows that the resistance on the car is cut out at a little less than 80 per cent of the speed at which this resistance is cut out on the standard motor. This means that the time the resistance is in circuit with the field-control motor is only 80 per cent of that with a non-field-control motor. No resistance is used in passing from full field to short field. When the car is running on resistance the current for developing a given tractive effort, that is, for a given rate of acceleration, is slightly less than 80 per cent of the current which would be required with the standard motor.

In closing, it should be said that field control is not to be considered a cure-all. Excessive energy consumption results from the use of heavy cars, unskilful motormen, incorrect gearing, poor voltage and other everyday incidents of operation. There are certain combinations of service conditions where field control equipment would be an unnecessary refinement. However, it may be taken as a well-established general principle that in service with frequent stops, field-control equipments are well worth while, and that the more frequent the stops the greater will be the benefit secured by using them.

THE CREDIT OF PUBLIC UTILITY COMPANIES

BY C. EDGAR ELLIOTT, OF BREED, ELLIOTT & HARRISON, BANKERS, CHICAGO, ILL.

As you all know, the three most important things that go to make up credit are:

1. The real property itself, that is, the plant.
2. The net earnings with which to pay the interest.
3. The ability to repay the money at maturity date.

It makes no difference how fine the plant, if it is incapable of earning not only the exacted interest return on the money loaned but a fair margin above interest requirements, to give what the banker calls "the margin of safety."

The banker and the investing public have no fault to find, as a rule, with the utility companies of this country in the matter of the physical conditions of their property, as they, through the liberality of the investing public, have, in the main, the best railway, gas and electric facilities in the world. So, it is not with this that any fault can be found, but there is a fear that there will be an ever-decreasing margin of safety of earnings, due to unfair regulation by the public.

The public demands the very best possible service, at the very lowest possible cost, and in this latter lies the danger. It has become the custom for every community to regulate the selling price per unit of service of every public utility company, and in this itself there can be no fault found if the public, in its greed and desire for the lowest possible charge for service, had not entirely overlooked the cost of that service to the company itself. The members of the public do not realize that it is necessary for the company to have such net earnings that its credit will not be impaired and that they themselves should be the ones most interested in keeping the credit of their own public utilities sound. It is only in the companies' ability to borrow money that they can be furnished with the best service.

The present street railways began with the horse car, which was discarded for the cable, and it, in turn, for the storage-battery car, and that was discarded for the modern trolley car, with its first central station. The station itself went through the same evolution, discarding one type of machinery for another, so that to-day the people of American cities are not compelled to live in crowded, restricted areas but live largely in their own homes, far away from the business district. All of this has been made possible by the discarding of obsolete motive power, rails and coaches long before they were worn out. There is no need to follow the many changes that have taken place in the plants of the other public utilities, such as telephone, gas and electric light, as they have passed through the same evolution, discarding good machinery for that which would give the best possible service at the lowest possible cost.

We are now asking, how was it possible for the different companies to keep constantly changing their

good machinery for better and more efficient equipment? It was through the credit given them by the investing public, under the guidance of the investment banker.

After the first venturesome speculative capital proved that these companies were not only a necessity but a profitable venture, the storehouses of investing wealth were at the command of the different companies and will remain so, as long as the companies can show that, above operating expenses, they earn more than enough to pay the interest on capital borrowed and will have credit or money, with which to pay the principal at maturity date.

THE SORT OF CREDIT NEEDED

Now, what sort of credit do the public utility companies need? It is not the same sort that the merchant or manufacturer desires—thirty, sixty or ninety days—but it is for a long period of time, say, thirty, sixty or even 100 years. Therefore, the investor or the one loaning the money has to feel sure that the company borrowing will either have earned enough money during that period of time to pay the necessary interest and principal, or that it will be able to keep its plant and earnings in such shape that it will be able to secure a new loan with which to repay the old one at the maturity date.

In looking this situation over, two conclusions were reached by the investment banker:

1. That if the companies were required to take from their earnings the amount necessary to pay the interest and repay the principal at maturity date, they could not give the best possible service at the lowest possible cost.

2. That these companies would have at the end of the given time, provided they were properly maintained and a sufficient allowance was made for depreciation and obsolescence, as good a property or plant as they had when the loan was first made, and upon these plants or properties they ought to be able to negotiate a new loan with which to pay off the old one.

This latter method was the one which was generally adopted and has made it possible for the communities to receive these different necessities at the cost that they have. You all know that if the other method, that of being able to save enough from their earnings to repay the principal, had been adopted, it would have been impossible to furnish the communities with service at anywhere near the price at which they have received it.

THE PRESENT SITUATION

But, now we are facing an entirely new situation. The tendency of the last few years has been for the communities to regulate the selling price of the unit of service without giving due regard to the ever-increasing operating expenses and the necessary charge-off for depreciation and obsolescence. Consequently, the investor no longer feels that he can loan his money for a long period of years but must make it for a short time.

What the companies need is assurance on the part of the public that they are going to receive for a period of years the right to operate their properties under such conditions that they can not only make a profit upon the capital represented but also maintain them in the highest state of efficiency and that, at the expiration of that period of years, they will have the right, for another period of years, to operate their property under as favorable conditions as they have in the last period. I do not mean that it is necessary for the selling price of the unit of service and the conditions as fixed in the original franchise or grant to remain forever the same but that the relative position of fixed charges to net earnings must be maintained and this, after an ample allowance has been made for depreciation and obsolescence.

It is the duty of you gentlemen to arouse the public, in their own selfish desire for good service, to realize the necessity that, in regulating rates, it is absolutely indispensable to bear in mind the need of maintaining the company's credit, so that it can at all times go into the money markets of the world and secure funds with which to make the necessary extensions and improvements and repay their debts.

Remember that this cannot be done under the methods that are now in vogue in this country; that is, for the public to keep the selling price of the unit of service down to the lowest possible cost for the longest possible time and then stingily grant a small increase, without regard to the future need and credit of the companies. To illustrate what I have in mind, I call your attention to the present railroad rate case. After a considerable number of years, in which the railroads have been selling their service at a fixed price, while their operating expenses have yearly and almost daily increased, and after having made several futile efforts to increase their selling price, we are now told that they are about to have the privilege of a small increase. Bear in mind that during these last few years they have been forced so to operate their properties that the margin of net earnings, over and above their fixed charges, has been constantly decreasing, thereby weakening the margin of safety for their interest bearing securities to such an extent that the holders of their long-time securities have become disturbed and worried. With this slight increase, given without regard to the future necessities of the companies, they are told to go to the money markets and seek money with which to refund their present debts and to make improvements. Are you surprised when I tell you that the investor and the investment bankers are not going overjoyously to welcome them?

Again, allow me to call your attention to conditions which exist within your very association, which is even a more flagrant violation of the investors' confidence! Some years ago the investor was invited to purchase securities or interest-bearing evidences of indebtedness of the Toledo Traction Company, with the distinct understanding that they would receive a given rate of interest thereon and that on July 1, 1909, they would receive their money back. This contract was made in good faith, and the Toledo company received the funds at the rate of interest which money at that time was commanding for similar use. On the day the investor expected to have his funds returned to him, he was advised that the community which the company served declined to give it a new contract, which would allow it to secure new funds on its physical property with which to pay him his principal and, therefore, he would have to extend his loan. The bond, which he expected to be paid, was extended against his will for an indefinite period, and not only that but there was some danger of his capital becoming impaired, or rather, he might have to take, in part, another form of security from that which he first had.

I could recite numerous other cases similar to this situation. I could tell you about Kansas City, Detroit, Cleveland and others, but what does all this prove? It proves that the investor has history to tell to him that no matter what showing the public utility company is making at the time he loans his money, that he must look further and see to it that the community in which his company is doing business agrees for all time to allow the company to charge enough for the service which it renders, to pay its interest, maintain its property, charge off a proper amount of obsolescence and to have a fair margin for emergency and profit, to interest

proper management, so that its credit will always be unimpaired.

THE FORMULA FOR THE MAINTENANCE OF CREDIT

But we are told that the managers of the past have milked the properties, have sought to pay dividends on watered stock and have committed all kinds of sins against their fellow man. Believing, as I do, that the managers of the past have been, on the whole, honest, upright and respectable citizens, giving their time and securing the necessary capital, not only at the least possible cost to the companies they represented but to the communities which they served, I say that what has been done in the past is not nearly of so great an interest to the people who are living to-day as how to secure for the to-morrows the proper management and the necessary funds to give them the best possible service at the lowest possible cost. With this in mind, I will give you my formula for the maintenance of the credit of public utility companies:

1. Good physical property, capable at all times of giving the best possible service at the lowest possible cost.

2. Good and honest management.

3. An assurance or contract, which cannot be violated, from the community which it is serving, that it will at all times be allowed to earn enough and operate under conditions that will assure maintenance of property, earning of interest on capital invested and an additional sum, as a margin of safety, to maintain the credit of the company. This assurance should not be based on any theoretical idea of what the company may be able to do, but on what has actually been accomplished in the past. In other words, the several communities should make the terms and rates such that the investors would be in the position of being sure of receiving their interest and return of their principal.

4. Publicity of earnings and financial condition of the company.

It is the right of every bondholder or creditor, and for that matter of every stockholder, to know at all times the exact condition of the company to which he has loaned his money. When any of the companies is desirous of securing new funds it does not hesitate, or, if it did, it should be compelled, to show not only its physical condition but its financial condition. Therefore, it is right and just for the investor, who loans his money for a long period of time, to have access to such a report, so that he may himself decide whether the company is in as good a position as it was at the time he made the loan. I am well aware of the arguments that have been used against publicity of earnings—trouble with labor, unjust taxation, burdensome and unfair regulations from the communities which are being served. However, I insist that labor troubles have arisen, unjust taxes have been levied and unfair and burdensome regulations have been imposed against the companies which have not published their earnings to a greater degree than against those which have.

On the other hand, it has become a matter of general knowledge that the companies that have given the greatest publicity to their affairs, both good and bad, are to-day enjoying the best credit.

In brief, what I have tried to impress upon you, gentlemen, is the fact that one of the very necessary adjuncts to your business, credit, has not been receiving from you the attention it deserves; that if you wish to maintain and improve your credit you must realize that reckless regulation of rates and operating conditions must cease. If you, as operators, are satisfied to continue under a hand-to-mouth "sufficient unto the day is the evil thereof" policy, accepting each niggardly increase or taking every decrease upon the theory that you may be able to make both ends meet, the investor is not. He is insisting, and will continue to insist to an ever-larger degree, that his security not only be perfectly safe at the time he purchases it, but that it remain the same through its lifetime and that at its maturity it will be paid. The time-worn statement "the franchise contains no burdensome features" will no longer satisfy the investment public.

That it is for you, realizing that the regulation of your companies by the public has come, to create some proper, constructive legislation which will assure the investor that you are going to be allowed to operate your properties under such conditions, that you will be able to pay a reasonable return on all capital invested and repay your debts at their maturity.

That you must also realize that the investor must at all times be kept advised as to the physical and financial conditions of your property.

OUR TRAFFIC ASSOCIATION

BY A. L. NEEREAMER, SECRETARY CENTRAL ELECTRIC RAILWAY ASSOCIATION AND CHAIRMAN CENTRAL ELECTRIC TRAFFIC ASSOCIATION

The Traffic Association is one of the subsidiaries of the Central Electric Railway Association and is composed of the traffic officials of many of the member companies. The Traffic Association is the only electric railway association of its kind in this country and, so far as the writer knows, in the world. The steam roads have associations of like character in the different territories, having two in this section, the Central Passenger Association and the Central Freight Association. We combine the two into one. So far, the details and office work of this association have been handled by the chairman and one clerk, but the business of the association is rapidly expanding to such an extent that this office force will soon have to be increased.

The traffic department of a large manufacturing concern has charge of the transportation, rates and routing of the shipments, while the sales department adjusts the sale price, advertises and places on the market the articles produced by that company. The traffic department of a railroad company is a combination of the two. It not only advertises and sells, but compiles and transmits to the public the rates, schedules and routings of its commodity—transportation. It is therefore a very important factor in railroad operation. Through its efforts the earnings of the property must be kept to the maximum and increased wherever possible, thus forming a vital adjunct to the successful operation of the road. It is not an independent branch as it must be able to carry out the policy outlined by the operating management and work in accord with the other departments.

The successful traffic manager must have executive ability, a good salesman, a Chesterfield, somewhat of an attorney and have a general idea of accounting and transportation. The representatives of the traffic department come in contact and deal with the general public more than any other branch of our business and therefore should be fully equipped to cope with any proposition pertaining to their office that may be presented. They must know what their own company can do, under all conditions, as well as the connecting lines over which through traffic to or from their line may move. Co-operation with various associations helps to achieve the desired results. Such co-operation must have been in the minds of the managing officials in the Central Electric Railway Association, as during the year 1907 the association took up the subject of organ-

izing the Traffic Association and appointed a committee which, after a complete investigation, made a report on the subject at the meeting held in Dayton, Ohio, in January, 1908. At that time the organization was instituted upon the following platform:

"The purposes of this organization are to promptly secure to each of the parties authentic information in relation to the tariffs, rate sheets and ticket regulations of the respective parties, and changes therein, and the due filing and publication thereof; to aid in securing compliance with the federal and state laws relating to and regulating commerce, and to enable the parties thereto to mutually confer, advise and act in relation to the above subjects stated and the proper methods to secure the purpose aforesaid."

In March, 1908, the action of the previous meeting was confirmed and the association launched. For a time the meetings were held jointly with the executive committee of the Central Electric Railway Association, but on Sept. 3, 1908, the first independent meeting was held in Indianapolis and the active work taken up. Meetings are now held monthly in order to keep in touch with conditions and are of inestimable value to the members.

TARIFF COMPILATION

One of the most important features of an association of this kind is the compiling, publishing and filing of tariffs. All tariffs must comply with the rules and regulations of the Interstate Commerce Commission and the various state commissions. The association makes a study of these various rules and regulations by keeping in close touch with the requirements of these various commissions, thus enabling its members to be at all times in harmony therewith and, if I may be permitted to say so, has resulted in benefits mutual to both the commissions and the companies.

Tariffs are furnished to the participating carriers at the cost of printing, plus the carriage and at times one or two small incidental expenses such as telegrams or notary fee in application for special permission to file in less than statuatory time. In some cases the cost of the composition is several times greater than the amount paid by any one member company for its entire supply. For example: the Interstate Commerce Commission promulgated a set of demurrage rules which were adopted by the different state commissions and were ordered filed as tariffs. The cost of the composition on this equaled one-half of the cost of the supply for the entire association. It can readily be seen that this was a saving to each member company. Another case: the last joint and local baggage tariff, containing twenty pages of rules and tabulated matter, was billed to the members at 4 cents per copy. Do the managing officials of any carrier know or realize what it would have cost them to have as complete an individual tariff printed as this one, or the time and expense it would have required to compile the same and secure the necessary concurrences to be used in filing? The composition in this case was more than 66 per cent of the entire cost of the tariff, and it would have been the same for each company had individual tariffs been issued.

The first tariff was issued by the association in December, 1908, and covered the interchangeable 1000-mile ticket. This was participated in by twenty member lines and represented less than 1800 miles of electric railway. The present interchangeable mileage tariff has thirty-one participating carriers, representing over 2900 miles. This ticket is limited to one year from day of sale, is good for bearer and party, and is sold for $17.50, or 1¾ cents per mile. The average sale of approximately 5000 of these tickets per annum since its inception speaks for its popularity. During the first year about 2000 of these tickets were sold, but the demand has increased since then, making this average.

The second tariff compiled and filed with the commissions covered the transportation of baggage, both interline and local. Here the first difficulty was encountered. The regulations of each state were different from the other states, and the various carriers had their own rules. The compilation of a tariff that would comply with the varied regulations and conditions and at the same time be acceptable to the commissions as well as being in conformity with the law, took considerable time and thought, which resulted in a publication that is now in general use throughout the territory. Wherever a through ticket is sold by an interurban line through baggage may be checked. This tariff has been revised and reissued several times to keep pace with the various changes in transportation and the regulations of the commissions.

Prior to 1907 it was impossible to purchase an interurban ticket from a point on one line to a station on another. Tickets were sold to junction points only, and passengers were instructed to rebuy and recheck their baggage. Early in the year mentioned the representatives of the Indianapolis lines compiled and published the first joint interline interurban passenger tariff. This tariff quoted rates between ten headline points and the more important stations on the participating lines. This publication was reissued twice and not only served its purpose well but paved the way for a more complete issue and was the only one in force when the association honored the writer by electing him chairman on March 27, 1908. On Nov. 14, 1909, this tariff was replaced by Association Joint Passenger Tariff No. 3, quoting rates between thirty-two headline points and 385 other stations. Over a year was consumed in compiling this issue, as it was necessary to start everything new and practically build the tariff up from nothing. During the compilation of this tariff one general manager complained to the writer of the time consumed in the work. He stated that if he had a clerk who could not do this work in forty-eight hours he would throw him out of the window. The last I heard of this ex-manager he was peddling maps in Texas.

In order to keep pace with the increased membership, this tariff was reissued adding thirty more stations under each headline point as well as making a number of reductions in rates to meet steam railroad competition, and opening up new routes which were not represented in the first publication. The revision of the latter tariff is now under way and when published will quote rates between 495 stations and thirty-six headline points, via every available route. At this time and in order to show the increased business, due very largely to this tariff, the following figures are submitted, covering the interline ticket sales only, at the joint ticket office:

1906	$32,199.00	1910	$176,616.00
1907	47,390.00	1911	181,540.00
1908	72,865.00	1912	182,861.00
1909	98,783.00	1913	160,247.00

The decrease in 1913 is due to the flood in March and the strike in November of that year. There is no doubt that the increase of nearly 80 per cent in 1910 over 1909 is to a great extent due to the complete tariff that was issued in November, 1909, as there is every reason to believe that the same conditions prevailed throughout the territory during the same period, and that the continued natural increase is maintained by the same cause.

The first freight tariff that was filed by the associ-

ation for its members covered Official Classification No. 36 and had only twenty-one participating carriers: No. 42 just filed covers thirty-nine. Owing to orders issued by the Interstate Commerce Commission from time to time it is often necessary to secure special permission from all the commissions to file supplements to this publication on less than statutory notice, which requires affidavits and much other work that is done by the chairman, thus saving time and expense to the member companies, as well as the members of the commission. The above are only a small part of the publications of this association and are given only as an example of what has been accomplished in that line, and the great advance made by the association.

It is not compulsory for every member to be represented in every tariff that is published. A member may participate in one or all, as desired, and can be represented in any way desired so long as such representation conforms with the federal and state regulations.

STANDARD FORMS OF TICKETS AND BAGGAGE CHECKS.

Standard forms of tickets and baggage checks have been worked out and are now in use by practically all lines in the association territory. Interline freight tariffs, based on the official classification and divisions, are now published by the freight carrying lines. The traffic departments now having authentic information at hand are soliciting long distance traffic as a means of increasing the revenue of their respective lines. This is interline or interchange business and has been rapidly increasing. For example, the following figures show that three lines, which shall be known as A, B and C, interchanged during the year 1913:

A to B		B to A	
Passenger	$6,355.00	Passenger	$8,480.00
Freight	2,486.00	Freight	3,071.00
Total A to B	$8,841.00	Total B to A	$11,551.00
A to C		**C to A**	
Passenger	$2,891.00	Passenger	$2,355.00
Freight	1,457.00	Freight	1,398.00
Total A to C	$4,248.00	Total C to A	$3,753.00

These are authentic figures secured from an accounting department and can be verified. These figures only cover the interchange between railway A and railways B and C, and it is to be supposed that the same proportionate conditions exist throughout the territory, and in some cases the volume is greater.

JOINT WEIGHT AND INSPECTION BUREAU

During the year 1912 the association made an experiment with a joint weight and inspection bureau at Indianapolis, Ind. The expense of this experiment, which was about $300, was taken care of by twenty-one lines members of the association, on a mileage basis. This experiment covered a period from May 25 to Aug. 31, 1912, and showed a net gain in weight due to corrections of 789,691 lb. and in revenue $1,250.40, or an average per working day of 11,362 lb. and of revenue $17.99. The above results were accomplished by one man laboring at a disadvantage, as he had four freight houses to cover, and quite frequently the unloading and loading was going on at three of them during the same period. During the early part of the inspection a great many irregularities in the weights as furnished by shippers were discovered, but as the work progressed and the shipper realized that the inspector was watching all points, these irregularities practically ceased and the shipments were usually tendered at correct weights. The proposition to establish a permanent bureau is now in the hands of one of our committees and will probably be worked out in the near future.

At all stages of progression and development the Central Electric Railway Accountants' Association has kept pace with us and has been at all times ready and willing to assist in working out any of the problems that would better traffic conditions and increase the revenue. It has never been found wanting when called on. This is the harmony that should exist, as there are no two departments in railroads that are more closely interlaced than the traffic and accounting.

MAP AND GUIDE

One of the presidents of the Central Electric Railway Association made a number of suggestions, two of which were very valuable, *i.e.*, an official interurban map and a joint interurban folder or guide. The question of preparing and distributing the official map was referred to the Traffic Association and was worked out by it. Over 100,000 copies have been placed, free of charge, in the hands of the traveling public and the different shippers. The map is a work of art and was engraved and printed by one of the most experienced firms of that kind in the world. Every line that uses this map in its local territory not only advertises itself but all its connections. As an advertising medium it cannot be excelled. Its distribution and fame is world-wide. The writer has, on request, sent copies to localities in nearly every country in Europe and now has on file in the office a reproduction of it, with a complete description taken from a German technical paper (*Elektrische Kraftbetriebe und Bahnen*).

JOINT FOLDER

Regarding the joint folder, this will be made another valuable advertising medium, and the writer is of the opinion that it will greatly assist in securing long distance travel. From the number of requests for routings and connections received in the chairman's office it seems as if much time could be saved for both the ticket agent and the passenger if a folder showing all time cards and through schedules could be published and placed with the agents for distribution. These requests only come from people who do not know where else to write to. The passenger department, being the advertising department, would supervise such a folder and distribute it, and a publication of this kind would help the freight business, for the reason that a man will ship his freight the way he travels if the service is satisfactory.

Auto bus and truck lines are now operated between some cities and near-by towns and have had an effect on the local earnings of the interurban lines in the same territory. These auto lines do not file tariffs and are not amenable to any of the commissions. This makes it all the more important that interurban lines should endeavor to secure long distance traffic, and a joint folder with our official map will greatly assist in accomplishing this result.

MEETINGS

The association holds a meeting every month, except during July and August. These meetings, as well as the discussions, are open to all officers of the electric railways which are members, and as a result, the benefits obtained are almost beyond value. It is here that the benefits of standard practice are discussed, the federal and state laws, rules and regulations are studied and digested so that if there should be any violation in traffic matters it is an error and not intentional, and every traffic official is thus kept fully informed. No one person is infallible or knows everything, so that the free expression of personal experiences in connection with the broadening results of discussion must be of great value. If information is requested that cannot be furnished at the time, some-

one knows where it may be found or to whom to go to secure it.

INTANGIBLE BENEFITS

The foregoing are merely some of the tangible benefits that may accrue to the members. The intangible benefits are many and may be more than we know. It is impossible for the writer to enumerate them, because who knows how much any one member may profit by the experiences of others, the discussions that take place in the meetings, the reports of some committee which has solved a knotty problem, or the co-operation of other lines in securing through traffic. The friendly feeling that always exists between the members of the association is always beneficial and leads to co-operation, and co-operation leads to success. Some misguided ones, especially those who believe in the complete reconstruction of society and business, claim that co-operation eliminates competition. There is no need to waste time on this argument, but Elbert Hubbard covered the situation when he said "Savages compete; wise men co-operate. He who assumes that co-operation and conspiracy are one should have his mentality rated in guinea-pig power." The writer cannot but feel that every member has received great benefit, either tangible or intangible, through co-operation with this association.

Since the organization of the association and the adoption of rational and standard practices for the handling of traffic, the relations with the steam roads have improved and many of the interurban lines are interchanging with them. The principal objection of the steam lines previous to this was the lack of uniformity, the different modes of handling interchange, the use of various classifications differing from the one used by them, the diversity of opinions regarding the checking of baggage and forms of tickets, and many other things that made it impossible to issue a through bill of lading or sell a through ticket. The elimination of these defects has been a benefit to all carriers and has greatly assisted the general public in the transaction of its business. Uniform rates and methods are what the public has been asking for, during the last twenty years. The public does not want different modes of handling traffic on the various transportation lines but desires the same general rules to apply. The shipper objects to different classifications, bills of lading, demurrage rules, etc., as applied by different companies and wants classifications that are uniform.

As the association increases in value it has been gradually growing in size and now has a membership of forty-eight lines covering 3686 miles. It does not as yet include quite all the members of the Central Electric Railway Association, but there is no reason why it should not as there is no additional cost outside the amount paid for tariffs, which is less than the cost for individual publications.

It would not do to close this paper without paying a tribute to the far-seeing and progressive men who fathered the association and who stood by it in the early days of its adversity. These men were not looking at the present or seeking personal gain, but were building for the future, and to their untiring efforts our present success is due. These men had faith in their convictions and the tenacity to stay with them until they were proven. They are all living, in fact very much alive and just as energetic and progressive as ever. May they live a long time and continue to build monuments that will keep their memory fresh in the minds of those who follow after, for an endless period after they have been called to the great and unknown beyond.

THE MEETING THURSDAY NIGHT

T. N. McCarter, president Public Service Corporation of New Jersey, was the only speaker at the session on Thursday night. He was introduced by Mr. Schneider, of Cleveland. Mr. McCarter said in part that he could speak from experience as he was administering one of the biggest public utility properties in the country. He knew that under present-day conditions it was impossible to operate and carry the overhead expenses of an electric railway for a 3-cent fare. Did those who clamor for such a fare know whereof they spoke? Had they studied the situation scientifically? To him the 3-cent fare agitation was a will-o'-the-wisp and the happy catch-word of the politician. Now was the time to fight rather than to be trampled on. It was essential to show that the 3-cent fare was an unsound, uneconomic proposition. The Public Service Railway Company's lines were operated in splendid territory by highly talented men, yet since the year 1908 the percentage of expenses to gross receipts has ranged from 59.1 to 63.6. As 60 per cent of 5 cents is 3 cents, it followed that with a 3-cent fare his company would have paid operating expenses but once during the last six years.

Some 3-cent advocates had asserted that low fares increased riding and in turn increased the receipts. The gas business of the Public Service Corporation of New Jersey had proved this argument to be a fallacy. He believed in general that the men who had had the hardihood to invest when the industry was new and untried were entitled to a higher rate of return. Of course, after a property had become established different problems presented themselves, but those who had borne the hazard should always be entitled to more than an ordinary return. Eight per cent, indeed, was small. Any community that scaled down the return would harm the utility, of course, but it would harm itself still more. The electric railway had been the greatest agent for the development of American cities, and would continue to be so if it was not hampered. As an instance, he said that his company had secured $5,000,000 for a large passenger terminal in Newark without any trouble. In Toledo, on the other hand, it would have been impossible to raise the money owing to the attitude toward the local company.

The policy of short-time return franchises was wrong in principle and unsound economically. Now that regulation was here, the question of length of franchise term had become relatively unimportant to the public at large, but not so to the company. It was a short-sighted policy to limit the franchise term because the railway must amortize its investment within the life of the grant, with the result that the present generation alone rather than several generations must pay for the entire equipment. As to municipal ownership, the municipal government was not on the same plane as the federal and state governments. Was it wise to turn over to these municipal governments the burdens of the railroads when they were neither organized nor equipped to handle them? Further, if the city did take this financial burden, the cost of raising municipal money would rise to 6 per cent, whereas the roads only asked to be permitted to earn 8 per cent. The difference of 2 per cent would quickly be lost in the difference in operating efficiency between municipal and private management.

Work on the electrification of the London & South-Western Railway's suburban system is progressing favorably, and it is hoped that trains will be running over certain routes before the end of the year.

C. E. R. A. Convention at Toledo

The Sessions Were Devoted Largely to the Questions of Public Relations and the Toledo Electric Railway Situation—Mr. Brady Speaks on Government Ownership

The summer meeting of the Central Electric Railway Association was held at the Hotel Secor, Toledo, Ohio, on June 25 and 26. The business sessions were devoted in large part to questions of public relation and to the Toledo electric railway situation.

The meeting was called to order by the president, E. F. Schneider, Cleveland, Southwestern & Columbus Railway, at 9.40 a.m. on June 25. After the reading of the minutes of the previous meeting by the secretary, A. L. Neereamer, the reports of committees were taken up.

Mr. Boardman, Service Director of the city of Toledo, made an address of welcome to the association in the absence of Mayor Kellar. President Schneider responded on behalf of the association to the welcome thus extended.

STANDARDIZATION COMMITTEE REPORT

R. N. Hemming, Anderson, Ind., reported for the standardization committee and gave in abstract the discussion of the committee meetings of Jan. 8 and May 12, 1914. Printed copies of Association Bulletin No. 67 were distributed. These show "Controlling Dimensions of Standard 6-in. Trolley Wheel"; "Proposed Arrangement of Electro-Pneumatic Signal System"; "Proposed Standard Trailer Light Connector" and "Standard End Connections for Interurban Cars."

With regard to the subject of "Mounting Radial Couplers," a table of carbody clearances and car coupler information which had been prepared by the Ohio Brass Company was shown and recommended for publication in the association proceedings. This table was compiled on the basis of a curve of 35 ft. center radius and shows various carbody clearances and coupler information data for cars varying in length from 40 ft. to 70 ft. and in width from 8 ft. to 10 ft., truck centers from 18 ft. to 48 ft., all having a uniform overhang of 11 ft. and a buffer radius of 5 ft. Formulas also are given from which similar information may be figured for curves and cars of other dimensions.

The subject of "Standard Train Signal Systems" also had had thorough consideration because the committee thought that its previous recommendation relative to the employment of the electro-pneumatic system could be broadened in scope to include the all-electric system which the committee thought appeared to possess certain advantages, principally in point of simplicity and lower first cost. The two systems should be inter-operative, the chief features embodying the installation of suitable signed switches in each car to be operated by the bell-cord extending from end to end, energizing the signal line extending throughout the train, with direct current at 500 volts to 650 volts. Print No. C-4-A was distributed. It showed fully the proposed arrangement of either electric or electro-pneumatic systems.

The committee recommended also that a set of uniform rules governing the operation of such signals as proposed be formulated and adopted.

The association accepted the standardization committee report.

REPORT OF CLAIMS COMMITTEE

The report of the claims committee was then read by Secretary Neereamer. This report was in part as follows:

"A meeting of the committee was held with William Tichenor, E. E. Slick and Fred R. Fahlsing present.

"The question of standardization of forms and blanks and accounts to be used in and by the claim departments of the various companies was under discussion as far as time permitted, but we did not arrive at any final conclusion; we beg to report, however, that the American Electric Railway Claims Association has the same matter under consideration with the hope and expectation of standardizing the same thing throughout the entire country, and since many of the members of this association are also members of the American Association it would seem to be an excellent thing to work in harmony with the committee of the American Association and, if possible, agree upon the same forms. We therefore recommend that this matter be continued with the hope of getting our committee and other claim agents and members of the association jointly interested in a meeting for the purpose of discussing the question fully and determining upon the best possible forms and if possible agreeing with the American committee."

Mr. Tichenor, speaking in support of the report of the claims committee, urged that the association take steps toward a meeting of claim agents of all member companies. This meeting should be called by the officers and executive committee of the association and be held at some central point before the next regular meeting of the association. It should be attended by all the claim agents and by representatives of the claim departments and other officials of the companies specially interested. A motion providing for a special meeting of claim agents was carried.

A report of the committee on appraisals was presented by the members, George Whysall, Columbus, Marion & Bucyrus Railway; Robert B. Rifenberick, Detroit United Railway, and T. P. Kilfoyle, Cleveland Railway. In the absence of the chairman of the committee the report was read by L. E. Gould, Electric Railway Journal.

Harry Atwood, the aviator, extended an invitation to the members on behalf of President F. R. Coates, of the Toledo Railways & Light Company, to visit Toledo Beach and take part in the air flights. Mr. Atwood referred to his flights as a new interurban development of the Toledo Railways & Light Company, and said that he expected to make trips to other cities near Toledo in the near future.

MR. COATES ON TOLEDO SITUATION

Owing to the unavoidable absence of Henry L. Doherty, chairman of the board of directors of the Toledo Railways & Light Company, who had expected to address the meeting, President Coates, of that company, described the Toledo situation to the members. He expressed the deep regret of Mr. Doherty, who had been called out of the city unexpectedly after having been in Toledo continuously for 90 days. Mr. Coates added that Mr. Doherty had led the effort to effect a settlement of the franchise controversy and that he appreciated the action of the association in going to Toledo. The contest with the city had been long drawn out, but he thought that the attitude and influence of the association would be of some assistance.

In expressing confidence that the company would win in the end, Mr. Coates rehearsed briefly the events of the last two and one-half years. He showed that the

company established a fare system in 1912 with the distinct understanding that the arrangement was temporary, and was designed to be an expedient during such time as a new franchise should be under negotiation. Afterwards the control of the property was transferred to new interests and the city asked an ordinance providing for a straight 3-cent fare. Mr. Coates quoted the testimony of Carl Nau, of Cleveland, before the United States Circuit Court, to the effect that it was impossible for the Toledo property to operate at a 3-cent fare. He then described the conditions which led to the desire of Mr. Doherty to operate on a "fair play" basis. The percentage of free riders was gradually decreasing. While the percentage each day was smaller, it had decreased from the beginning, showing that as time went on fewer people were willing to take advantage of the company by riding free.

Mr. Coates also quoted the statement of Peter Witt, city street railroad commissioner of Cleveland, that while he wanted a 3-cent fare Toledo, with its present layout, was not a city in which this rate of fare could be given and the needed service provided. While Mr. Witt advocated public ownership, he had said that the city should not go forward to effect this until it had the necessary money and could see the way clear to avoid failure in it. Mr. Coates then outlined the conditions of the franchise which was under negotiation with the city and the franchise which citizens have drafted in an effort to settle the controversy. He thought that the feeling in the city was growing better toward the company each day. He emphasized the fact that the controversy had not disorganized the trainmen. The company had the most loyal set of men in the country. The conductors had tried in every way to get passengers to pay full fares. Whatever success the company might have as a result of the policy of "fair play" which it had followed, it had to give credit to the conductors and motormen. Certainly the men had borne the brunt of the battle. Mr. Coates added that he would take off his hat to the men. They were doing good to the electric railway business as a whole. Under the most trying circumstances the men had held their tempers in all but a few cases and they were doing their best to aid the company to win the confidence, esteem and help of the people.

S. D. Hutchins, Westinghouse Traction Brake Company, spoke of the plans for June 26, which day was devoted entirely to entertainments at Toledo Beach.

S. W. Greenland, Ft. Wayne & Northern Indiana Traction Company, chairman of the committee on charges for repairs in interchange of equipment, said that no report would be presented at the Toledo meeting. The committee, however, had arranged for a joint meeting with the standardization committee and would report at the next meeting.

Arthur W. Brady, president Union Traction Company of Indiana, then made an address on the subject of government ownership. An abstract of this address is published on this page.

Following Mr. Brady's address C. Edgar Elliott, of Breed, Elliott & Harrison, read a paper on "The Credit of Public Utility Companies." This is found in abstract on page 1448 of this issue. This paper was followed by the papers of Messrs. Neereamer and Wynne, also abstracted in this issue.

In the discussion on the paper of F. E. Wynne, general engineer railway department Westinghouse Electric & Manufacturing Company, on "Economies in Operation of Field Control Equipment on the Toledo Railway & Light Company's Lines," Mr. Wynne said that the more frequent the stops the greater the saving with field control motors. In reply to a question by Mr. Rolston, Michigan City, on temperature readings, he added that the readings showed 6 deg. less temperature rise for field control motors.

F. D. Carpenter, Western Ohio Railway, spoke of the use which his company had made of the Cronin Electrical Appliances Company's tools for changing the cross-arms and insulators of high-tension lines with power on. These devices were demonstrated at the beach on Friday.

After Mr. Schneider had announced that Thomas N. McCarter, president Public Service Corporation of New Jersey, would make an address at the public meeting to be held in the evening, the meeting adjourned. A brief report of Mr. McCarter's address is published on page 1453; a more extended report will be published in next week's issue. The delegates took a trip through the historic territory traversed by the Maumee Belt Line.

The entertainment provided on Thursday was an automobile ride for the ladies in the morning followed by luncheon at the Inverness Club. In the evening the ladies were invited to a theater party.

The entire day of Friday, June 26, was given up to a visit to Toledo Beach. In the afternoon there was a ball game between the railway and the supply men.

ADDRESS OF ARTHUR W. BRADY ON GOVERNMENT OWNERSHIP

In introducing his remarks Mr. Brady said that the subject of public ownership of public utilities was so large that it could not be covered comprehensively in an address, but he hoped to present some of the considerations bearing on the present situation.

Mr. Brady spoke of an address regarding public ownership of railroads made by William J. Bryan in Madison Square Garden, New York, in 1896. The lack of public acceptance of the ideas advanced at that time made it appear that the question was one that had been set at rest. It looked then as if the decision of the country was almost unanimously against public ownership. The determination of the large question of public ownership of railroads would determine also the policy on the general question of public ownership which this country would adopt for other public utilities.

DECISION ON STEAM RAILROADS

While there might be sporadic cases where public ownership would be a sharp issue and where the decision of the people might be for or against this policy, it appeared to be almost a self-evident fact that the question of the policy of the people as a whole would be decided by the final determination of the question of steam railroads. One reason why the proposition advanced by Mr. Bryan fell flat was probably to be found in the fantastic character of his recommendations. These were that the main lines should be operated by the federal government while local lines should be under the control of states. This division introduced an element of confusion and disorganization that was enough to lead to the failure of the suggestion. Another reason was the fact that under the Hepburn act railroads were to be brought under public regulation and supervision. Since that time, instead of a diminishing opinion in favor of public ownership, so far as the matter had received attention at all it might be said that sentiment had been growing. There could now be seen on the horizon a natural phenomenon in which some people would see a ray of hope for government ownership and others would see a portentous warning and danger for the people.

In referring to the post-office department Mr. Brady said that the last year had seen the department advocate federal ownership of telegraph and telephone lines.

It had seen this suggestion backed up by a member of Congress who held himself responsible for the federal parcel post, a government development which had interfered with the public utility companies engaged in the express business. Another impetus had been given by the law providing for government ownership and probably operation of railroads in Alaska. There had been Senators who had made lengthy speeches advocating public ownership of railroads.

From a survey of these conditions it might be fairly said that a start had been made in the direction of public ownership on a large scale. Another sign was the fact that the committee on the District of Columbia of the House of Representatives had reported the Crosser bill. All the signs were pointing in one direction. The situation should be faced. The fact should be recognized that an issue was approaching which would have to be met in the near future. Some party would raise the issue. Some people would have an opportunity within a short period of determining their position on this question.

GREATEST EXTENSION OF ACTIVITIES EVER UNDERTAKEN

Mr. Brady declared that purchase and operation of the steam railroads by the federal government would involve the greatest extension of activities ever undertaken by this government or any other government. The mileage of all of the railways of the world was 640,000. In the United States there were 250,000 miles. The Interstate Commerce Commission returns covered 240,000 miles. They showed a net capitalization outstanding in the hands of the public in 1910, including both stock and bonds, of $14,500,000,000. The gross operating revenues were $2,750,000,000. Operating expenses were $1,822,000,000, or twice the disbursements of the government. The receipts were three times the receipts of the federal government during the same year. Federal ownership of railroads would mean that the financial affairs of the government would be quadrupled, and that expenses would be trebled, without regard to the interest on the money invested. One of the arguments advanced by Senators who had discussed the subject in speeches at Washington was that the government could supply capital at vastly less cost than private companies. The theory was that the capital would be represented by securities that had the entire credit of the United States behind them; not the United States as owner and operator of the railroads but the credit and resources of the nation as a whole. The interest rate on outstanding government obligations was very much less than on the obligations of private companies. It was estimated that the total purchase price for the railways would be from $14,000,000,000 to $19,000,000,000. It would probably be not far from $16,000,000,000. Some people said that it might be $8,000,000,000, $9,000,000,000 or $10,000,000,000. They proceeded on the theory that the steam railroad properties had a vast amount of water in them. That question would be determined with some degree of accuracy by the Interstate Commerce Commission valuation.

THE COST OF CAPITAL

Some indication of the probable result could be obtained from a study of the state valuations. In Minnesota a valuation had been made by the State for the purpose of showing the value of the railroads within the borders of the State. It was believed confidently by steam railroad men that the value of the steam railroads, taken as a whole, would be fully as much as, and may be more than, the outstanding stocks and bonds in the hands of the public. If robbery did not take place it was probable that instead of $16,000,000,000 nearer $20,000,000,000 would have to be paid. In 1910, Mr. Brady said, the railroads paid $680,000,0000 interest and dividends. The United States was then paying on a comparatively small debt only about 2 1/3 per cent. The German government had to pay about 4 per cent on its bonds. It was only fair to believe that with privileges taken away from the government bonds of this country, such as the right to deposit them as the basis of currency issues, an interest rate of 3½ per cent was as low as could be expected with any degree of conservatism. The total cost of capital to be paid on the purchase price at this rate would be $560,000,000 which would be an apparent saving of say $120,000,000. The argument based on this showing was the one which carried the most weight. If, however, the rate of interest should be advanced to 3¾ per cent, it would reduce the saving on this account.

EFFECT ON PRESENT GOVERNMENT BONDS

Mr. Brady also mentioned the effect which the issue of additional government obligations would have on outstanding government securities. In time those securities must be paid or refunded. If they were refunded they would have to bear the same rate of interest as other government securities unless they were aided by the introduction of some special privilege as in the case of the present government bonds. The government would lose by a refunding operation, so that the net amount of any saving of this kind would be nearer $100,000,000 than $120,000,000. The argument could not be gainsaid so far as it went. The securities must have a better standing as government securities than they could possibly have at the present time.

Another side of the question was the fact that railroad securities were now subject to taxation of one kind or another. The moment these bonds became government obligation they would pass out of the field of taxation; then, if the bonds had borne 3½ per cent interest they would certainly bear 3¾ per cent, if not a greater rate of interest.

The saving from standardization, centralization and consolidation was mentioned by Mr. Brady. It would be unnecessary for the railroads to maintain separate expensive offices and stations and traffic and advertising departments. The business would be an absolute monopoly. Provided the government could get without effort the business which came to the railroads now, there would be a saving on this account.

EFFECT ON OPERATING EXPENSES

Against these considerations there was to be charged the question of what would be the effect on operating expenses. Would government railroads be efficiently and economically operated? Could the government embark in this activity, doing three times as much business as the federal government did now and conduct the properties as efficiently and economically as the companies? That was the critical question in all operation by public authorities. The answer would appear to be plain to anyone who observed the action of public governments.

Mr. Brady believed, and thought that those who observed government operations believed, that governments could not carry on any business with the same degree of efficiency and economy as those who owned the properties under consideration. As an illustration he cited the operation of the Panama railroad by the federal government. This road was acquired in 1904 or 1905. At the time it was purchased the capitalization was $220,000 per mile. The federal government reconstructed the road at an additional cost of $225,000 or $230,000 per mile. In 1904 the operating ratio was

61.9 per cent. For ten years prior to 1904 it had not exceeded 66 per cent. Under public ownership the operating ratio had been as follows: in 1905, 77.5 per cent; in 1906, 79.5 per cent; in 1908, 74.5 per cent; in 1910, 71.4 per cent; in 1911, 70.8 per cent. The increase in earnings between 1904 and 1911 was 84 per cent. The increase in expenses in the same period was 110 per cent. Mr. Brady also discussed the operation of the Intercolonial Railroad of Canada. The operating ratio of this system for 1911 was 97.2 per cent as compared with 69.4 per cent for all other lines in the Dominion, or a difference of 30 per cent. The conditions in Canada probably presented the nearest parallel to the conditions in this country. In referring to the government-owned Western Railroad of France, which was bought by the government in 1908, Mr. Brady said that from 1909 to 1912 there was a decrease in net profits of 66 per cent, while in the same period the operating ratio had increased to 91 per cent.

AUTOCRATIC GOVERNMENTS AND RAILROADS

It was true, said Mr. Brady, that some railroads in the world were pointed out as profitable examples of government ownership. The roads of Germany and Japan were notable among the examples thus cited. The roads were successful in those countries because there was no democratic control of the government. The government in each country was virtually autocratic. It had been estimated that only 15 per cent of the population of Germany controlled the acts of the government. The government was practically on a military basis in its control of railroads. The people who operated railroads in Germany and Japan were part of a military organization. The question that had to be decided here, however, was not whether government railroads were a success in any other country, but whether the general question of public ownership would be a success in the United States, whether it would be adapted to the conditions in this country. The Western Railroad of France had had a large increase in operating expense, a decrease in net earnings, and an increase in hazard. While suffrage was widely extended in France, the individual did not count as in this country. The people of Continental Europe expected to be supervised, regulated and controlled in every direction. Since they looked to the government for everything the argument with them was: Why should they not look to the government for operation of the railroads?

Bearing on the question of governmental efficiency and operation Mr. Brady quoted from the last report made to stockholders of the American Telephone & Telegraph Company by Theodore N. Vail, the president. He also quoted from a letter written by Halford Erickson, member of the Railroad Commission of Wisconsin, in regard to the need and difficulty of supervision of the accounting methods of municipal public utilities. This letter was published in part in the ELECTRIC RAILWAY JOURNAL of May 30, 1914, page 1194. Inefficient operation by public authorities of such utilities was an inherent weakness as was developed by the statements of Mr. Vail and Mr. Erickson. In an address made in Indianapolis some years ago B. H. Meyer, who was at that time a member of the Wisconsin commission, stated that that commission had more difficulty in regulating municipal plants than in regulating privately owned plants.

POLICIES WOULD GOVERN OPERATION

There was the danger, Mr. Brady said, that politics would govern operation and that places would be provided for the man who did good for his party. It was also necessary to guard against graft. Mr. Brady referred to the fact that Mayor Mitchel, of New York, had found it practically impossible, on account of the civil service laws, to make important changes in the police department. Ex-President Taft had also discussed the operation of civil service laws in an article published recently in the *Century*. Mr. Brady said that he believed in civil service laws and that the good which they did outweighed the bad. He said, however, that they protected mediocrity. The difference between working hard enough and not quite hard enough was often the difference between efficiency and inefficiency.

Suppose, said Mr. Brady, that the hours of railroad men should be cut from a normal ten-hour day to a normal nine-hour day without an increase in efficiency. The effect of that alone would be to add $117,000,000 to the expenses of the railroads, against a possible saving in interest of $120,000,000. If there should be an addition of 5 per cent to the wages that would mean $58,000,000, or practically one-half of the saving in the cost of capital. If the increase in wages and the shorter day should both be established the result would be to wipe out the saving in the cost of capital and add 50 per cent. Could it be doubted that with 2,000,000 employees government railroads would exercise a powerful influence upon legislators and there would be legislators in Congress who would be even more careful than now to conciliate the labor vote and add indirectly and directly to railroad costs?

In conclusion Mr. Brady said that without the slightest doubt the question which the country would have to decide was whether the doctrine of private ownership of public utilities with public regulation or public ownership should prevail. When this question was decided for the railroad and telegraph and telephone lines it would be decided for all utilities.

BLACKSTONE ON DEMOCRACIES, ARISTOCRACIES AND MONARCHIES

Mr. Brady quoted the following from Blackstone saying that the words were as true now as when they were first written:

"In a democracy, where the right of making laws resides in the people at large, public virtue or goodness of intention is more likely to be found than either of the other qualities of government. Popular assemblies are frequently foolish in their contrivance and weak in their execution; but generally mean to do the thing that is right and just and have always a degree of patriotism or public spirit. In aristocracies there is more wisdom to be found than in the other forms of government; being composed, or intended to be composed, of the most experienced citizens: But there is less honesty than in a republic and less strength than in a monarchy. A monarchy is indeed the most powerful of any; for, by the entire conjunction of the legislative and executive powers all the sinews of government are knit together and united in the hand of the prince; but then there is imminent danger of his employing that strength to improvident or oppressive purposes. Thus these three species of government have, all of them, their several perfections and imperfections. Democracies are usually the best calculated to direct the end of a law; aristocracies to invent the means by which that end shall be obtained, and monarchies to carry those ends into execution."

ALL ADVANTAGES CANNOT BE REALIZED

Mr. Brady said that it could not be expected in a country like this, where each person had exactly the same say, that all of the advantages of every form of government could be realized. That the Emperor of

Germany could operate railroads to advantage did not mean that this country could do so. At meetings like the one in which the members were gathered together they were sometimes accused of thinking of the pockets of their bondholders and stockholders. There was not one among the attendants who was not deeply interested in the welfare of his country. There were found in history records of nations which were just as strong in their time as this country now, but it was found that great governments had shrunk. Though there was a time when Spain had appeared to be more powerful than this country, it had now disappeared from all parts of the world except the seat of its government. Lawyers had a saying that "it's hard cases that make bad law." There was always a beginning. It was to the interest of all as citizens to settle the question of government ownership and to settle it right. If there was a mistake it would be exceedingly costly to withdraw from the results of the error. It might be that such a thing would require a strong government such as Germany has instead of the government under which we live and in which we believe.

PROSPECTS OF THE CROSSER BILL

Although announcement has been made on the floor of the House of Representatives that an effort will be made to secure the passage of the Crosser bill for the government ownership of the street railway systems in Washington, D. C., during the summer session, there seems to be little possibility of such action. Unless a special rule were presented by the Democratic House managers, the measure could come up only on the "District of Columbia" days on the House calendar which are limited to two Mondays in each month. This is in control of Chairman Ben Johnson of Kentucky, who is opposed to the Crosser bill. The formal reports are now promised for the last week in June. Representative Robert Crosser of Ohio is at work on the affirmative report, while Representative Samuel E. Winslow of Massachusetts is drafting a minority report.

The statement that efforts will be made to force immediate action upon the Crosser bill was made in the session of June 8, the first of the District days for the present month. At that time the House Democratic leaders determined to abrogate the District days to make way for the sundry civil appropriation bill. This was opposed by Representative Frank Buchanan of Illinois, who wanted action on the "workingmen's safety act" for the district, and by Representative Nathan P. Bryan of Florida, who said he wanted action on the Crosser bill. The vote that displaced the District days was 202 against 64.

POSITION OF CAPITAL TRACTION COMPANY

The position of the Capital Traction Company on the bill is set forth in a letter sent early in the history of the hearings to Hon. Ben Johnson, chairman House committee on the District of Columbia, by George E. Hamilton, president of the company. In part Mr. Hamilton says:

"We oppose public ownership of street railways because:

"First—Public ownership, if fairly acquired and based upon all the elements and items of value now approved by commissions and allowed by courts, would, in the District of Columbia, impose upon the people of the District and the general government in equal proportion a burden of expense which would be very much larger than the estimate given by Mr. Crosser.

"Second—Municipal ownership of street railways is practically untried in the United States. No effort at such operation has been made on a scale sufficiently large or for a sufficient length of time to give any idea of its practicability. Mr. James Dalrymple, manager of the Glasgow Tramways, probably the best operated municipal street railway in the world, stated after a careful examination of conditions made at the request of the Mayor of Chicago, that in his opinion municipal ownership was not now to be desired in this country. There is nothing to indicate that the governmentally owned utilities in this or other countries have given as good service or as low rates as those privately owned. On the contrary, this country, where practically all utilities are privately owned, is pre-eminently superior to all others in the development of these utilities, particularly street railways, and gives many illustrations of much superior service and equally low rates when service is considered.

"Third—It has been stated that the satisfactory operation of Washington's excellent water works system is an argument for government ownership and operation of the street railways and other utilities, but it should be remembered that in the operation of the water system the cost to the consumer takes no consideration of the large investment, most of which was made by the United States government, and is based purely on operating expenses. Notwithstanding this, the cost of water service has steadily increased, while the cost of street railway fare has remained the same, although changed conditions have necessitated complete changes in system on several occasions, and very largely increased service, due to extensions and improved facilities.

"Fourth—For more than fifty years it has been the aim and effort of the stockholders, nearly 1800 in number, and of the management of the Capital Traction Company, who are almost entirely citizens of the District of Columbia, to give to Washington and its people a service at least equal to any in this country. In this effort, we submit, the company has been and is successful. Manifestly it would be unfair to these citizens whose money has been used in the building, equipment and operation of this system, and subjected always to the risks involved, to deprive them now of their investment and its advantages.

"Fifth—There is no demand for public ownership and no evidence of a desire therefor on the part of the people of the District. The street railways are chartered by Congress and are now under regulation of the Public Utilities Commission created by Congress, clothed with all the power and authority given to similar bodies in the States. It is known that the District Utilities board has strongly advocated public ownership and bases its position on the belief that satisfactory regulation is impossible. It should be borne in mind, however, that this declaration is made before the members have had time to become even moderately acquainted with conditions relating to street railway operation, conditions as to which they had no prior knowledge or education, and their position is taken without a full or fair trial. Commissions in other States and cities where conditions are much more complex and perplexing have succeeded in bringing public utilities under efficient regulation, and the confession of inability on the part of the District Board is, it would seem, too hastily made and might be construed into a confession of weakness. We believe and confidently assert that private ownership under strict public regulation is all that is needed or to be desired, and such regulation by the experience throughout the country is practical and has been usefully established and exercised."

Proceedings of the Illinois Electric Railway Association

Among the Topics Considered Were Tendencies in the Regulation of Public Utilities, the Maintenance of Electric Railway Equipment and Hydro-Electric Developments

The summer meeting of the Illinois Electric Railways Association was held at Keokuk, Ia., on June 24, 1914. About fifty members of the association assembled in the Keokuk High School Auditorium with President Britton I. Budd presiding. The first order of business included the reports of various standing committees. E. E. Soules, chairman of the publicity committee, reported progress. Regarding the map showing the electric railroads in the state of Illinois, the committee decided that a stock map could not be utilized to advantage, so that a special map showing electric lines prominently and the steam roads in light lines, is being sketched especially for this purpose. This map will be made in two sizes, the large size being 14 in. x 21 in. and a letterhead size for use on the back of traffic department correspondence paper. Mr. Soules reported that a proof copy of this map was just about ready to send out to the members and non-members for final checking. It will show all the stations on each road's line, as well as the exact alignment. This committee is also considering the publication of a booklet containing information regarding the company members of the association, maps, schedules, etc., as well as other editorial matter setting forth the advantages of electric railway travel. President Budd emphasized the importance of such a pamphlet, not only from an income standpoint, but for its educational value as well. The committee's report was received as representing progress.

John Leisenring, chairman of the signal committee, reported that it was making a study of signal maintenance and organization for the purpose of setting down a few principles and instructions outlining a standard practice. Other committee reports were made by Marshall E. Sampsell, chairman of the executive committee, and F. E. Johnson, chairman of the membership committee.

TENDENCIES OF PUBLIC SERVICE REGULATION

Immediately following these reports the regular program was opened with an address by the Hon. Walter A. Shaw, member of the Public Utilities Commission of Illinois. He discussed the waterway and water-power possibilities in the Mississippi River Valley, emphasizing especially the need of water-terminal facilities and water powers. In connection with the latter he said that they could be controlled either by the state or by private ownership, but in either case they should be supervised or regulated by a competent commission of experts. He believed that steps should be taken at once to develop these water-powers as a means of conserving the coal supply for future generations. In any case, however, these water-power developments should be considered only on a basis of a fair return on the investment whether they were publicly or privately owned.

He discussed briefly the Illinois public utility law in its relation to present-day consolidation tendencies. He stated he believed the public was convinced that consolidation of lighting and railway properties were for the good of all, if properly managed. The problem facing it at this time, however, is one of whether these consolidated properties should be governed locally or by state body. He was of the opinion that the state body would be the best solution, and its first duty would be to investigate the adequateness of the service furnished. This problem should be attacked by listening to complaints and through expert investigations, following which such rules and regulations as were necessary to eliminate the cause of complaint should be adopted. Following the correction of service difficulties, it was the commission's second duty to investigate the question of rates, basing its conclusions on a fair valuation of the property. In connection with rate regulation he stated that in many cases local friction often interfered with a fair solution of the problem, consequently the state body was in a better position to study the problem from an unbiased point of view.

HYDROELECTRIC DEVELOPMENTS

At the conclusion of Mr. Shaw's address, E. N. Lake, of the Stone & Webster Engineering Corporation, gave an illustrated talk on the low-head hydroelectric development at Keokuk and the high-head development at Big Creek, Cal. In connection with the Keokuk development Mr. Lake confined his talk largely to construction problems and views illustrating them, leaving the pictures of the finished plant to be viewed by the members on the inspection trip following the meeting.

MAINTENANCE OF ELECTRIC RAILWAY EQUIPMENT

The next speaker was Miles B. Lambert, railway and lighting department, Westinghouse Electric & Manufacturing Company, who spoke on the maintenance of electrical equipment. He said that while many companies were doing all that they could to maintain their rolling stock in good condition, there were other properties, notably the smaller ones, which neglected the rolling stock, even though they took good care of the power system. Economical shop maintenance was largely a question of men. With the right man on the job there was little need to work out inspection systems, comparative records, etc., because to-day there were opportunities on all sides for a live man to learn through the weekly technical magazines and otherwise just what was being accomplished elsewhere, and he could forthwith apply many such ideas to his own problems.

The old scheme of car maintenance was to fix things up after trouble developed. It would be difficult to find a road to-day which was not trying to follow the method of prevention rather than cure. Unfortunately, however, many roads had apparently never caught up with regular repairs to a point where they could apply the better way. Where such conditions existed it would be money well spent to put on a sufficient extra force until the desired condition was reached. As the work of inspection required a most conscientious man, the master mechanic should be permitted to pay wages that would attract good men. The company should also provide quarters where the men could work under agreeable conditions. An inadequate or poorly kept storeroom also had much bearing on the general cost of maintenance. Thus a $6,000 to $10,000 car might be kept out of service for long periods for lack of a part costing only a few dollars. It was good economy

to carry adequate repair parts, and to use such machine tools as were best adapted for many classes of work. A most desirable repair shop device was an arc welding outfit.

The proper selection of apparatus for the service was a most important matter. The adoption of the later forms of motor and control were particularly important factors in reducing maintenance cost. It would be well worth while to study the repair costs of old and new motors to see what types should become obsolete.

One of the most important things in the selection of equipment was proper gear ratio. Usually the stops and slow-downs imposed by the conditions of city traffic made it of little importance whether the car was geared for a maximum speed of 25 m.p.h. or 30 m.p.h. The ability quickly to reach a speed of 10 m.p.h. to 12 m.p.h., however, was important. The lower the maximum speed for which a car was geared the more easily the motors developed the large tractive effort necessary to secure the maximum acceleration. Also the lower the maximum speed for which a car was geared, the lower would be the current required to develop a good tractive effort. The low-speed gearing not only reduced the heating of the motors, and consequently their maintenance cost, but also reduced the energy consumption. After studying these facts as applied to their own special conditions a number of railway companies had reduced their pinions from eighteen to fifteen teeth or the equivalent, thus effecting large reductions in maintenance and energy with no change in the schedules. The same principle held in interurban service except that the additional factor of excessive drop in line voltage entered. Thus a car geared to run at 55 m.p.h. with 500 volts might require so much more current than one geared to run 50 m.p.h. that with the limited feeder available the higher speed gearing would cause a sufficient additional drop in the line voltage, and consequent loss in speed, great enough to overbalance its ratio. In short, the car would run at practically the same speed as one geared for 50 m.p.h. Furthermore, the extra current which the first car took on account of its higher-speed gearing would impose greater loads on the motors and thus tend to increase their maintenance without giving any advantage in return. The influence of voltage drop was so pronounced on some lines that the maximum speed was limited to a certain definite value no matter how great the capacity of the motors or the number of the pinion teeth. The only remedy for a condition of this kind was to install additional feeder capacity.

The intelligent handling of equipment by the employees of the transportation department was another place where maintenance could be decreased, say, by avoiding excessively heavy trailing loads, permitting time for proper inspection, teaching the motormen to handle equipment properly, etc.

In conclusion Mr. Lambert said that it would pay railways of reasonable size to have in charge of the electric railway equipment a man who would not be tied down to routine work. A man thus unhampered by detail would have the opportunity to work out bigger and more important methods of efficiency and economy. It was also desirable to have an understudy for every man in charge of important work. Frequent changes in organization were not good, and general changes in personnel were occasionally due to one-man organization. Every branch of the work should be self-contained so that in the absence of the foreman the second in command would take charge, and so on throughout the organization. This meant that the assistants would take more pride in their work, and the old adage "Two heads are better than one, even if one is a cabbage head" would be justified.

President Budd, in commenting on Mr. Lambert's paper, emphasized the importance of systematic inspection, stating that his road recently had thoroughly tested its inspection system without failure. He stated that all the equipment on the elevated railways was inspected on a mileage basis. Recently when the through routing of cars through the elevated loop was put in operation it was necessary for trainmen to operate and inspectors to inspect strange equipment. This was considered an especially severe test when it is considered that more than 1500 cars were involved. At this time the inspection system did not break down because failures were no more than usual, varying from 3 to 5 per cent of the total rolling stock out of service.

ENTERTAINMENT

Upon the completion of the program the association luncheon was served in the Keokuk Elks' Club House, after which the members were the guests of the Mississippi River Power Company on an inspection tour of the Keokuk hydroelectric development. Every part of this important plant was visited and every courtesy was extended the members to see the entire plant and show how it was operated. Following this inspection trip, the association boarded a boat for a trip up the Mississippi River from Keokuk to Fort Madison, whence they returned to their homes. The Chicago members of the association made the round trip to Keokuk in two special cars.

STEEL CARS ON THE PENNSYLVANIA

The Pennsylvania Railroad System, with 2554 all-steel passenger cars in service and 379 others under construction, owned more than one-third of all the steel passenger equipment cars in use in the United States on Jan. 1, 1914. These figures are exclusive of sleeping and parlor cars, but out of 2115 steel sleeping and parlor cars in service on all roads on Jan. 1, 1914, 750, more than one-third of the total, were in use on the lines of the Pennsylvania System, where every sleeping car normally in use is of all-steel construction. The Pennsylvania Railroad announced in 1906 that all future additions to its passenger equipment—passenger coaches, postal cars, baggage cars, express cars, etc.—would be of all-steel construction, and the above figures show that on Jan. 1, 1914, almost exactly one-half of its passenger equipment had been replaced with steel cars, as the road had 6100 passenger cars in service on that date.

FIRST-AID EQUIPMENT FOR SERVICE CARS

In response to an inquiry as to the contents of the "first aid" box referred to in the article by Edward Dana on "The Removal of Surface Obstructions," published in the issue of the Electric Railway Journal for May 23, page 1137, Mr. Dana states that the box is supplied by the company and contains the following:

Two tourniquets.
Two rolls ½-in. adhesive plaster.
One roll 1-in. adhesive plaster.
Two rolls 2-in. adhesive plaster.
Four packages gauze bandages.
10 yd. gauze.
Eleven emergency slings.
5 yd. canton flannel.
One pair scissors.
500 corrosive tablets.
1 lb. absorbing cotton.
Two quart bottles (empty).
Two pillows.
One package common pins.
Three dozen safety pins.
One 8-oz. bottle ammonia.
3 quarts Caron oil.
One wash basin.
Six white wood splints.

The Turin-Cirié-Lanzo Railway in Italy has decided to electrify its present line. The system adopted is direct current at 1500 volts and is 28 miles long.

American Association News

Committee on Equipment Receives Reports on Various Subjects from Sub-Committees—Meeting of the Committee on Power Generation—Other Committee Activities.

COMMITTEE ON EQUIPMENT

A meeting of the committee on equipment was held at the Fort Pitt Hotel in Pittsburgh on Friday, June 19. There were present F. R. Phillips, chairman, superintendent of equipment Pittsburgh Railways; J. P. Barnes, general manager Syracuse & Suburban Railroad; D. E. Crouse, electrical engineer Maryland Electric Railway; L. M. Clark, master mechanic Indianapolis Traction & Terminal Company, and W. R. McRae, master mechanic Toronto Railway. W. E. Johnson was also present as representative of W. G. Gove, superintendent of equipment Brooklyn Rapid Transit System.

At the committee meeting reports from the following sub-committees were presented: Wires and cables for car equipments, lighting of electric street cars, air-brake hose specifications, specifications for solid wrought carbon steel wheels for electric railway service, and lightning protection for car equipment. These sub-committee reports were discussed in detail by the committee as a whole and certain changes were suggested in accordance with the views of the committee. In addition to these reports the committee considered action upon various matters which had been brought to its attention during the year; namely, the apparent desire for association specifications covering gears and pinions; modification of the present standard design of journal brass to meet the advent of high-speed cars with high braking power and revision of the specifications for heat-treated carbon-steel axles, shafts and similar parts. At the meeting all miscellaneous business of the committee for the year was completed and final plans were made for the preparation of the committee's report at the convention.

COMMITTEE ON POWER GENERATION.

A meeting of the committee on power generation was held in New York on Thursday, June 18. There were present B. F. Wood, chairman, chief engineer United Gas & Electric Engineering Corporation; W. H. Sawyer, vice-chairman, Ford, Bacon & Davis; L. P. Crecelius, electrical engineer Cleveland Railway Company; J. W. Welsh, electrical engineer Pittsburgh Railways; Fay Woodmansee, Woodmansee & Davidson, Inc.; L. R. Lee, chief engineer E. W. Clark & Company, and R. J. S. Piggott, mechanical construction engineer Interborough Rapid Transit Company. The meeting was held primarily for the purpose of discussing the details of various subjects that had been assigned to the committee for consideration and also for selecting the sub-committees which were to prepare the various sections of the report of the committee as a whole.

The discussion first centered upon the general subject of automatic stokers and the possible advantages of their installation in small plants. In this connection the point was raised that every new power plant designed for railway use would probably be equipped with stokers, so that the question as to the size of the plant in which stokers became profitable depended upon the cost of changing over the plant from hand firing to stokers, and that the fixed charges on the cost of the change had to be balanced against the generally admitted savings due to the improved efficiency and capacity of stokers. The subject, notwithstanding previous consideration in technical papers, merited attention on account of the new conditions which had arisen through the existing practice of over-rating boilers, with the consequent increase in importance of estimating standby losses.

The subject of reactance for power circuits was then taken up, and the possible use of time-limit relays instead of reactance and the relation of resistance and reactance in a circuit were discussed at length, it being decided that the report should include consideration of general types of reactance for reducing short-circuit currents.

The relative advantages of sixty-cycle and twenty-five-cycle systems of power distribution for railway systems was then taken up, and Mr. Sawyer presented a paper which he had prepared in advance of the meeting. This was discussed by the committee as a whole and approved for inclusion in the report before the convention.

Of the subjects which had been suggested to the committee, that of capacity and efficiency in the boiler room, including consideration of the relative merits of automatic stokers and giving consideration to the size of plant in which stokers could be profitably introduced, was assigned to Messrs. Piggott, Sinclair and Lee for preparation as a part of the final report. The subject of control and safety devices for power stations and feeder circuits with special reference to reactance was given to Messrs. Welsh and Woodmansee. It was also decided that the subject of advantages and disadvantages of sixty-cycle apparatus for railway use should be reported on by Messrs. Sawyer and Crecelius. The matter of control of currents in three-conductor, high-tension feeders so as to limit them to a predetermined value was assigned to G. C. Hall, Interborough Rapid Transit Company, who was to consult with the sub-committee that was to prepare the part of the report dealing with control and safety devices for power stations and feeder circuits.

MEETING OF COMMITTEE ON RULES

A meeting of the committee on rules was held in New York on Friday, June 12, at which were present L. H. Palmer, chairman, with Harrison Williams, New York; W. R. W. Griffin, vice-chairman, general manager Tri-State Railway & Electric Company; W. H. Collins, general manager Fonda, Johnstown & Gloversville Railroad. In addition, J. W. Brown, assistant general superintendent Public Service Railway of New Jersey, attended the committee meeting as a representative of the committee on block signals for electric railways, for the purpose of considering the subject of block signal rules.

The first subject considered by the committee was the possibility of establishing a standard joint code of rules for both interurban and city service, and after a thorough discussion this was decided to be inadvisable at the present time. The committee then took up in detail the series of changes suggested in the proposed revision of the existing interurban code. These changes were generally minor in character and were designed to make the wording of both the city and interurban codes harmonize wherever possible.

During the committee session the subject of contactor signal rules was taken up. A set of proposed rules was submitted to the committee by Mr. Brown so that it could pass upon them prior to the submission to the committee on block signals for electric railways. This proposed code of rules included definitions for the fundamentals of signals of the contact type, together with rules suitable for trainmen who would be likely to use them. They were discussed in detail by the committee of the whole and placed in the form in which they would be submitted for consideration to the committee on block signals.

MEETING OF BLOCK SIGNAL COMMITTEE

The joint committee on block signals of the Engineering and the Transportation & Traffic associations met at Toledo on June 23. Those in attendance were J. M. Waldron, New York; C. D. Emmons, South Bend, and H. A. Nicholl, Anderson. The manufacturers were represented by Carl P. Nachod, Nachod Signal Company, Inc.; Roy V. Collins, United States Electric Signal Company; H. W. Griffin, Union Switch & Signal Company, and S. M. Day, General Railway Signal Company. The principal discussion was on the proposed rules and definitions for trolley contact signals. All the sub-committees on other subjects reported, and plans were completed for transmitting the year's work of the committee to Secretary Burritt for early publication.

BOARD OF ACCIDENT PREVENTION

A sub-committee of the Board of Accident Prevention, which was appointed at the convention of the American Electric Railway Association at Atlantic City last October, met at the association headquarters June 24 and 25, for the purpose of devising ways and means to prevent accidents to the public and the employees of public utilities companies, by co-operation with member companies throughout the country, the general public and the civic authorities. The purpose of the committee is to gather and classify information from all sources as to what is being done to prevent accidents, based upon their varied experiences. This information will be used for the purpose of drafting recommendations for a general and systematic country-wide effort in preventing accidents that result in personal injury.

MANITOBA PUBLIC UTILITIES COMMISSION REPORT

The second annual report of the Manitoba (Canada) Public Utilities Commission for the year ended Nov. 30, 1913, contains a general itemization of applications made to the commission during the year, of proceedings and orders upon the commission's own motion, and all formal applications, decisions and offers. At the end of the report there is appended a 77-page report on the Winnipeg Street Railway service prepared by Robert N. Feustel under date of Sept. 15, 1913. This covers the general subject of the traffic problem existing in Winnipeg, such as the factors entering into the problem of furnishing adequate street railway service in that city, the necessary changes in cars, track and track structures, car routing, and the like. At the end of his report Mr. Feustel emphasizes the need for proper understanding between the public and the company and the need for co-operation on the part of the public. He stated that best service can be had only by an intelligent effort on the part of the public to understand operating conditions and to aid the company in all possible ways to meet them.

COMMUNICATIONS

STATUS OF PREPAYMENT PATENTS

Prepayment Car Sales Company
50 Church Street
New York, June 22, 1914.

To the Editors:

I note in the Electric Railway Journal of June 20, 1914, page 1397, the report of a paper presented by C. H. Cross, mechanical engineer of The Milwaukee Electric Railway & Light Company, at a meeting of that company's section of the American Electric Railway Association, held in Milwaukee on June 2.

Under the title "Improvements in Car Design" Mr. Cross takes occasion to discuss the "Prepayment" type of car and the legal status of the Prepayment Car Sales Company. In this connection Mr. Cross does not state all the facts and makes broad statements and references to the patents owned by this company and its rights, which are entirely misleading, and I welcome this opportunity, so far as possible in a short letter, of putting before the street railway fraternity the facts in the case.

Mr. Cross is evidently misinformed as to the situation and the facts involved in the suits which we found necessary to institute against the Orange County Traction Company to protect our rights under our patents. As an example of his lack of correct knowledge of the facts he states that the cars in question were equipped with a type of mechanism developed in Milwaukee. This is not the case. The mechanism in use on the Orange County Traction Company's cars is one of our original type that was developed early and is in use on many cars operating to-day throughout the country under our license. The present type of car operating in Milwaukee, while coming under several of our patents, is different from most types of regular prepayment cars so far as details of platform design are concerned.

We originally equipped twelve of the Milwaukee cars with our standard inclosed platform type of construction, for which the Milwaukee company paid us our regular royalty charge. Subsequently that company equipped other cars with a somewhat different arrangement. These cars, by the way, as so changed, also come under our patents. None of these changes made in the Milwaukee cars was adopted in the Orange County cars. Not a single part of the Orange County car construction originated in Milwaukee.

Again, Mr. Cross would leave us under the impression that the patent to which he alludes contains twenty claims. He is evidently not familiar with the patent, and his statements are misleading. The fact is this patent contains sixteen claims, fourteen of which were concerned in the suit. Mr. Cross also conveys the impression that only five of the claims of this patent mention means for operating the door. All of the claims but one include means for operating the door.

I mention these inaccuracies merely as illustrating Mr. Cross's evident lack of knowledge of the situation.

The facts as to the litigation between the Orange County Traction Company and the Prepayment Car Sales Company are that the latter company brought two infringement suits against the Orange County Traction Company. In one of these suits was involved one patent, and in the other suit another patent. In one of these suits, being the suit upon our basic prepayment patent, the court held the patent valid and infringed as to all of the claims involved, and judgment was entered in favor of the Prepayment Car Sales Company for the full amount of our standard royalty of $100 per car and costs. In the other suit, upon the patent referred to by Mr. Cross, out of fourteen claims

of the patent involved, four were held to be invalid and ten not infringed. Evidently Mr. Cross is not aware of the fact that our basic prepayment patent was sustained, as above stated—at least he does not mention that fact.

Since the decisions were rendered in the two suits above mentioned, we have brought another suit against the Orange County Traction Company upon another patent owned by our company, which suit is pending.

It appears to me that the paper by Mr. Cross is not so much a paper on car design as an attempt to discredit the patents of the Prepayment Car Sales Company.

The Prepayment Car Sales Company is an organization whose business has been from the first, and is to-day, centered solely on the designing and development of car platforms for street railway service and of mechanisms for the operation of platform doors and steps. It is a member of the American Electric Railway Manufacturers' Association and has done everything possible in its power to further the aims and interests of its parent association, the American Electric Railway Association. The Prepayment Car Sales Company has been a great factor in the improvement of street car practice generally and in the methods of fare collection, and, notwithstanding the criticism in the article referred to, its business is continuously increasing, which is evidence of the support being given it by street railway companies throughout the country.

That the Prepayment car has been a success and a decided advantage to street car companies throughout the country, is beyond question; its admitted benefits have been referred to in many papers written by some of the oldest, ablest and most experienced street car men in the country, and presented to the different street railway associations from time to time.

That the "Prepayment Car" was unknown until introduced by us is proven beyond question or cavil by sworn testimony given voluntarily by many of the ablest and most successful street railway operators, who in all cases frankly state that the "Prepayment" car was absolutely unknown in the field before it was exhibited by us at the American Street Railway Association Convention, held in Columbus in 1906, where it attracted marked attention and favorable comment. Since that time it has been the constant aim of our company to keep abreast of the times and aid the street car companies in the improvement of their service, and in doing this we have developed types of mechanism and platform car design to meet any new conditions.

Mr. Cross closes with the legal conclusion that anyone can operate in this country "Prepayment" cars without paying royalty. This assertion, in view of the contracts entered into with us, and royalties paid and being paid to us by numerous street car companies throughout the country, upon the advice of their attorneys after most careful examination of our patents, scarcely merits comment, but reminds us of the old proverb to the effect that a cobbler should stick to his last, and of that other saying, that a certain class of people rush in where angels fear to tread. Mr. Cross evidently entirely overlooks and ignores the fact that our basic Prepayment patent has been sustained by the courts; that we own exclusive rights for Prepayment cars under about seventy United States letters patent, a considerable number of which cover different types of door and step mechanism, and jumps to the remarkable conclusion that because four claims in one of our patents were held invalid we have no rights in the premises, and that all of our other patents may be ignored.

T. W. CASEY,
President, Prepayment Car Sales Company.

ALL-STEEL CARS FOR CITY SERVICE

June 25, 1914.

To the Editors:

I have read with interest the editorial comment on my communication relative to "All-Steel Cars for City Service" in the June 13, 1914, issue of the ELECTRIC RAILWAY JOURNAL and I am glad to find such a strong proponent of the steel car for city service.

I feel, however, that my remarks in regard to the use of commercial rolled shapes and pressed sections were somewhat misinterpreted. I would be last to suggest the use of heavy, inefficient sections simply because they are easy to obtain. I have used commercial rolled sections in designs of steel cars and believe in their use to just about the extent that they are used on the New York Municipal Railway car, namely: in the long bottom sill sections, such as bottom side sills and center sills. Here, for mechanical and other reasons, long uniform sections are desired, and it is easy to reinforce them with cover plates when it is necessary. However, for short members where variations in sections are desired, such as bolsters, crossings, end sills and platform knees, the pressed section lends itself admirably to the work, and its use results in a member of high efficiency for its weight.

There are, however, many places where stiffeners or light tie members are required, and these can be furnished with light angles or other commercial rolled sections with no perceptible increase in weight over pressed sections. In the drawings of the New York Municipal car presented in the June 13, 1914, issue of the ELECTRIC RAILWAY JOURNAL I note that angles and Z-bars are used in several places. It will be seen also that the major sills of the car frame are of rolled channels, namely, the side and center sills.

There is another point with reference to the use of pressed and rolled sections that might be brought out at this time. Consider the channel section. For a given depth and weight, and with substantially the same flange widths, the commercial rolled shape will show a greater section modulus than the pressed section. This is due to the better distribution of the metal in the rolled section, because the flanges are relatively heavier than the web. If a pressed member was used, the thickness of the metal would be uniform at all points, therefore requiring additional weight to obtain the same strength. The rolled section is also stiffened by the fillets. Moreover, an outside bottom sill to which are to be riveted the finish sheets forming the web of the girder may be supplied by the rolled section to much better advantage because it presents a flat square corner member with which the web plates can be neatly aligned.

With regard to the weight of steel cars, that is, the structure only, not including the weight of appurtenances, sashes, doors, curtains and steps, over which the designer has no control, the steel street cars to which I referred in my previous communication have a weight per running foot of approximately 325 lb. This figure is for a car with monitor roof, 49 ft. 2 in. long, 8 ft. 9 in. wide over guard rails, and 8 ft. 8½ in. from bottom of side sill to top of roof. I believe that with an 8-ft. 6-in. width and the use of an arched roof this unit weight figure could be safely reduced to well below 300 lb. per running foot.

In connection with the discussion of the growing use of steel cars in city service I note in the June 20 issue of the ELECTRIC RAILWAY JOURNAL that a city property has recently contracted for twenty steel street cars. May the good work go on.

"EQUIPMENT ENGINEER."

Equipment and Its Maintenance

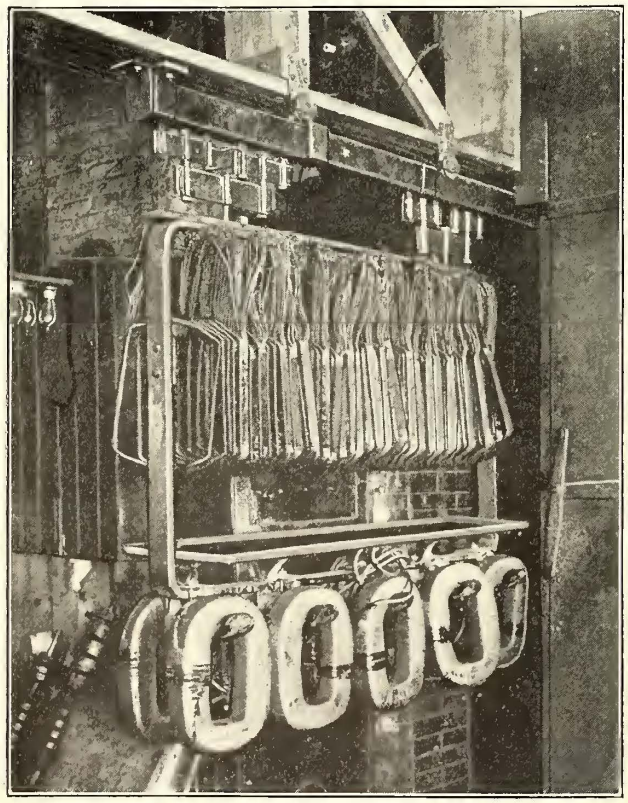
Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

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

IMPROVEMENTS IN DETROIT'S COIL BAKING OVEN

BY T. L. KELLER, ASSISTANT MASTER MECHANIC, DETROIT UNITED RAILWAY

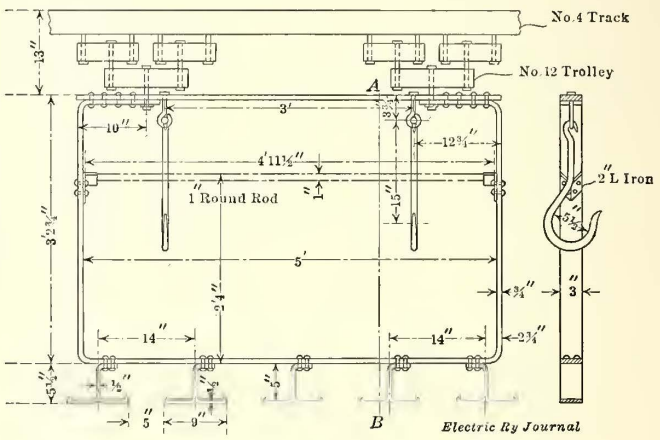
In order to hasten the coil-baking process as well as to facilitate the handling of coils to and from the oven, the Detroit United Railway's mechanical department has made several interesting improvements in its baking oven. The oven occupies a small room, 9 ft. x 13 ft. in plan, in the old shop building, and is often taxed to its limit to meet the increased demands. Not having sufficient heat or ventilation to permit of hastening the baking process, additional ventilators were placed in the roof and the entire floor of the oven covered with steam-heating pipes. These heater coils were made up of 1-in. pipe with return bends resting on 2-in. angle irons, so as to provide air circulation from the floor level through the pipe coils, thence to the ventilators. Since it was necessary for workmen to enter the oven



Detroit Coil Baking-Oven—Suspended Carrier

the coils had to be covered with sheets of ¼-in. boiler plate perforated with 1½-in. holes at 5½-in. centers. These plates rest on 3-in. rails, which separate the boiler-plate floor from the pipe coils. In addition to the heat provided by the steam coils, air is forced over electric heaters into the oven at the floor level. By this means the oven may be kept at a temperature of from 200 to 220 deg. Fahr. and absolutely free from fumes and gases.

In order to remove the weight of coils undergoing the baking process, from the boiler plate floor, ordinary floor trucks were abandoned for an overhead system of suspended carriers. One of these carriers filled with coils is shown in one of the accompanying illustrations. The suspended carrier track is formed of a heavy rec-



Carrier for Detroit Baking Oven

tangular tubing such as used with extra large sliding doors. This track is supported on the roof beams inside of the oven and extends a sufficient distance outside the oven door to permit the carrier to be loaded and unloaded. As shown in one of the illustrations the suspended carrier is about 2½ ft. above the floor and is made up of ¾ x 3-in. bar iron. The frame is 3 ft. 3 in. x 5 ft. over all, and fitted with a pair of semicircular sockets for a 1-in. round rod on which the armature coils are hung in the baking process. The field coils are swung from T-shaped hooks riveted to the bottom of the frame. Other details of this suspended carrier are also shown.

TESTING TYPE M CONTACTOR COILS WITHOUT REMOVAL

BY F. E. CASE, ENGINEER RAILWAY EQUIPMENT GENERAL ELECTRIC COMPANY

If a contactor of type M control fails to pick up properly with the minimum voltage at which it was intended to operate, the mechanism may be binding at some point, or the coil may be partly short-circuited. The former defect can be readily detected by inspection.

Probably the simplest way of testing the contactor coil is to connect it in series with a resistance of known value, such as the tubes used in type M control, and place it across a 600-volt circuit. Measure simultaneously with two voltmeters the drop around the coil and the resistance. The resistances of the two will be proportional to these voltages. The resistance of the coil is determined by multiplying the number of ohms of the known resistance by the volts drop across the coil

and dividing by the volts drop across the resistance. The coils can be tested in this way without removal from the contactors.

All contactor coils are marked with specification numbers, which are also given on diagrams, and the resistance of any particular coils can be obtained through our local offices. If a coil is impaired, the test suggested should indicate whether or not it is in bad shape.

EQUIPMENT DEFECTS—CIRCUIT BREAKERS AND HOOD SWITCHES—III

BY C. W. SQUIER, E.E.

Periodic tests should be made on all circuit breakers to make certain that they will open at the desired current setting. When properly adjusted they compel the motorman to handle his controller with more care than otherwise and so save energy and prevent excessive heating of the motors and equipment. A proper adjustment decreases the liability of accidents, burnouts and fires. In case of damage suits, the ability to prove regular circuit-breaker inspection and adjustment has great weight with the judge and jury. Several kinds of apparatus for testing and setting circuit-breakers are employed. These comprise portable outfits, motor-generator sets, low voltage tests, balancing tests, etc. I will describe some of the least expensive outfits that have been found to give satisfaction.

TESTING CONDITIONS

The best practice is to test and set all car circuit breakers at periodical intervals. This time can be arranged to conform to the regular overhauling or inspection of other parts of the equipment so that it will not be necessary to bring in a car solely to adjust and test the circuit breakers. At the same time the breakers can be cleaned and all worn or burned parts renewed. Where this is done, it is best to remove the circuit breakers from the cars and take them to the bench where the renewals of contact tips can be made most efficiently, after which the circuit breaker can be placed in a rack for testing. This rack should be arranged to hold the breakers in the same position as when installed on the cars. There are certain times, however, when it would seem advisable to test the breakers without removing them from the car, as, for instance, after a car has had a short-circuit or burnout which a properly-adjusted circuit breaker should have prevented. The removal of the breaker from the car in such a case might remove the cause that made the circuit breaker hold in, and so prevent its detection. With little extra expense, the same testing set can be arranged to test the circuit breakers both on and off the car. Where a permanent testing set is provided, its location should be such that it will be convenient to the bench where repairs are made and also to a track where cars can be brought for testing the circuit breakers in their normal operating position.

TESTING SETS

Fig. 1 shows the connections for a stationary test set that can be used for adjusting circuit breakers either on the car or in the testing rack. It consists of a water rheostat, *F*, for varying the current through the circuit breaker on test, an ammeter, *A*, for measuring the current at which the circuit breaker blows, a protective circuit breaker, *D*, a double-throw switch, *S*, and a reel, *R*, for holding the lead used when testing breakers without removing them from the cars.

The water rheostat *F* consists of a wooden tank filled with water and having a ground plate at the bottom so that the solution is grounded. An electrode, *G*, made of sheet iron is used to vary the adjusting current. This may be raised and lowered by means of a rope running over pulleys with a weight, *W*, at the end to counter-balance the weight of the electrode. The ammeter *A* is direct reading, and for ordinary testing should have a scale reading 500 amp. The protective circuit breaker *D* should be set sufficiently high so as not to blow while the test breaker is being adjusted while still providing a safeguard against abnormal currents and short-circuits. If an ammeter with a full scale reading of 500 amp is used, the protective circuit breaker should be set to blow at about 400 amp. The double-throw switch *S* enables the same apparatus to be used for testing breakers either on or off the car, and should have the contacts so arranged that the fulcrum will not carry current. When it is thrown to the "down" position the circuit is closed for testing breakers on the car, and when in the "up" position breakers may be adjusted in the rack *P*, which is arranged to clamp the breaker in the same position as when on a car. An insulated cable about 40 ft. or 50 ft. long is required for testing breakers on the cars, and the reel

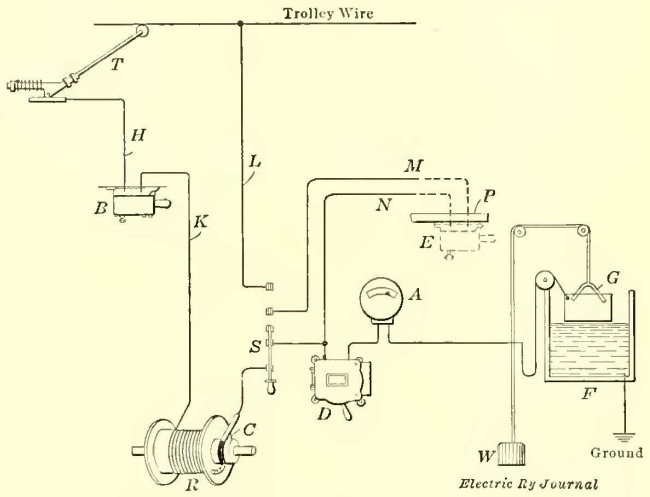


Fig. 1—Stationary Test Set with Water Rheostat and Ammeter

R affords an effective and easy means of keeping this off the floor and out of the way when not in use. A slip ring *C* with a brush contact is provided at one end so that the turning of the reel does not disturb the connections.

To test a circuit breaker on the car, remove the lead connecting the circuit breaker with the controller and insert the test lead *K* from the reel in its place. Close the circuit breakers *B* and *D* and then put the trolley pole of the car on the wire. Then by lowering the electrode *G* into the water of the water rheostat, a circuit is created from the trolley pole through the circuit breaker *B* on test, out the lead *K* and through the reel *R* to the switch *S*, through this switch, the circuit breaker *D*, ammeter *A* and the water rheostat to ground. By lowering and raising the electrode *G* any desired current range may be obtained.

To test circuit breakers off the car, place them in the rack *P* and attach the leads *M* and *N* to the terminals of the breaker. Close both circuit breakers *D* and *E* and throw the switch *S* to the "up" position. Then by lowering the electrode *G* into the water, we have a circuit from the trolley wire through the lead *L* and switch *S* to the circuit breaker under test *E*, and from this breaker through the protective circuit breaker *D* and ammeter *A* to the water rheostat and to ground.

Fig. 2 shows the connections and apparatus required for a "limit" method of setting circuit breakers. This differs from the method just described in that no ammeter is required, the adjustment of the circuit breaker being between two current values indicated by the burning of lamps. The apparatus used is the same as that previously described except that the ammeter is replaced by a grid resistance, two low-voltage relays and a bank of lamps. To determine the values of the grid resistance R_1, R_2, let us assume that circuit breakers are to be set so that they will blow when 250 to 260 amp are flowing through them, and that the relays K and L will operate at 6 volts. Relay K should close the circuit for the lamps when 250 amp flow through the resistance R_1 and relay L should open the circuit when the current through the resistance R_2 reaches or exceeds 260 amp. From Ohm's law, resistance equals volts divided by current. Therefore, we get R_1 equals 6/250 or 0.024 ohms, and R_2 equals 6/260 or 0.02308 ohms.

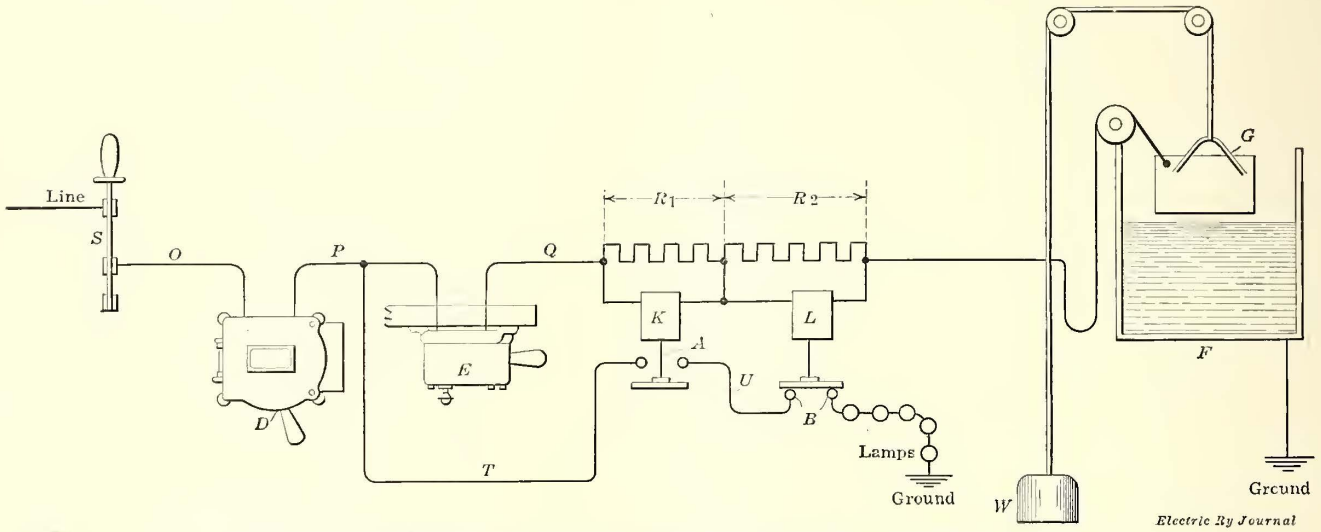


Fig. 2—Limit Method for Setting Circuit Breakers Without Using an Ammeter

The operation of the apparatus is as follows: Connect the circuit breaker to be adjusted in the circuit at E and close the protective breaker D and switch S. By lowering the electrode G into the water rheostat we then have a circuit from line through the switch and two circuit breakers, resistances R_1, R_2 and water rheostat to ground. When the current rises to 250 amp the drop across the resistance R_1 will be 6 volts and the relay K will close. We then will have an additional circuit from the breaker D across the contacts A and B of the relays and through the lamps to ground. This circuit remains closed and the lamps continue to burn until the current through the resistance R_2 reaches 260 amp, when the drop across this resistance will be 6 volts and the relay L will open the lamp circuit. The circuit breakers should then be adjusted to blow while the lamps are burning. The resistances R_1 and R_2 should be of such capacity that they will not get hot while the breakers are being tested, as the resistance changes in value with the temperature and this will affect the value at which the relays will operate.

By substituting a double-throw for the single-throw switch and adding the reel with a long insulated lead, the latter method may be adapted for testing the circuit breakers without removing them from the cars.

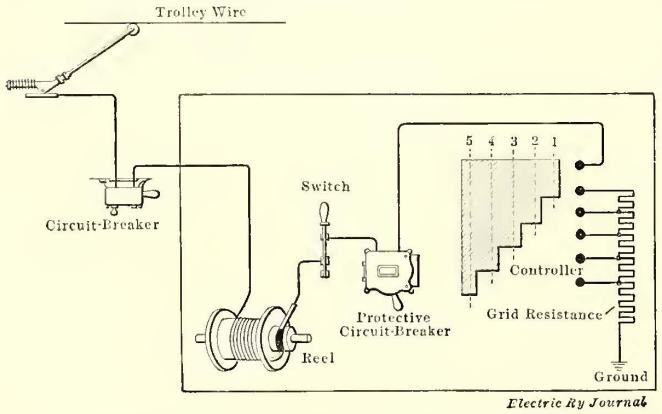


Fig. 3—Portable Circuit Breaker Testing Set

While either of the test sets just described could be mounted on a truck and so made portable a water rheostat does not lend itself readily to being hauled around on account of its weight and the solution which it contains. A more satisfactory form of portable outfit is obtained by replacing the water rheostat with a few frames of grid resistance and connecting a controller for cutting this resistance in and out of the circuit to get the necessary current variation. Fig. 3 illustrates such an arrangement. An ammeter is required only initially for adjusting the resistance, after which each point of the controller will have a definite current value, providing, of course, that the line voltage is reasonably constant. On a road operating two general types of equipment, let us assume that it is desired to have the circuit breakers on one class set at 275 amp and on the other at 325 amp. With a five-point controller, convenient current values would be 260, 270, 280, 320 and 330 amp. Circuit breakers for the first class of equipment should not blow on the second but should blow on the third point of the controller, and circuit breakers for the second class should not blow till the fifth point of the controller is reached. This would assure that circuit breakers for the first class of equipment would be set to blow between 270 and 280 amp and breakers for the second class between 320 and 330 amp.

The third annual field day of the office employees of the Boston (Mass.) Elevated Railway was held at Riverside, Mass., on June 13. About 500 persons attended. There were numerous athletic events on the grounds of the Riverside Recreation Club, and a baseball game between a team from the legal department and an "all L" nine recruited from the company as a whole. The ball game was won by the legal department by a score of eight to five. H. B. Potter was chairman of the committee on arrangements. Many officials of the company were present.

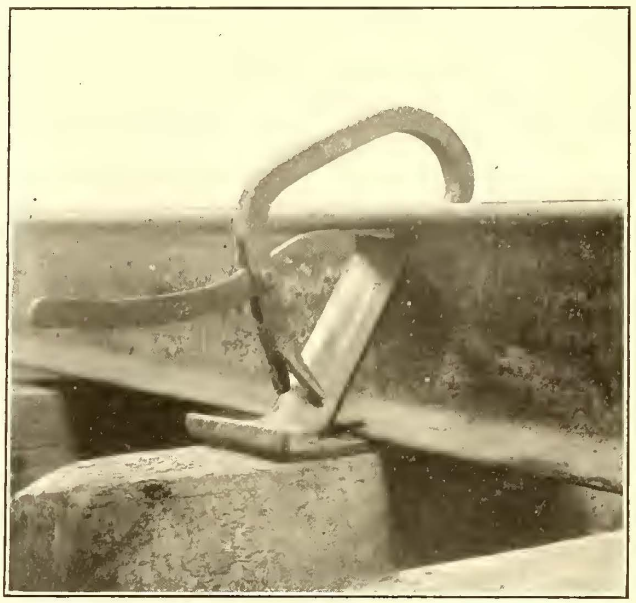
ELECTRIC WELDED JOINT AND RAIL BRACE USED IN CINCINNATI

The Cincinnati (Ohio) Traction Company has recently developed an electrically welded joint and combination tie plate and rail brace which is of especial interest because extremely low first cost has been combined with durability. In fact, this joint offers an opportunity to consume scrap material which otherwise would be worth scrap prices only.

The welded joint was made on 140-lb. Lorain section 402, girder-grooved rail with standard 36-in. plate and one-half of a standard 119-lb. Lorain section 341 connection plate welded to the rail base. Three or four of these test joints have been made at a cost of a little less than $4 each. It is believed that in an actual installation this cost will be reduced about 50 cents, which should make a joint of this kind very attractive when one considers that this figure includes labor and material. The actual welding was done with the rail in position as in the track, and required one hour and ten minutes, during which time 160 sq. in. of welding contact was covered. A portable electric welding outfit furnished by the Indianapolis Frog & Switch Company was employed on the work.

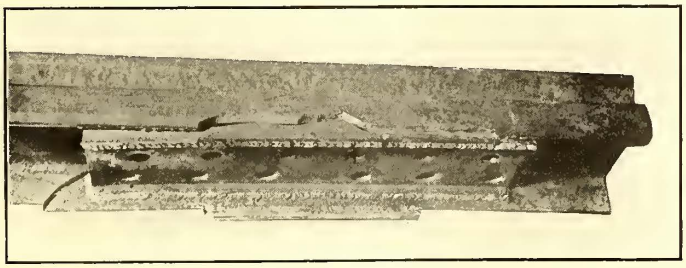
In order to be positive that the weld between the rail and the joint would be secure, both the edges of the rail and joint were carefully ground free from scales and the joint pressed in position. A grinding tool was used only because it was near at hand, as it was felt that a sand blast would prove just as satisfactory. In order to demonstrate the effect of failure to remove scale from the joint and the rail, a portion of the joint and rail was left unground. In the accompanying illustration where the ball of the rail is in the foreground, it will be seen that at the upper portion of the angle bar the weld has parted, but at the exact point where grinding began the weld was so secure that instead of breaking along the weld or through the angle bar, it split the ball of the high-carbon rail. This also is true of the weld between the base of the bar and the base of the rail. The reversed rail in another illustration shows that the base of the rail has split away from the web. The purpose of this test was to determine the quality of bond after the electric weld had been made. Ordinary track chisels were inserted behind the bars, one wedge at a time being driven with a 14-lb. sledge. The results of the test, as illustrated, required one and three-quarter hours of continual swinging of the hammer on the wedges. The weld failed only where the rail and joint had not been ground.

The engineers of the Cincinnati Traction Company believed that better progress with the paving between track rails could be made if tie rods were eliminated. Accordingly, a combination tie plate and rail brace was devised for standard track construction with the 140-lb. Lorain section 402, girder-grooved rail. In other instances, however, only the standard rail brace has been used, and this was spiked direct to the tie independent of the rail. In this class of construction five spikes to the rail to each tie were required, one on the inside of the rail base, two on the outside and two in the rail brace. The latter construction, however, was not considered as substantial as the combination rail brace and plate, and accordingly attention was turned to the electric welding outfit to provide the combination plate and brace at a lower cost than they could be purchased in the open market.

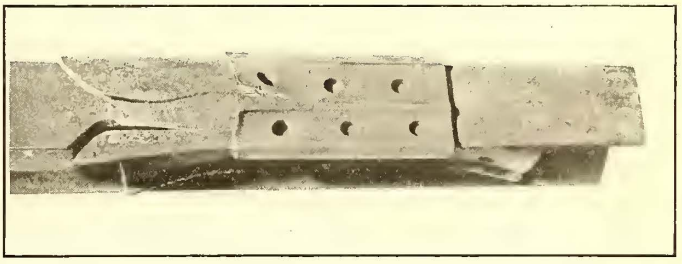


Cincinnati Welded Tie Plate and Rail Brace, with Clamp in Position

The Cincinnati Traction Company uses a tie plate of 6-in. x 12-in. x ⅜-in. size, to which a standard rail brace with the spike hole section cut off is welded. During the welding process the brace is held in position against the rail with a special clamp which forces the top of the brace under the ball of the rail and the base down against the tie plate. With this class of combination rail brace and tie plate, only spikes are necessary to each tie with braces 6 ft. apart. In a demonstration but two minutes were required to complete the weld, and the entire piece including brace and tie plate welded together cost only 25 cents. While very little more time is required to install the welded tie plate and brace than was the case with the brace alone, the welded brace and plate are equal to a combination brace and plate and about 15 cents cheaper. In case steel ties instead of wooden ties are used, the brace may be welded directly to the steel tie and may be placed to serve as a lock to the nut on the rail clip. The combination brace and tie plate is shown held in position with the special clamp used during the welding process.



Cincinnati Welded Joint After Test, Looking at Head

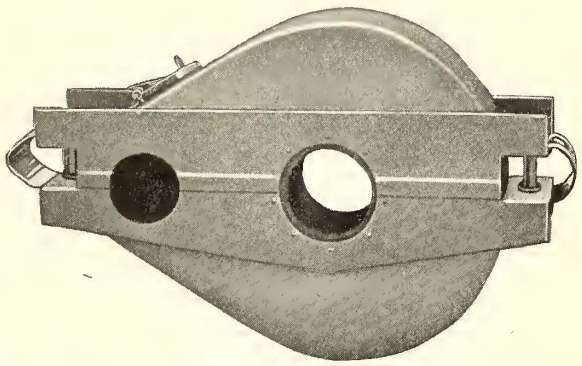


Cincinnati Welded Joint After Test, Looking at Base

SEAMLESS AND RIVETLESS GEAR CASES

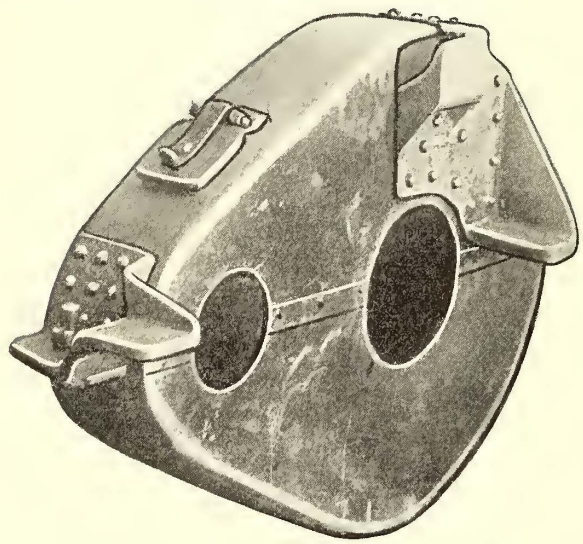
The Chillingworth Manufacturing Company introduced its seamless drawn-steel gear case to the American market in 1912, but it was not until May, 1913, after the designs had proved themselves adapted to American requirements and conditions of electric railway service that actual manufacturing was commenced, and the sale of the product in the United States and Canada was taken over by Thayer & Company, Inc., New York.

Since that time this type of gear case has proved so successful that it is now in use on more than seventy-



End-Suspended Gear Case for Westinghouse-101 Motor

five electric railways in the United States and Canada, some of the largest being the Public Service Railway, Newark, N. J.; Brooklyn Rapid Transit System, Brooklyn, N. Y.; United Railways & Electric Company of Baltimore, the Chicago surface lines, Cleveland Railway, Toronto Railway, Montreal Tramways, and on some of the properties of J. G. White & Company, Stone & Webster and the American Railways. The General Electric and Westinghouse Companies have also purchased this type from time to time for their most advanced types of motor equipment.



Side-Suspended Gear Case for GE-80 Motor

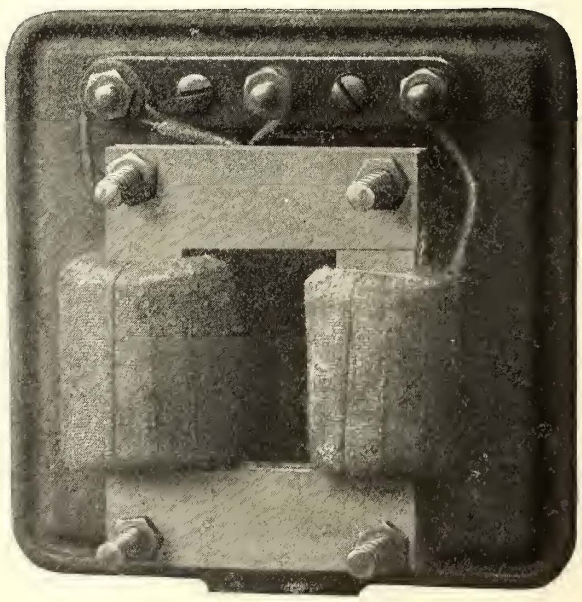
The accompanying illustrations represent the construction peculiar to this case and the types of suspensions adopted in the most recent designs. The most vital feature is the elimination of seams, rivets and unnecessary weight, and this is accomplished by the process of drawing each half of the case from a single sheet of steel. Two general types of suspensions are required by railway motors, one for side-suspended cases and the other for end-suspended cases, whichever type the motor frame is designed to accommodate. The former design is more commonly required on General Electric motors and the latter on Westinghouse motors.

The Chillingworth bracket for side-suspended cases is shown in the accompanying illustration of the GE 80 gear case. These brackets are arranged to overlap the top of the case which distributes the area of stress. Further strength is secured by the addition of reinforcing plates underneath the total area of the brackets inside the case to obviate the loosening of rivets and the tearing away of the brackets from the case. The weight of this case is 110 lb.

The design of suspension adopted for the end-suspended cases is shown in the illustration of the Westinghouse 101. This type permits an ideal arrangement of suspensions by the attachment of plates that run longitudinally from end to end on each side of the case, secured by a special method of spot welding. Not a single seam or rivet is used throughout on this type which is, on this account, unique in gear case construction. The weight of this case is 100 lb.

TORQUE COMPENSATORS

The Westinghouse Electric & Manufacturing Company has introduced a device known as a torque compensator, intended primarily for modifying the time element characteristics of an a.c. overload relay. It reduces the torque of the relay at heavy overloads without reducing the torque at light loads. The compensator thus increases the time element of the relay at overloads, its effect being in proportion to the overload. An example of the effect of the torque compensator on the time element characteristic of a relay is shown in the accompanying curves. Curve A shows the natural characteristic of the type C relay. When used with the



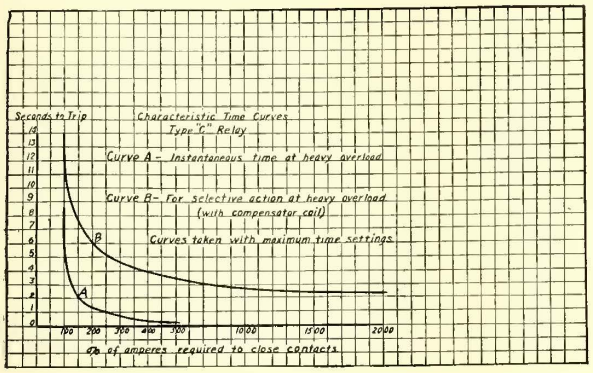
Torque Compensator

torque compensator, a definite minimum time element at heavy loads is obtained, as shown in curve B.

The overload relay with definite minimum time element obtained by a torque compensator provides selective action of circuit-breakers where feeders are placed in series. The relays which control the breakers nearest the source of power can be set for a slightly greater time element than those further along. The difference in time is retained at all overloads with sufficient accuracy to cause the breakers nearest the trouble to

open, thus confining the inoperative section to the smallest area, without interruption of service on the part of the system between the trouble section and the source of power.

Another use of the relay with definite minimum time element is in relieving circuit-breakers. It is well known that the ultimate breaking capacity of a circuit-breaker depends on the time of breaking. If a ground or short-circuit can persist for two seconds before the circuit is opened, the ultimate breaking capacity is greatly increased; that is, the strain on the breaker



Characteristic Time Curves of Relay

is reduced very materially, owing to the drop in voltage and current occurring during the interval.

The torque compensator consists essentially of a small auto-transformer connected between the relay and the current transformer on the line. It is so designed that at a certain value of current, the core of the compensator becomes saturated, and any further rise in current results in an increasing impedance drop so that the current in the relay circuit does not increase in proportion to the current in the line. The ordinary time adjustment provided on standard relays will give the desired definite minimum time element within the range characteristics to each relay. In this maker's relay this range is from zero to two seconds. The winding and core are enclosed in an iron box with sides perforated for ventilation. The compensator can be mounted on any convenient place, such as the rear of a switchboard behind the relay it controls.

SELF-PROPELLED FREIGHT-PASSENGER CAR

The Minneapolis & Northern Gasoline Motor Railway has recently purchased a gasoline motor freight car from the McKeen Motor Car Company for freight and express service between Minneapolis and Anoka, Minn. It is a semi-convertible car which, during periods of heavy passenger traffic, can be used for the transportation of passengers, removable seats and chairs being installed for that purpose.

The car is equipped with the McKeen Motor Car Company's Type "A" motor truck, in which have been incorporated many of the important foolproof and economic features of the latest model Type "C" motor truck. The air-brake system has a special Gregory motorman's valve for the operation of straight air on the motor car and automatic air on trailers.

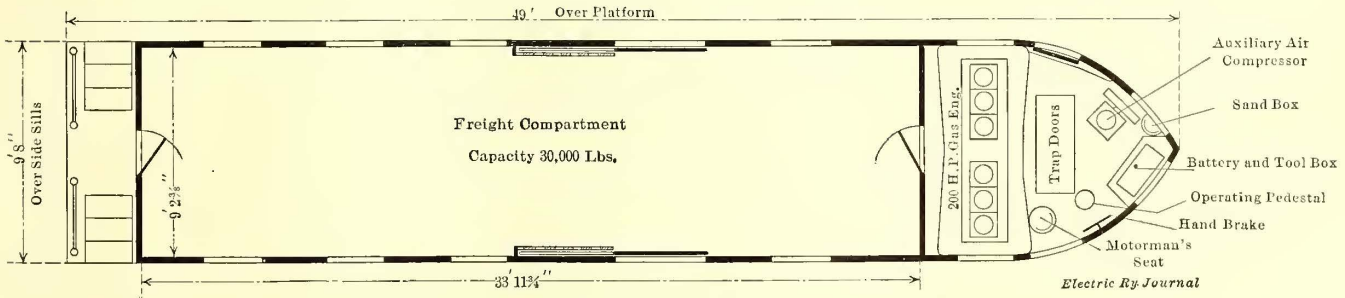
The length of the car over the end sills is 45 ft. while the total length is 52 ft. 2 in. The accompanying floor diagram present the design and equipment layout of the car, from which it will be noted that the front end is wedge-shaped and that the rear end has a platform for ingress and egress of passengers. The McKeen depressed center-side entrance is not a feature of this car, in as much as it is to be used chiefly for freight and express service. The car structure consists of a metal underframe, and continuous 2 in. grooved steel combination side posts and carlines extending from side sill to side sill with metal diagonal bracing. The outside and inside wall sheathing is of 13/16-in. fir. The floor is of 1⅝-in. fir. The main dimensions follow:

Length over the end sills	45 ft. 0 in.
Length over the platform	49 ft. 0 in.
Length over all	52 ft. 8 in.
Width over the side sills	9 ft. 8 in.
Width over the sheathing	9 ft. 9⅝ in.
Width over all	10 ft. 4⅛ in.
Width inside	9 ft. 2⅜ in.
Length of freight compartment	33 ft. 11¾ in.
Height from rail to roof	11 ft. 11 3/16 in.
Weight	56,000 lb.

CARNEGIE LIBRARY OF PITTSBURGH SECURES EARLY TECHNICAL BOOKS

The Carnegie Library of Pittsburgh recently had the good fortune to secure a collection of early technical books, including more than 100 volumes on electricity and its applications. Among them are many standard works which at the time of publication adequately represented the highest development of electrical engineering, especially with respect to European practice, making the collection a valuable record of electrical work during the eighties and nineties. The library has in its technology department the "Catalogue of the Wheeler gift of books, pamphlets and periodicals in the Library of the American Institute of Electrical Engineers" which includes "practically every known publication in the English language previous to 1886 on magnetism, electricity, galvanism, the lodestone, mariner's compass, etc." The Carnegie Library is especially strong in the recent literature of electrical engineering. It files more than thirty electrical journals, the contents being made available to visitors by means of a card-index.

The ninth annual convention of the Federation of Trade Press Associations, will be held in Chicago Sept. 24 and 26. This association includes in its membership 250 class, trade and technical publications.



Plan of Self-Propelled Freight-Passenger Car, Showing Also the Operating Equipment

News of Electric Railways

Toledo Marking Time

The members of the Council and the citizens of Toledo, Ohio, are studying the franchise proposal made by the Toledo Citizens' Franchise Association on June 16. No public meetings have been held since that date, and the consensus of opinion is that the administration is giving the proposal most careful consideration with a view to tangible action. The franchise committee of the Council is understood to have held several private conferences since the business men's proposition was made public. This proposition would probably be acceptable to the administration were it not for the fact that it does not provide for a flat 3-cent fare. The written pledges to that rate made before the election appear to be the barrier in this connection.

The Citizens' Franchise Association is still increasing its membership and the natural presumption is that an exhaustive effort will be made to secure the adoption of the proposed franchise ordinance. The membership now includes most of the prominent business men of the city all earnest in their desire for a settlement at the earliest date possible. The association has done nothing toward forwarding the movement in favor of its proposition, aside from the work that would naturally be done by its members, but has given time for all to become perfectly familiar with the terms of the proposed ordinance and the ideas that dominated the members of the committee in formulating the instrument.

No statement has been made by the company or by Henry L. Doherty, who has had charge of the negotiations for it. Comparison shows that the new proposition and the one proposed by Mr. Doherty are similar in many respects, but even where they differ the possibility appears to be greatly enhanced of adjusting such matters and reaching an agreement. Mr. Doherty looks upon the efforts of the business men as a most valuable aid in reaching tangible results.

The publicity plans have been continued and some very interesting advertisements have appeared recently. One of the most pointed was a reply to an editorial in the Toledo *Blade*. This reply appeared in the *Times* and the *Blade* on June 24. Such editorials give Mr. Doherty an opportunity to go into phases of the business of which the public is particularly ignorant.

F. R. Coates, president of the Toledo Railways & Light Company, said on June 24 that the operation of the road does not differ materially from past years at this particular season. Everything possible is being done to give proper service, notwithstanding the fact that some riders continue to proffer 3 cents for fare. This is always refused, but trouble from this source occurs infrequently.

The members of Council remain silent as to their opinions of the proposed franchise and have refrained from discussing the matter.

Appeal to Courts from Order of New York Commission

A writ of certiorari signed by Justice Greenbaum of the Supreme Court of the State of New York and returnable in twenty days from June 16 was served on June 24 on the Public Service Commission of the First District of New York requiring it to produce for the court to review the record in the case of the application of the New York Railways to the commission for permission to issue $1,050,000 of bonds to cover the purchase of 175 new cars, in which proceeding the commission is willing to allow the company to issue only $640,000 of bonds. The company wants to capitalize the entire cost of the 175 cars. The commission has taken the stand that as an equal number of old cars, each of which cost the Metropolitan Street Railway, the predecessor of the New York Railways, originally about $3,200 have been retired, the cost of these should be deducted from the amount of bonds which the New York Railways may now issue. This would permit the company to raise only $499,200 for its new cars, but as the bonds would have to be sold at a discount the actual amount of new bonds the commission is prepared to authorize is $640,000. The company is protesting against being forced to write off the entire first cost of the old cars it has discarded. The company contends that when it took over the Metropolitan Street Railway it paid only $700 a piece for the cars, and that their reasonable value to-day is only $300. It objects to paying the cost of their entire depreciation from the time when the cars were purchased by the Metropolitan Street Railway as they were worth only $700 apiece when they came into its possession. The company regards the action of the commission in this matter as unauthorized, illegal and in violation of the rights of the company, and as the commission refused on a rehearing to modify its order the company decided to appeal to the courts for relief.

Connecticut Company Discontinues Mail Service

Dissatisfied with the terms of the arrangement under which it has been serving the post office department the Connecticut Company, New Haven, Conn., operating 672 miles of electric railway, discontinued carrying mail on June 21 at midnight. The company served notice on April 14 of the proposed discontinuance of the service and subsequently extended the time. The statement of the company explaining its position follows:

"The Connecticut Company desires to make clear to the public the position regarding discontinuance of carrying the United States mail on passenger cars after midnight of June 21, 1914. Negotiations have been conducted with representatives of the post office department for some months in an earnest endeavor to secure relief from conditions which are unjust and burdensome in the extreme.

"On April 14, 1914, the post office department was advised that, unless some readjustment was effected and an effort made to afford relief, we would be forced to discontinue the handling of mails after May 3, 1914. This was, later, extended to June 15, then June 22. Since our letter of April 14, correspondence has been conducted with the department and conferences have been held between representatives of the department and officers of this company, but no reasonable proposition has been submitted by the department. In justice, therefore, to ourselves and our employees, we shall be obliged to withdraw from this service.

"Since the establishment of these electric car mail routes by the post office department some fifteen or sixteen years ago, our employees operating the cars have been obliged, by the regulations of the department, to carry the mail pouches between the cars and the different post offices along the line. These pouches, in many cases, are extremely heavy and invariably covered with dust and dirt. To require our men to handle these pouches, and, at the same time, keep their uniforms clean and neat, in accordance with our rules, is unreasonable, and has been continually protested against by the representatives of the men, and we do not feel that this burden should be imposed upon them. In a few cases, however, where women or infirm men were in charge of the post offices, we offered to make the necessary arrangements to handle the pouches. The post office department, while willing to relieve us from this service at a few points, still insists that we perform the work at twenty-four different post offices, which we think is unreasonable. Another serious objection is that the transferring of these pouches oftentimes occasions serious delays to the car schedule with the resulting inconvenience to our patrons. Furthermore, in the interest of safety, the car crews should be free to devote themselves to the proper operation of the cars and not be required to leave the car and passengers without protection.

"On many of the routes the number of pouches carried is excessive, twenty to thirty pouches per car in some cases, and, during the Christmas rush and other heavy periods this amount is increased beyond reason. We have received no more money for carrying a large number of pouches than we have for carrying one, as compensation is on a mileage basis. The department was requested to limit the number of pouches to a maximum of six per car. The main reason for requesting this was out of consideration for the safety of our patrons. We do not feel that the front vestibules of closed cars, or the front platform of open cars should be filled with mail sacks. In many cases the amount of mail is so bulky as to prevent safe egress from the car in

case of accident. The motorman is also hampered in the performance of his duties. He should have clear access to all the apparatus he is called upon to control, which is impossible under the present conditions. Also, the loading of these sacks on to the front platform is injurious to the clothing and comfort of patrons and we do not feel that we should have to bear the onus of such complaints. The department offered to split up a few of the routes, so as slightly to reduce the number of sacks in some cases, but they have stated that they are not disposed to place any limit on the number to be carried.

"The following statement of method of computing compensation is given, that there may be no confusion in the mind of the public as to the compensation allowed by the government. The postmaster general fixed the rates of pay on July 1, 1896, at 3 cents per mile per annum for miles run on routes where the annual mileage was over 8,333 miles. The vast majority of our routes are under this classification, and there are a few routes for which we are paid a fixed sum, from $150 to $250 per annum. These rates of pay are established regardless of the number of sacks or pouches carried and no extra compensation is allowed for carrying the sacks between the cars and the post offices.

"Assuming that the rates established in 1896 may have been equitable at that time, any one at all familiar with the tremendously increased cost of material, rails, supplies, labor, pavements and other matters affecting the operating costs of street railroads, will admit that these rates are not equitable under present conditions. In addition to our greatly increased operating costs, the volume of mail has increased to such an extent, particularly since the advent of the parcel post, that the compensation allowed by the post office department is entirely inequitable and utterly inadequate for the service performed. The department offered to allow us 4 cents per mile, instead of 3 cents on three routes, out of a total of eighteen. This, together with the fact that some of the routes would be split, thereby making more trips and increased mileage, would amount to an increase in our total compensation of about 18 per cent, whereas it is well known that the volume of mail has increased several hundred per cent.

"The above will show that relief was requested on the following three issues:—

"First—A limit of six sacks per car, in the interest of safety and maintenance of schedules.

"Second—Relief of the car crews from carrying sacks to and from cars and post offices; a request of our employees.

"Third—An increase in rate commensurate with the increase in our costs and increased weight of mail.

"Having endeavored in every way to secure such relief and additional compensation, but without success, we regret that we will have to discontinue the transportation of the mails after midnight of June 21, 1914. This with a full appreciation of our responsibilities to our patrons, our employees and the communities served by our lines."

Connecticut postmasters were instructed by Second Assistant Postmaster-General Stewart to hire automobiles or trucks to deliver mail which the Connecticut Company refused to transport. Mr. Stewart is quoted as follows:

"I have not yet determined whether any action can be taken against the company. The post office department agreed to meet, as far as the law would permit, all demands made by the company, but the company refused to accept our offer and discontinued service. Upon my authorization, the postmasters have put into operation a substitute service, which, I am informed, is working successfully. At present the post office department contemplates no further steps in this matter."

Mayor Attempts to Remove George Weston from Chicago Board of Supervising Engineers

In anticipation of a report from the local transportation committee of the Chicago City Council vindicating the Board of Supervising Engineers and George Weston, the city's representative, Mayor Harrison on June 23 discharged Mr. Weston. In his letter to Mr. Weston the Mayor claims that he has concluded "to make this removal in order that the city should be represented on the board by a member more aggressively active in guarding the city's interests and securing full compliance with the terms of the traction ordinances of 1907 and 1908." With the exception of the two Hearst papers all the local newspapers defend Mr. Weston and the work of the Board of Supervising Engineers. Since the Mayor has disregarded the investigations into the accounting affairs of the board now being carried on by the local transportation committee of the Chicago City Council, as mentioned in the ELECTRIC RAILWAY JOURNAL for May 23, and since it is believed that the Mayor no longer controls the Council, it is considered improbable that Mr. Weston's removal will be confirmed or that a successor will even be considered.

Mr. Weston's response to the Mayor's communication removing him from office follows in part:

"I am advised by counsel that you have no right or authority to remove me without the concurrence of the City Council, and I shall decline to recognize your authority unless and until that concurrence has been expressed by appropriate action. I deny not only the right but the justice of your action. I do not claim to be infallible, but I do claim to have done all that could reasonably have been expected within the authority of my position. I confidently expect to establish this claim convincingly before the local transportation committee, and I assume that neither the committee nor the City Council will follow your example in acting before it has heard my side of the controversy.

"Your letter raises two questions: one with regard to the present street railway service, and the other with regard to the extent to which I have consulted the legal representatives of the city in obtaining advice as to the correct construction of the traction ordinances.

"As to the first question, the Board of Supervising Engineers has never been given the power to regulate the street railway service. On the contrary, that power was expressly reserved in the ordinances of 1907 and in all subsequent ordinances to the City Council, which acts in such matters largely on the recommendation of the Mayor and his appointees. By authority of the City Council you appointed a traction expert to attend to these very matters. Upon you rests the chief responsibility for improving the street railway service. I can only carry out those provisions of the ordinances which relate to the board and I can act only in the manner in which those ordinances provide. I have at all times gone to the limit of my authority as a member of the board and have even exceeded my official duties to take advantage of every opportunity to recommend the passage and enforcement of more effective regulations of the service. I have vigorously contended for the utmost stretch of the authority of the board to provide adequate construction and equipment, and where that authority has been denied by the companies I have called the attention of the city authorities to the necessity and advisability of action by them to enforce the provisions in the ordinances which the board has been given no authority to enforce. I have appeared before council committees and I have repeatedly, but in vain, sought to obtain your co-operation in these matters.

"I have also repeatedly conferred with the office of the corporation counsel, and have joined with the other members of the Board of Supervising Engineers in seeking to secure, and sometimes in securing, the attendance of the legal representatives of the city at meetings of the board at which the construction of some provision of the traction ordinances was under consideration. The traction ordinances were adopted in 1907, and in the very nature of the case it was necessary during that year and the years immediately following to determine the construction of the more important provisions of the traction ordinances. Upon all matters which seemed to be of substantial importance, and upon many matters of relatively minor importance, the board secured the advice of counsel representing the city as well as of counsel representing the street railway companies. I have at all times sought and followed the advice of the counsel representing the city.

"It is gratifying to know that in practically every instance the action of the board has been sustained by public and official opinion, which finally culminated in the approval of the unification ordinance in November, 1913. I have no desire to rest up this approval, but stand ready now, as at all times, to have my good faith, my professional capacity, my industry and my earnest devotion to the interests of the city determined by any fair and competent tribunal."

Mayor Jost Signs Kansas City Ordinance

Mayor Henry L. Jost, of Kansas City, Mo., signed the proposed Metropolitan Street Railway franchise on June 15, with two changes incorporated after they had passed both houses of the City Council. The first change consisted of an addition to the interurban clause, reading, "It is agreed that interurban traffic to and within the city shall be encouraged to a fully practicable degree." The second clause originally read: "Before the city shall have the right to begin a proceeding to enforce said forfeiture it shall give notice to the company in writing of the specific dereliction or derelictions complained of, and unless the company within sixty days thereafter shall fully remove such alleged cause of forfeiture, the city shall have the right to begin and proceed with the enforcement of said forfeiture." The amendment eliminated the clause, "sixty days thereafter shall," and substituted the following: "Shall promptly and with expedition. For a second or subsequent breach of the same provision the city shall have the right to proceed without further notice to enforce such forfeiture."

The passage of the amendments made it necessary to repass the ordinance providing for the election on July 7, and this was done. Alderman W. C. Tabb, who voted against the ordinance at its first passage, did not vote on the amendments. He was excused by request.

The Metropolitan Street Railway on June 18 deposited with the city comptroller a check for $32,500, the estimated cost of the franchise election on July 7. The money will cover the expense of legal advertising in addition to the actual expenses. The city is authorized to draw on the company for further funds, if necessary.

The franchise committee of the Kansas City Commercial Club, the leading commercial organization, reported favorably to the organization on June 18, referring to the ordinance as "a fair and equitable arrangement for both the city and the company." The Commercial Club met on June 25 finally to ascertain the sentiment of its members.

As a result of statements appearing in the Kansas City *Star* and the *Times*, which are combating the franchise, Henry L. Doherty, of the Doherty Operating Company of Toledo, sent the following telegram to William R. Nelson, owner of the two papers:

"I have just been shown your issues of June 12 and 15. Your statements about the writer and of the Toledo situation reek with false testimony. If you are not deliberately trying to mislead your readers, you should endeavor to secure the facts on these matters and publish them. And if you do not correct your misstatements the citizens of Kansas City who stand for good morals, fair play and decency should undertake your moral regeneration. As a first move they should present you with an engrossed copy of the ninth commandment."

The Nelson papers, in their fight against the franchise, have sought to prove that in all of the cities which have had street railway troubles long franchises have been responsible for the complications.

The labor situation is still unsettled. Frank Hagerman, attorney for the receivers of the company, wrote labor leaders on June 20, calling attention to the franchise clause which provides that the company shall not discriminate against any employee because of his affiliation with any labor organization.

Middlesex & Boston Arbitration Board Decides Upon Wage Increase

A majority of the arbitration board sitting in the wages case of the Middlesex & Boston Street Railway has granted an increase of approximately 15 per cent in pay to the employees of the company. The award was signed by Chairman George L. Mayberry and James H. Vahey. A dissenting report was filed by Arthur A. Ballantine, who represented the company on the board.

The finding increases the wages of platform men from the present scale of 20½ to 27 cents an hour to a temporary scale of from 23 to 29 cents an hour for the past thirteen months, with a new scale of 24 to 30 cents, reaching the maximum in five years, for the two years beginning July 1, 1914. Carhouse and other employees for the entire period are awarded an increase of from 2 to 5 cents an hour. Pitmen, car cleaners or night men are to receive from 17 to 29 cents an hour, blacksmiths 30 and 35 cents, firemen 27 cents, track greasers, 23 and 25 cents; trackmen, 26 and 29 cents, and teamsters, 24 cents. The board finds further, that after the date of the award overtime for carhouse employees shall be 50 per cent above the regular rate, and that the computation of back pay shall be made upon the basis of the actual number of hours worked. Extra men will receive back pay only for the weeks in which their time, computed at the new rates, exceeds the agreed minimum guarantee.

In his dissenting report Mr. Ballantine says that the wages fixed by the majority necessitate either a reduction of the present 4 per cent return upon the capital stock of the company, higher fares or the acceptance of a less adequate service by the public, and perhaps all three. After reviewing the company's financial condition he concludes that the award will tend to discourage capital from investing in public service enterprises.

New Franchise Proposal in Des Moines

Emil G. Schmidt, president Des Moines (Ia.) City Railway, has presented to the City Council a tentative franchise for the extension of the company's rights in Des Moines for twenty-five years. The conditions which Mr. Schmidt has outlined differ in several essentials from the terms of the franchise passed a few months ago by the Council and rejected by the company as being too onerous. Under both the old and new proposals it is planned to determine the fare on the basis of the company's earnings after the question of valuation has been settled. Mr. Schmidt suggests a straight 5-cent fare at the outset with a sliding scale of fare reductions varying as the dividends on the present fixed capital of the company increase. Under this plan it is proposed that when the net earnings after the payment of all fixed charges are sufficient for a dividend of more than 7 per cent upon the capital stock, six tickets shall be sold for a quarter. By a similar process an 8 per cent dividend would result in the sale of five tickets for 20 cents; a 9 per cent dividend of four tickets for 15 cents, and a 10 per cent dividend of ten tickets for 35 cents. The bonds outstanding amount to $2,754,000, the stock to $1,305,000 and the floating debt to $1,356,000, or a total of $5,415,000. It is proposed to fund the floating debt and to capitalize improvements which are to be made, to the amount of $1,500,000, making the total capital liabilities approximately $7,000,000. Two supervisors to determine questions of service, fixed schedules, etc., are provided for in the draft. The city would name one of the supervisors and the company the other, but the company would pay the salary of both.

Depreciation Charges in Ohio

E. W. Breyer has been employed as an expert by the Ohio Public Utilities Commission to prepare a system of depreciation charges for public utility companies. Mr. Breyer does not employ the word "depreciation" in his system, but rather contemplates the creation of reserves by contemporaneous charges to the operating expense to defray what he terms "extraordinary maintenance, deferred upkeep and contingencies," which, taken together, include the charges generally accepted as coming under depreciation. By the term "extraordinary maintenance" Mr. Breyer contemplates repairs of an extensive nature, but something less than the replacement of an entire unit of buildings or machinery. Such a charge would accrue through deterioration for a long period of time. "Deferred upkeep" would mean the necessary replacement of complete units, retired by inadequacy, advancement in the arts or because of becoming obsolete. "Contingencies" contemplates extraordinary losses occasioned by fires, floods, earthquakes or storms. The corporations would act as trustees of the funds accumulated for these purposes, as representing trust funds paid in advance by the public. It is contemplated that such funds be used for working capital or for financing extensions and improvements temporarily. Interest must be paid and evidences of indebtedness executed when the funds are used for purposes other than those for which they were established.

Preliminary Legal and Valuation Reports in San Francisco

On June 17 the public utilities committee of the Board of Supervisors of San Francisco, Cal., instructed City Attorney Long to investigate and report on the city's legal status in the event that the acquisition of the property of the United Railroads by the city is deemed expedient. At the same time the committee requested the city engineer's office to estimate the physical value of the company's properties. No definite date was set for further consideration of the matter, but Chairman Alex Vogelsang of the committee announced that it would be taken up again as soon as reports are received from the city attorney and the city engineer. In the case of the city engineer, the report will be of a purely preliminary nature and will be made without the aid of any special appropriation. The work of the city attorney will consist in determining the various avenues by which the city may legally acquire the United Railroads.

Hearing in Manila on Service.—The new public utility board in Manila has begun its administration by requiring reports of earnings from all inter-island shipping companies and with a hearing on the service of the Manila Electric Light & Railway Company.

Public Service Commission Publication.—The Public Service Commission of the First District of New York is to issue every month the *Public Service Record*, in which the doings of the commission are to be set forth. The first number contains an article signed by Chairman McCall explaining the purposes of the new magazine.

Organization Changes of the Northern Electric Railway.—Louis Sloss, president of the Northern Electric Railway, Chico, Cal., has announced that in the future the auditor, the traffic manager and the secretary of the company will all report to him. W. A. McGovern, the new general manager, will be in charge of operation. He, too, will report to Mr. Sloss.

Electric Operation on New Haven Extended.—On June 22 regular service with a schedule of sixteen passenger trains a day was established over the recently completed electrified section of the main line of the New York, New Haven & Hartford Railroad between Stamford and New Haven, Conn. The electrified line between the Grand Central Terminal, New York, and the Union Station, New Haven, via Stamford, is 73 miles long.

Toronto to Take Over Small Railway Section.—Corporation Counsel Geary, of Toronto, Ont., has recommended the City Council to serve notice on the Toronto & York Radial Railway that it proposes to take over a portion of the Metropolitan Railway on Yonge Street, at the expiration of the franchise granted by the Corporation of the county of York to the Metropolitan Railway, by agreements dated June 25, 1884, and Jan. 20, 1886.

Inspection of European Terminals.—An inspection of the steam railroad terminals in a number of European cities may be made by a committee from the Chicago Council and the engineers in charge of the terminal plans in that city. The party would start about the middle of July and be gone about six weeks. It would probably include John F. Wallace, Walter Fisher, B. J. Arnold, Corporation Counsel Bennett and Aldermen Geiger, Richert, Capitain and W. J. Healy.

New Michigan Road Ready for Service.—Announcement is made of the proposed formal opening on July 1 of the new electric railway between Romeo and Almont, known as the Detroit, Almont & Northern Railway. Officers of the Detroit United Lines, officials of the city of Detroit, newspaper representatives and a number of guests will constitute the party to be present at the road's opening. For the immediate future cars running from Detroit to Romeo will be sent through to Almont and return. The length of the extension is 10 miles.

National Guard at Kentucky Park.—The maintenance by the Kentucky Traction & Terminal Company of Blue Grass Park near Lexington has been the means of that company assuring itself of a greatly increased traffic during the first ten days in July, when the Kentucky National Guard will be encamped there. To take care of the militiamen, who will be augmented by the addition of a company of U. S. regulars, the Traction & Terminal Company will erect a storage tank to hold 10,000 gallons of water. Gen. J. Tandy Ellis, accompanied by F. W. Bacon, vice-president of the company, and George McLeod, chief engineer, recently inspected the park.

Negotiations Regarding Detroit Valuation Compensation.—Prof. E. W. Bemis and the members of the Detroit Street Railway Commission have not as yet agreed upon the terms for making an appraisal of the property of the Detroit United Railway within the city of Detroit. It is understood that Professor Bemis wants compensation by the day while the commissioners favor a fixed amount for the entire work. J. C. Hutchins, president of the company, has assured the commissioners of the company's fullest assistance to the city in arriving at an equitable valuation of the property. The inventory submitted by the company to the commission last December will be amplified, and every detail will be placed at the disposal of the city's appraisers.

Extension of Lake Burien Line Proposed.—The plan to extend the Lake Burien line, known as Division "C" of the Seattle (Wash.) Municipal Railway from Lake Burien, the present terminus, to Three Tree Point on Puget Sound, a distance of 2 miles, has been discussed with the Council by the property owners of the territory, who have suggested that they construct the line and deed it to the city without incumbrance except for an agreement on the part of the municipality that cars will be operated regularly to the Sound terminus. Hourly service is now maintained on the Lake Burien line and A. L. Valentine, superintendent of public utilities of the city, who is in charge of the railway, recently announced a package service on Tuesday, Thursday and Saturday.

New Cleveland Shops Described.—At a recent meeting of the street railway committee of the City Council of Cleveland, Ohio, Joseph Alexander, street railway engineer, described the new repair shops that are now being erected by the Cleveland Railway at Harvard Avenue and Independence Road. An office building, with twenty-four shower baths in the basement, a hospital with a physician in attendance constantly, dining room space and other up-to-date ideas are to be provided. The Council has authorized the company to enter into contracts for new buildings for this group, to cost about $500,000. The three buildings making up the repair shop section proper have already been erected at a cost of about $387,000. There will be fourteen buildings in the group and between 400 and 500 people will be employed.

Resumption of Toronto Purchase Negotiations Likely.—At the meeting of the City Council of Toronto, Ont., on June 15 Comptroller Church moved to instruct the Corporation Counsel to table the draft agreement for the purchase of the property of the Toronto Railway and Toronto Electric Light Company by the city and to report on the causes of delay in completing the legal negotiations. Several extraneous proposals were eliminated from the motion by an amendment introduced by Alderman Graham, after which it was carried unanimously. Mayor Hocken told the Council that Z. A. Lash, chief counsel for the Mackenzie interests, promised to resume negotiations with the city's lawyers immediately after the adjournment of the House of Commons. He considered the company's excuse for delay was reasonable.

Meridian Power Plant Explosion.—A boiler explosion in the power plant of the Meridian Railway, Light & Power Company, Meridian, Miss., on June 8 caused the death of a negro, injured two employees and badly wrecked the power house. Though the cause of the explosion is still unknown, there was a flaw in one of the boiler heads, which was torn off. This boiler was hurled by the impact of the explosion through a brick wall and landed outside of the building. Another boiler was torn off its foundation. The generators were injured by falling bricks. One of the boilers remained uninjured. Immediately after the explosion every effort was made to repair the wreckage, with the result that in two days street railway service was resumed. The two boilers which were wrecked have been replaced by the purchase of a 750-hp and a 350-hp Stirling boiler from the Babcock & Wilcox Company.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

MASSACHUSETTS

The joint committee on metropolitan affairs and street railways has decided to draft a resolve referring the proposed merger of the Boston Elevated Railway, the Bay State Street Railway and the Boston, Revere Beach & Lynn Railroad, with other electric railways in the Boston metropolitan district, to the next Legislature, providing for an investigation and report upon the subject at the next session by the Public Service Commission. The resolve is being drafted by Messrs. Williams, Mack, Cox, Robinson and Lomasney, and will probably be passed.

PROGRAM OF ASSOCIATION MEETING

Pacific Claim Agents Association

The sixth annual convention of the Pacific Claim Agents Association will be held at the Hotel Spokane, Spokane, Wash., on July 9, 10 and 11. At the first session at 10 a. m. on July 9 addresses of welcome will be delivered by William J. Hindley, Mayor of Spokane; D. L. Huntington, president of the Washington Water Power Company, and Waldo G. Paine, vice-president of the Spokane & Inland Empire System. The program of papers for the session on the afternoon of July 9 follows:

"What Methods Should be Pursued in Keeping Informed of the Movements of Witnesses in Cases Where Litigation is Likely to Arise?" by A. N. Lee, assistant general claim agent of the Northern Pacific Railway, Seattle, Wash.

"What are the Most Effective Methods that can be Adopted by Public Service Corporations in Prosecuting Fraudulent Claimants and Professional Witnesses?" by Harrison Allen, attorney of the Portland Railway, Light & Power Company, Portland, Ore., and John S. Mills, assistant superintendent of the San Francisco-Oakland Terminal Railways, Oakland, Cal.

The program of papers to be presented at the sessions on July 10 and July 11 follows:

July 10

"The Prevention of Automobile Accidents," by S. A. Bishop, general claim agent of the Pacific Electric Railway, Los Angeles, Cal., and J. H. Handlon, claim agent of the United Railroads, San Francisco, Cal.

"Statistical Information Showing the Accident Cost of Trainmen with Respect to Length of Service," by H. G. Winsor, claim agent of the Tacoma Railway & Power Company, Tacoma, Wash., and Thomas G. Aston, claim agent of the Washington Water Power Company, Spokane, Wash.

"To What Extent Can the Claim Department Co-operate with the Operating Department in the Matter of Selecting Trainmen as to Their Moral, Mental and Physical Fitness?" by B. F. Boynton, claim agent of the Portland Railway, Light & Power Company, Portland, Ore., and A. E. Beck, claims solicitor of the British Columbia Electric Railway, Ltd., Vancouver, B. C.

"What Can Be Done Toward Remedying the Trespassing Evil?" by H. K. Relf, general claim agent of the Spokane, Portland & Seattle Railway, Portland, Ore.

July 11

"Is It Advisable for a Statement to Be Secured from an Injured Person Immediately After an Accident Occurs Without Regard to Liability or the Intention of the Injured Person to File a Claim?" by George Carson, general claim agent of the Puget Sound Traction, Light & Power Company, Seattle, Wash., and T. A. Cole, claim agent of the Los Angeles Railway Corporation, Los Angeles, Cal.

"The Evolution of 'Safety First,'" by T. M. Lyall, assistant claim agent of the British Columbia Electric Railway, Ltd., Vancouver, B. C.

"What Policy Should Be Adopted in the Disposition of Claims of Doubtful Liability?" by T. J. Rupli, assistant claim agent of the Puget Sound Traction, Light & Power Company, Ltd., Seattle, Wash., and Mrs. Ida P. Newell of the Portland Railway, Light & Power Company, Portland, Ore.

"Safety (A) From Standpoint of (1) The Public, (2) The Companies; (B) Safety Work of Various Companies, by George Carson, chairman of committee.

Financial and Corporate

Stock and Money Markets

June 24, 1914.

The trading on the New York Stock Exchange to-day was the most active in many weeks and the net loss was the most pronounced movement recorded during a considerable period. The sales of stock to-day totaled 353,600 shares, compared with 194,900 yesterday and 112,200 a week ago. The principal railroad issues and the industrials sold down, some yielding several points. Rates in the money market to-day were: Call, 2 per cent; sixty days, 2¼ @ 2½ per cent; four months, 3 @ 3¼ per cent; six months, 3¼ @ 3½ per cent.

In the trading in Philadelphia to-day most of the local issues ruled fractionally weaker and were in very light demand.

The Boston market was fairly active to-day in the early and late dealings. Prices declined.

The Chicago market was narrow and inactive to-day with losses general. Bond quotations were unchanged, but the market was very narrow.

Dealings were light in Baltimore to-day in a narrow market. The sales of stock totaled 369 shares and of bonds $57,500, par value.

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

	June 18	June 24
American Brake Shoe & Foundry (com.)	90½	88⅛
American Brake Shoe & Foundry (pref.)	138	134
American Cities Company (com.)	*29	*29
American Cities Company (pref.)	65¼	*65¼
American Light & Traction Company (com.)	340	341
American Light & Traction Company (pref.)	109	109
American Railways Company	37	37⅜
Aurora, Elgin & Chicago Railroad (com.)	34¾	34
Aurora, Elgin & Chicago Railroad (pref.)	78	76
Boston Elevated Railway	87½	90¾
Boston Suburban Electric Companies (com.)	7	7
Boston Suburban Electric Companies (pref.)	65	*65
Boston & Worcester Electric Companies (com.)	*6¼	*6¼
Boston & Worcester Electric Companies (pref.)	36	35
Brooklyn Rapid Transit Company	90¾	90
Capital Traction Company, Washington	98½	97
Chicago City Railway	135	135
Chicago Elevated Railways (com.)	20	25
Chicago Elevated Railways (pref.)	65	75
Chicago Railways, ptcptg., ctf. 1	96	99
Chicago Railways, ptcptg., ctf. 2	33¼	34
Chicago Railways, ptcptg., ctf. 3	5	6
Chicago Railways, ptcptg., ctf. 4	2	2½
Cincinnati Street Railway	102¾	105
Cleveland Railway	103½	103¾
Cleveland, Southwestern & Columbus Ry. (com.)	*4	*4
Cleveland, Southwestern & Columbus Ry. (pref.)	*30	*30
Columbus Railway & Light Company	13	13
Columbus Railway (com.)	*53	*53
Columbus Railway (pref.)	79½	79½
Denver & Northwestern Railway	*63	*63
Detroit United Railway	a80	80
General Electric Company	147⅝	147½
Georgia Railway & Electric Company (com.)	120½	120
Georgia Railway & Electric Company (pref.)	86½	86½
Interborough-Metropolitan Company (com.)	14¼	14
Interborough-Metropolitan Company (pref.)	62⅝	61¼
International Traction Company (com.)	*30	*30
International Traction Company (pref.)	*85	*85
Kansas City Railway & Light Company (com.)	22	22
Kansas City Railway & Light Company (pref.)	39	39
Lake Shore Electric Railway (com.)	*6	*6
Lake Shore Electric Railway (1st pref.)	*90	*90
Lake Shore Electric Railway (2d pref.)	*22	*22
Manhattan Railway	129¼	130
Massachusetts Electric Companies (com.)	11	11¼
Massachusetts Electric Companies (pref.)	61	56
Milwaukee Electric Ry. & Light Co. (pref.)	95	95
Norfolk Railway & Light Company	26	*26
North American Company	68¾	71
Northern Ohio Traction & Light Co. (com.)	60	a60
Northern Ohio Traction & Light Co. (pref.)	a101	101
Philadelphia Company, Pittsburgh (com.)	38¾	39½
Philadelphia Company, Pittsburgh (pref.)	37	37
Philadelphia Rapid Transit Company	15¾	15¾
Portland Railway, Light & Power Company	47	*47
Public Service Corporation	112	112
Third Avenue Railway, New York	41½	41
Toledo Traction, Light & Power Co. (com.)	13	a13
Toledo Traction, Light & Power Co. (pref.)	70	70
Twin City Rapid Transit Co., Minn. (com.)	103	103¼
Union Traction Company of Indiana (com.)	*11½	*11½
Union Traction Company of Indiana (1st pref.)	*75	*75
Union Traction Company of Indiana (2d pref.)	14	*14
United Rys. & Electric Company (Baltimore)	27⅝	28
United Rys. Inv. Company (com.)	11	11
United Rys. Inv. Company (pref.)	32	32½
Virginia Railway & Power Company (com.)	49	49
Virginia Railway & Power Company (pref.)	97	87½
Washington Ry. & Electric Company (com.)	86	86
Washington Ry. & Electric Company (pref.)	82⅝	82½
West End Street Railway, Boston (com.)	67¾	66½
West End Street Railway, Boston (pref.)	88	85
Westinghouse Elec. & Mfg. Company	75⅝	74⅜
Westinghouse Elec. & Mfg. Co. (1st pref.)	124	124

* Last sale. a Asked.

ANNUAL REPORTS

Puget Sound Traction, Light & Power Company

The comparative statement of income, profit and loss of the Puget Sound Traction, Light & Power Company, Seattle, Wash., for the years ended Dec. 31, 1913 and 1912, follows:

	1913	1912
Earnings:		
Railway department	$5,950,786	$5,599,130
Light and power department	2,244,705	2,177,542
Gas department	57,443	55,742
Steam heat department	315,712	299,589
Other earnings	44,953	181,844
Total earnings	$8,613,599	$8,313,847
Expenses:		
Operating expenses	$4,266,977	$4,182,035
Taxes	741,398	590,263
Total operating expenses and taxes	$5,008,375	$4,772,298
Net earnings	$3,605,224	$3,541,549
Interest charges	1,811,436	1,752,376
Balance	$1,793,788	$1,789,173
Bond sinking funds	251,583	223,874
Balance	$1,542,205	$1,565,299
Dividends paid:		
Dividends paid:		
By Puget Sound Traction, Light & Power Company:		
Preferred	$641,542	$428,193
Common	742,253	549,301
By subsidiary companies (before acquisition) to others		300,293
Total dividends paid	$1,383,795	$1,277,787
Balance	$158,410	$287,512

The gross earnings for 1913 showed an increase of $299,752 or 3.6 per cent over 1912. The earnings of the railway department increased $351,656, or 6.3 per cent, while the light and power earnings increased $67,162, or 3 per cent. The operating expenses increased $84,942, or only 2 per cent, but taxes increased $151,135, or 25.6 per cent, owing to greatly increased tax rates brought about by many public improvements. In spite of this large increase in taxes, however, the net earnings in 1913 increased $63,675, or 1.8 per cent over 1912 and 4.2 per cent over 1911.

Among some of the improvements made to the property during 1913 may be noted the following: Construction of a 55,000-volt transmission line from Snoqualmie Falls to Everett; extensions to the transmission system to Bellingham and Tacoma; a considerable amount of paving in the railway department; the purchase of twenty new passenger cars and five new box cars; the purchase of monitor nozzles to reduce the fire hazard and the installation of window guards, additional air-brake equipment, electric heat, etc., to a number of cars in Seattle.

The Puget Sound Traction, Light & Power Company is operating 561 passenger and 195 freight, mail and miscellaneous street cars, and 45 passenger and 252 freight and miscellaneous interurban cars. The number of passengers carried, including transfers on all divisions, amounted to 142,049,229, while the transfers taken up numbered 30,399,145.

Illinois Traction Company

The comparative statement of income, profit and loss of the Illinois Traction Company, Peoria, Ill., for the years ended Dec. 31, 1913 and 1912, follows:

	1913	1912
Earnings:		
Interurban lines	$3,055,519	$2,964,955
City lines	2,129,804	2,030,994
Electric	1,977,349	1,689,477
Gas	466,449	428,977
Heat	247,530	219,170
Miscellaneous	71,445	82,074
Total	$7,948,097	$7,415,647
Operating expenses and taxes	4,613,336	4,353,214
Net from operating	$3,334,761	$3,062,433
Interest on bonds, etc.	2,072,538	1,975,969
Available for dividends	$1,262,223	$1,086,464
Dividend on preferred stock	406,372	344,547
Surplus income	$855,851	$741,917
Dividend on common stock	224,805	
Net surplus	$631,046	

The gross revenue increased during the year $532,450, or 7.8 per cent; net earnings $272,328, or 8.89 per cent, and surplus income $113,933, or 15.35 per cent. During the year there was expended for maintenance $1,343,489, which was 16.9 per cent of the gross receipts as compared to 15.7 per cent of the previous year. During the year there was also expended for improvements on the properties controlled by the company $1,660,156. The surplus income for the year, after paying 6 per cent dividends on the company's preferred stock, was $855,851, equivalent to 8.56 per cent upon the common stock of the company, as compared to 7.43 per cent for the preceding year. The balance carried forward to the surplus amounted to $2,550,206.

The report states that the installation of electric automatic block signals started between Springfield and Carlinville and between Staunton and Edwardsville was 50 per cent completed at the end of the calendar year. The interurban line now has 145 miles of trackage protected by these signals, whose operation during the year was 99.97 per cent perfect. Improvements made during the year include three new grain elevators, five miles of industrial tracks and side tracks, track connections with four railroads, and fourteen bridges replaced with permanent concrete openings. A new three-story brick terminal office building was constructed at Champaign, and the company expects to proceed with the work on the Peoria terminal building this year.

The annual report of the company, besides the above information, contains a list of the principal component properties, a résumé of the service (exclusive of interurban) in the various cities, a comparative statement of receipts and expenditures for the years from 1908 to 1913, inclusive, a table showing the indebtedness of the properties controlled by the Illinois Traction Company, and a man showing the diversity of location and character of the city properties controlled by the company.

Merger of Wisconsin and Minnesota Properties

The La Crosse Gas & Electric Company has changed its name to the Wisconsin-Minnesota Light & Power Company, and under the authority of the Railroad Commission of Wisconsin has increased its capitalization to acquire all the properties of the Chippewa Valley Railway, Light & Power Company and valuable water power rights on the Chippewa and Red Cedar rivers capable of developing approximately 100,000 hp of electrical energy. The new company will control the entire electric business in La Crosse, Eau Claire, Chippewa Falls, Menominee and cities located along its 100 miles of transmission lines, the gas busines in La Crosse, Eau Claire and Chippewa Falls, the street railway systems in Eau Claire and Chippewa Falls and an interurban railway connecting these two cities. The Wisconsin-Minnesota Light & Power Company has an authorized capitalization of $20,000,000 and will have outstanding $988,000 of common stock and $1,700,000 of 7 per cent cumulative preferred stock. Its authorized bond issue is $20,000,000, of which $3,750,000 is now issued. The preferred stock has been purchased by Paine, Webber & Company, Boston, and the bonds have been bought by the Harris Trust & Savings Bank, Chicago. The common stock of the company will all be owned by the American Public Utilities Company, Grand Rapids, Mich. Kelsey, Brewer & Company, Grand Rapids, Mich., will manage the newly acquired properties.

Chicago Bank Failure

The efforts of the promoters of the Southern Traction Company of Illinois, East St. Louis, Ill., in its behalf are said to be responsible in a large measure for the failure of the LaSalle Street Trust & Savings Bank, Chicago, with four subsidiary banks in the outlying district. These banks are known as institutions of the Lorimer-Mundy syndicate. Former United States Senator William Lorimer, of Illinois, the head of the Lorimer-Gallagher Construction Company, Chicago, the contractors who financed and built the Southern Traction of Illinois, carried on the work with the aid of the Lorimer-Mundy banks. When the company was thrown into the hands of a receiver following Mr. Lorimer's failure to finance the railway in Europe, an investigation by the state bank examiner showed that the Lorimer-Mundy banks held a considerable amount of the paper of the traction company.

Following the closing of the LaSalle Street Trust & Sav-

ings Bank William Lorimer resigned as one of the trustees of the Southern Traction Company. William A. Trautman, formerly a federal attorney in the Danville, Ill., district and a stockholder in the Southern Traction Company, has been named trustee for the company by Federal Judge Francis M. Wright, to succeed Mr. Lorimer.

Boston (Mass.) Elevated Railway.—In a recent article on the distribution of the stock of the Boston Elevated Railway among investors the Boston *News Bureau* said: "The stockholders' list of the Boston Elevated Railway as of April 1, 1914, in comparison with April 1, 1913, presents a most interesting commentary of the faith of shareholders—owning 300 shares or more—in the property. On that date there were ninety-seven shareholders having 300 shares or more. Of these ninety-seven stockholders only four sold any of their shares during the year to April 1, 1914, the total reduction in their shareholdings being only 1308 shares. On the other hand, fifty-four shareholders increased their share interest in the property, shareholdings of thirty-two were unchanged, while seven persons who were not on the list of larger stockholders last year appear this year with total holdings of 5206 shares. Only one stockholder owning 600 shares or over disposed of any stock last year."

Central Park North & East River Railroad, New York, N. Y.—The committee of shareholders of the Central Park, North & East River Railroad has decided to discontinue its action against the former directors of the Metropolitan Street Railway and the New York City Railway as such owing to the recent decision of Justice Davis of the Supreme Court of New York dismissing the suit of minority stockholders of the company against former directors to recover $2,000,000 damages. This decision was referred to briefly in the Electric Railway Journal of May 16. The committee has, however, issued a circular which it concludes in part as follows in regard to separate actions which it proposes to institute: "The action is being continued against those who were directors of the Central Park, North & East River Railroad, several of whom were also directors of the Metropolitan Street Railway and the New York City Railway. It seemed wisest not to carry the case to the Court of Appeals, particularly as your committee had started a similar suit in Pennsylvania against certain directors who could not be served in New York. In this way it was felt that we could try out, at less expense and more promptly, the issues against the old directors who were responsible for your losses, and from whom we believe we can collect any judgment that the courts will give us. We are pushing these matters as fast as possible. The funds in our hands provided by the initial assessment of $1 per share are about exhausted, and a further assessment of $1 a share is hereby called, payable forthwith at the office of the Equitable Trust Company, New York, making so far $2 called out of the agreed $3 a share assessment."

Chicago (Ill.) Elevated Railways.—The new first mortgage 5 per cent bonds of the Northwestern Elevated Railroad have been purchased by a syndicate composed of Lee, Higginson & Company, N. W. Halsey & Company and the National City Bank of New York. There are $12,000,000 out of the total of $17,000,000 to be offered shortly. The price at which they are to be sold to the public has not yet been given out. The National City Bank is also forming a syndicate to bring out the notes and debentures which are to care for the balance of the $30,000,000 of notes maturing July 1.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—The Elmira Water, Light & Railroad Company has declared a dividend of 1 2-3 per cent on the second preferred stock for the four-month period ended June 30, payable on July 1 to stock of record of June 15. This is the first dividend that has been declared on the $1,000,000 of 5 per cent cumulative second preferred stock since the readjustment of the company's finances a few months ago. The present second preferred stock was formerly the first preferred.

Geary Street, Park & Ocean Railroad, San Francisco, Cal.—The Mercantile Trust Company, San Francisco, as successor trustee, has brought suit against the Geary Street, Park & Ocean Railroad to foreclose the mortgage under which $484,000 of 5 per cent bonds have been issued and on which interest has been in default since October, 1912. The principal remaining assets consist of the property at Buchanan and Geary streets, and at First Avenue and Geary Street, valued at more than $270,388, while the liabilities are $526,000. It is requested that a receiver be appointed to take charge of the property and that he be given power to require stockholders to pay the full amount of their subscriptions. The capital stock authorized and issued is $1,000,000 in shares of a par value of $100, of which $37.50 was paid in. Following the expiration of the franchise of the Geary Street, Park & Ocean Railroad the route over which the company operated was converted to the use of the present Geary Street Municipal Railroad.

Lehigh Valley Transit Company, Allentown, Pa.—The Easton Consolidated Electric Company, which is owned by the Lehigh Valley Transit Company, with the exception of the directors' shares, has made its dividend rate of 4 per cent payable on the full par value of the stock, $1,500,000. Only one-half of the capital, or $750,000, has been paid in. The Lehigh Valley Transit Company now will receive dividends from the Easton Consolidated Electric Company amounting to $60,000 a year, whereas formerly the dividends paid by the latter amounted to $30,000.

Michigan Railway, Jackson, Mich.—E. W. Clark & Company, Philadelphia, together with Hodenpyl, Hardy & Company, New York, and the National City Bank, New York, are offering for public subscription $5,000,000 of first lien 6 per cent five-year gold notes of the Michigan Railway at 98½ and interest, to yield 6.35 per cent. The issue, which has been approved by the Michigan Railroad Commission, is guaranteed, principal and interest, by the Commonwealth Power, Railway & Light Company, through individual endorsement on each note. The notes are dated June 1, 1914, and mature on June 1, 1919. They are issued in denominations of $1,000, $500 and $100 and are redeemable at 103 and interest on June 1 or Dec. 1, 1916; 102 and interest on June 1 or Dec. 1, 1917, and 101 and interest on June 1 or Dec. 1, 1918. The authorized issue is $7,000,000. As security for its guaranty of the notes, the Commonwealth Power, Railway & Light Company has placed with the Bankers Trust Company, New York, and the Detroit Trust Company, Detroit, trustees, stocks of other subsidiaries having an earning power in excess of the interest requirements on the notes. Net earnings of the Commonwealth available for the payment of dividends on its preferred and common stocks amounted, for the year ended April 30, 1914, to $2,203,350, or more than seven times the obligation which the company assumed through its guaranty of the interest on the notes. The notes are secured by first mortgage, through pledge of the entire outstanding amount ($6,250,000) of first mortgage 5 per cent bonds of the Michigan Railway, upon the entire property of that company, comprising 45.35 miles of interurban electric railway in actual operation; 42.42 miles of steam railroad now being equipped for electric operation, and 56.83 miles additional interurban electric railway, which it is expected will be put in operation by Jan. 1, 1915.

Northern Electric Railway, Chico, Cal.—The Railroad Commission of California has authorized the Northern Electric Railway to operate under lease the property of the Northern Electric Railway—Marysville-Colusa Branch. The authority is granted on the condition that the Railroad Commission, or other competent public authority, shall at all times have the right to revise or alter all or any of the terms of the lease. The Railroad Commission has also authorized the Northern Electric Railway to operate under lease the property of the Sacramento & Woodland Railroad. The lease is subject to revision or alteration by the Railroad Commission or other competent public authority, at any time, in any rate fixing inquiry or otherwise.

New York (N. Y.) Railways.—The Public Service Commission of the First District of New York has granted the application of the Broadway & Seventh Avenue Railroad for authority to issue $500,000 of refunding 5 per cent bonds, maturing on Dec. 1, 1914. The proceeds are to be used to refund a like amount of outstanding second mortgage bonds, payable on July 1, 1914, and if there should be any surplus from the sale it is to remain in the treasury of the company until the commission makes an order as to its disposition. The application of the company was referred to in the Electric Railway Journal of June 20, 1914, page 1416.

Ohio Service Company, New Midland, Ohio.—The State Public Utilities Commission of Ohio has authorized the Ohio Service Company to issue securities aggregating $1,489,807, and to acquire the property of the following companies: County Electric Company, having plants at Canal Dover, Denison, Urichsville and New Philadelphia, $694,000; Lafayette Light & Power Company, transmission lines between these towns, $45,807; New Midland Power & Traction Company, electric plant at Cambridge and an interurban railway between Cambridge and Pleasant City, $750,000.

Philadelphia Company, Pittsburgh, Pa.—At the special meeting of the stockholders of the Philadelphia Company on June 16 the proposed reduction in the authorized capital stock of the company from $73,400,000 to $69,433,400 was approved. The reduction is to be in the 5 per cent preferred shares.

Public Service Corporation, Newark, N. J.—The Board of Public Utility Commissioners of New Jersey has reserved decision on the application of the Public Service Railway for approval of an extension of payment of $300,000 of bonds of the Paterson Railway for a period of thirty years from Oct. 1 with interest at 5 per cent.

San Francisco-Oakland Terminal Railways, Oakland, Cal.—A copy of the contract, under the terms of which the controlling interest in the San Francisco-Oakland Terminal Railways was transferred from the Oakland Railways to the Realty Syndicate, has been filed with the Railroad Commission of California. This contract was filed in connection with the application of the San Francisco-Oakland Terminal Railways for authority to issue bonds. Copies of three of the so-called "George Moore contracts" have also been filed with the commission.

Shreveport (La.) Traction Company.—All of the outstanding $150,000 of first mortgage 5 per cent bonds of the Shreveport Traction Company had been called for payment on June 20 at 105 and interest at the office of the Hibernia Bank & Trust Company, New Orleans, La.

Taunton & Pawtucket Street Railway, Taunton, Mass.—The full bench of the Supreme Court of Massachusetts has granted the petition of the Federal Trust Company, Boston, Mass., to foreclose the mortgage for $250,000 given by the Bristol County Street Railway. The Taunton & Pawtucket Street Railway took over the Bristol County Street Railway at receiver's sale on Dec. 17, 1904, subject to $200,000 of bonds issued under the mortgage of the Bristol County Street Railway authorizing $250,000 of bonds.

Twenty-third Street Railway, New York, N. Y.—Hallgarten & Company, New York, N. Y., have purchased the $1,500,000 of 5 per cent bonds of the Twenty-third Street Railway recently authorized by the Public Service Commission of the First District. The proceeds from the sale of the bonds are to be used to liquidate notes made by the Twenty-third Street Railway to the Mercantile Trust Company as trustee in 1907.

Twin City Rapid Transit Company, Minneapolis, Minn.—Pursuant to a resolution of the board of directors of the Twin City Rapid Transit Company the company is offering to all stockholders of record of June 15, 1914, for subscription pro rata at par $1,900,000, par value of the authorized but unissued common stock of the company and $25,000, par value of treasury stock. Under this authority each stockholder owning either preferred or common stock may subscribe to new stock to the amount of one-twelfth of a share for each share held.

United Light & Railways Company, Grand Rapids, Mich.—The usual quarterly cash dividend of 1 per cent has been declared on the common stock of the United Light & Railways Company, payable on July 1, the same as in April last when 1 per cent was paid on stock. In regard to the omission to declare a stock dividend in addition to the cash distribution, Frank T. Hulswit, president of the company, says: "Our treasury and surplus would stand it, but in view of the present business depression the board did not consider it conservative to declare the stock dividend at this time, although declaring the regular cash dividend. When action will be taken on the stock dividend I am not prepared at present to say. It was purely a matter of business policy."

United Railways & Electric Company, Baltimore, Md.—The Public Service Commission of Maryland has authorized the United Railways & Electric Company to issue and sell $1,000,000 of two-year 5 per cent collateral trust notes convertible into common stock of the company at its par value of $50 a share. The commission had refused to authorize the issue of notes convertible into stock at the rate of $33.33 per share. In order to comply with the decision of a majority of the commission in connection with the original application the company filed an amended petition fixing the rate of conversion at $50 instead of $33.33 and the commission agreed to this, with certain conditions. The order states that, as the commission is engaged in making an investigation of the property and business of the company and the rates that should be charged by it, the authorization of the sale of notes and their conversion into stock at par shall not "be taken or construed in any way as a determination by the commission that such common stock is now or will be at any time within the period of conversion actually worth its par value, or as evidence of any intention upon the part of the commission . . . to hold the owners of such common stock or any other common stock of the company entitled to a return upon the basis of such or any other valuation." W. A. House, president of the company, has announced that all subscribers, to whom allotments were made originally, who desire to take the notes with the change in the conversion price should communicate with Alexander Brown & Sons, agents for the company.

West Penn Traction & Water Power Company, Pittsburgh, Pa.—The West Penn Traction & Water Power Company has decided to discontinue dividends for the present on its $6,500,000 of preferred stock, $3,094,800 of which is owned by the American Water Works & Electric Corporation. Guy E. Tripp, president of the company, in a statement which he issued, says that in consultation with the leaders of the syndicate which bought the $6,000,000 of notes it was deemed advisable to defer dividends until the company has sufficient cash in reserve to enable it to meet from time to time drafts upon the construction fund which is to be created out of net earnings. The dividends on the preferred stock are cumulative and will be resumed as soon as all contingencies are guarded against to a reasonable extent. Mr. Tripp says that the intrinsic value of the property will be enhanced and its financial position strengthened by the expenditures of earnings on construction.

Dividends Declared

Athens Railway & Electric Company, Athens, Ga., quarterly, 1¼ per cent, preferred.

Aurora, Elgin & Chicago Railroad, Wheaton, Ill., quarterly, 1½ per cent, preferred; quarterly, three-quarters of 1 per cent, common.

Chicago City & Connecting Railways, Chicago, Ill., $2.25, preferred.

Cincinnati, Dayton & Toledo Traction Company, Hamilton, Ohio, 2½ per cent, preferred.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Columbia Railway, Gas & Electric Company, Columbia, S. C., quarterly, 1½ per cent, preferred.

Consolidated Traction Company of New Jersey, Newark, N. J., 2 per cent.

Elmira Water, Light & Railroad, Elmira, N. Y., 1¾ per cent, preferred.

Germantown Passenger Railway, Philadelphia, Pa., quarterly, $1.31¼.

Interstate Railways, Camden, N. J., 3 per cent, preferred.

Kentucky Securities Corporation, Lexington, Ky., quarterly, 1½ per cent, preferred.

Lake Shore Electric Railway, Cleveland, Ohio, quarterly, 1½ per cent, first preferred.

Little Rock Railway & Electric Company, Little Rock, Ark., 3 per cent, preferred; 5 per cent, common.

London (Ont.) Street Railway, quarterly, 3 per cent.

Mohawk Valley Company, New York, N. Y., quarterly, 1½ per cent.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, 1¼ per cent, common and preferred.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, 1½ per cent.

Reading (Pa.) Traction Company, 75 cents.

Republic Railway & Light Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Ridge Avenue Passenger Railway, Philadelphia, Pa., quarterly, $3.

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

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., quarterly, 1½ per cent, preferred.

Washington Water Power Company, Spokane, Wash., quarterly, 2 per cent.

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

West Penn Traction Company, Pittsburgh, Pa., quarterly, 1½ per cent.

Western Ohio Railway, Lima, Ohio, quarterly, 1¾ per cent, first preferred; quarterly, 1½ per cent, second preferred.

West India Electric Company, Ltd., Kingston, Jamaica, quarterly, 1¼ per cent.

Winnipeg (Man.) Electric Railway, quarterly, 3 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

DALLAS (TEX.) ELECTRIC COMPANY

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Apr.,	'14	$179,086	*$106,896	$72,190	$27,335	$44,856
1 "	"	'13	166,008	*99,185	66,823	24,635	42,188
12 "	"	'14	2,270,136	*1,339,920	930,216	312,062	618,154
12 "	"	'13	1,947,360	*1,142,779	804,581	296,787	508,794

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

1m.,	Apr.,	'14	$52,519	*$32,365	$20,154	$8,212	$11,942
12 "	"	'14	570,783	*344,953	225,831	89,639	136,192

EL PASO (TEX.) ELECTRIC COMPANY

1m.,	Apr.,	'14	$81,419	*$47,940	$33,479	$4,522	$28,957
1 "	"	'13	70,657	*40,093	30,564	4,176	26,388
12 "	"	'14	944,339	*513,504	430,835	51,267	379,568
12 "	"	'13	844,778	*455,217	389,561	56,245	333,316

GALVESTON-HOUSTON ELECTRIC COMPANY, HOUSTON, TEX.

1m.,	Apr.,	'14	$196,149	*$109,759	$86,391	$35,669	$50,721
1 "	"	'13	185,508	*109,574	75,934	34,755	41,179
12 "	"	'14	2,434,215	*1,375,662	1,058,553	432,241	626,312
12 "	"	'13	2,147,048	*1,242,851	904,197	408,752	495,445

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

1m.,	Apr.,	'14	$24,345	*$15,357	$8,988	$5,660	$3,328
1 "	"	'13	25,699	*14,765	10,935	5,465	5,470
12 "	"	'14	290,492	*176,943	113,548	67,492	46,057
12 "	"	'13	312,187	*177,340	134,847	69,040	66,807

JACKSONVILLE (FLA.) TRACTION COMPANY

1m.,	Apr.,	'14	$62,836	*$70,239	$22,597	$12,735	$9,862
1 "	"	'13	56,364	*36,633	19,731	11,118	8,613
12 "	"	'14	711,162	*452,208	258,854	141,148	107,706
12 "	"	'13	579,168	*391,136	188,032	124,948	63,084

PADUCAH LIGHT & TRACTION COMPANY, PADUCAH, KY.

1m.,	Apr.,	'14	$23,941	*$16,677	$7,264	$7,666	†$402
1 "	"	'13	13,701	*14,088	387	7,340	†7,727
12 "	"	'14	308,257	*198,024	110,232	91,300	18,932
12 "	"	'13	281,033	*186,886	94,137	87,276	6,871

PENSACOLA (FLA.) ELECTRIC COMPANY

1m.,	Apr.,	'14	$22,323	*$14,470	$7,853	$7,173	$683
1 "	"	'13	21,156	*15,328	5,828	6,404	†575
12 "	"	'14	285,373	*180,072	105,301	84,480	20,821
12 "	"	'13	287,099	*178,445	108,655	76,427	32,228

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1m.,	May,	'14	$2,178,843	*$1,260,510	$918,333	$805,473	$112,859
1 "	"	'13	2,173,825	*1,263,454	910,371	762,658	147,413
11 "	"	'14	22,195,756	*13,089,983	9,105,773	8,817,810	287,963
11 "	"	'13	21,884,863	*13,095,569	8,789,295	8,387,622	401,673

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m.,	Apr.,	'14	$702,770	*$427,455	$275,315	$175,267	$100,048
11 "	"	'13	689,941	*414,102	275,839	171,728	104,111
12 "	"	'14	8,726,264	*5,028,377	3,697,887	2,088,303	1,609,584
12 "	"	'13	8,320,185	*4,865,208	3,454,977	2,011,187	1,443,790

SAVANNAH (GA.) ELECTRIC COMPANY

1m.,	Apr.,	'14	$70,842	*$47,762	$23,080	$22,876	$204
1 "	"	'13	66,378	*43,689	22,689	22,552	137
12 "	"	'14	843,082	*559,719	283,364	272,523	9,841
12 "	"	'13	776,153	*564,357	211,795	211,287	508

TAMPA (FLA.) ELECTRIC COMPANY

1m.,	Apr.,	'14	$79,258	*$44,590	$34,668	$4,454	$30,214
1 "	"	'13	60,181	*33,105	27,075	4,552	22,524
12 "	"	'14	907,485	*505,862	401,623	55,851	345,772
12 "	"	'13	765,345	*399,198	366,147	54,810	311,337

*Includes taxes.
†Deficit.

Traffic and Transportation

Recommendations Regarding Service in Albany

The report of Charles R. Barnes, electric railway inspector of the Public Service Commission of the Second District of New York on the United Traction Company, Albany, has been filed with the commission. The report being received by the commission as in the nature of an exhibit, its official consideration and the adoption in whole or in part of its conclusions and recommendations await a formal hearing after the corporation shall have been served with a copy of the report and been afforded an opportunity to be heard thereon. The report embodies nearly 400 pages and constitutes nearly 150 separate heads. Mr. Barnes says that his work was greatly facilitated by the co-operation of individuals and civic associations in all parts of the city and that every facility was afforded to him by the United Traction Company and its officials. The investigation of the company was very much delayed by the severe weather conditions of January, February and March. During this time Mr. Barnes states there was little opportunity for a fair estimate of the average service furnished by the company, and the figures as to service are not based on the extraordinary conditions of the winter. These extraordinary conditions, however, furnish the basis for recommendations in regard to the company's snow fighting equipment. In this connection Mr. Barnes severely critisises the regulation of vehicular traffic by the city authorities. Mr. Barnes says of his report:

"In this report an attempt has been made to confine the statements to fact and make the discussion on them in an impartial manner. The predominating influence in the affairs of this company includes broad gage men of wide experience in railroad operation who, it is believed, will recognize the necessity for the improvements suggested and will, no doubt, put them in force, after which they should receive the support and assistance of the people and the municipality. This report is based entirely upon the requirements of present population, and in it consideration has not been given to necessary future increase of service. It has also been based upon winter operation only. With the exception of the use of open cars, the service furnished during the summer season would seem to be a reasonable one."

Mr. Barnes' recommendations are as follows:

"1. That the company put in proper operating condition the 13.26 miles of track classified in the track table as in fair condition.

"2. That it construct the track suggested for the Arbor Hill and New Scotland extensions, also for the connection of the tracks in Trinity Place and Hamilton Street. Unless delayed by reasons beyond its control, this recommendation to be complied with in full before Dec. 1, 1914.

"3. That it construct curves in both directions on the east side of Pearl Street connecting the tracks in State and Pearl Streets. This recommendation to be complied with before Nov. 1, 1914.

"4. That it provide additional means to prevent a car from running into the river when the draw of the Greenbush Bridge is open.

"5. That on or before Nov. 1, 1914, it improve its snow fighting equipment in Albany by replacing the three 5½-ton snow plows by plows of modern type; also, that it replace the 30-hp motors on the sweepers by 50-hp motors.

"6. That it comply with the suggestions contained in this report on pages 259, 260 and 261 in reference to additional service on the various lines and at the time mentioned, with the understanding that while the averages of the checks made show the additions are required at the specific time mentioned, it shall be provided at such times as to best accommodate the travel, this to be determined by continuous and close observation of traffic. This recommendation to be fully complied with not later than Nov. 1, 1914.

"7. That it increase the service on the Belt line by decreasing the present headway of seven minutes to five during the non-rush hours, and the five minute headway between 5 p. m. and 6.30 p. m. to three; and a four-minute during the morning rush hours between 6.30 and 9 o'clock.

This recommendation to be complied with by Nov. 1, 1914.

"8. That it increase the service on the Delaware Avenue line by decreasing the present headway of ten minutes to seven during the non-rush hours. This recommendation to be complied with by Nov. 1, 1914.

"9. That it comply with the detailed suggestion on page 262 of this report in reference to service during church hour.

"10. That it furnish a reasonable service during what is known as the theater hours, especially the travel from the theater, and in accordance with the suggestion for this service contained on page 262 of this report.

"11. That it immediately modify its rules in reference to transfers so that a second transfer will be issued to persons on Pine Hill cars, eastbound, desiring to go to points on the West Albany Line west of Quail Street, and persons on the West Albany Line, eastbound, desiring to go to points on the Pine Hills line west of Quail Street, enabling them to make their journey via Quail instead of Lark Street, as they are now obliged to do by the use of only one transfer; also, enabling persons on the Arbor Hill-Kenwood line, northbound, whose destination is points on the Delaware Avenue line south of Madison Avenue to make a transfer at Delaware and Second Avenue and vice versa.

"12. That it arrange with the Schenectady Railway so that passengers boarding the latter company's cars eastbound within the city limits can procure a transfer to take them on other lines to points within the 5-cent fare zone.

"13. That it change the route of the Troy-Albany (red line), running these cars from Broadway, through State and South Pearl Streets, returning through Second Avenue, Broad Street, Trinity Place and Madison Avenue.

"14. That it rearrange its passenger stops on the basis of rapid transit with the least possible inconvenience to patrons, and report such rearrangement to the commission by Aug. 1, 1914.

"15. That it cause cars to be operated up the State Street hill between Pearl and Eagle Streets on average schedule speed.

"16. That it equip all of the single truck cars (open and closed) which are to remain in service after Nov. 1, 1915, with an auxiliary breaking system to be approved by this commission, this recommendation to be complied with by Nov. 1, 1914.

"17. That it equip all of its cars in the city of Albany with conspicuous route and destination signs, properly illuminated during hours of darkness.

"18. That it replace the twelve 18 ft. cars 100 series by twelve modern cars seating not less than forty, by Nov. 1, 1914.

"19. That it replace forty 20 ft. 400 series by modern cars seating not less than forty, twenty of these to be replaced by Nov. 1, 1914, and twenty to be replaced by Nov. 1, 1915.

"20. That as new cars are added it make retirements from service of the open cars used in the city of Albany, the intent of this recommendation being that all open cars should be retired as soon as they can be replaced by a closed car suitable for summer operation.

"21. That it cause the steps on six of the open cars which are 21 in. or more in height, to be lowered, or these cars withdrawn from service.

"22. That it construct a new transformer station, replacing the present North Albany station as near as practicable to the center of gravity of the feeder system, as shown in this report, and that it rearrange its feeder system as suggested in this report; this recommendation to be complied with before Nov. 1, 1914.

"23. That it construct an additional high tension transmission line between Mechanicville and Watervliet, a distance of 12½ miles; this recommendation to be complied with by Nov. 1, 1914.

"24. That it make material yearly extensions of its underground conduit and feeder system necessary to the continuity of service, facilitate the work of the fire department and improve the general appearance of the streets; that it notify the commission before Aug. 1, 1914, of the extensions it will make this year, and that such modification be given of the amount of work to be done in this direction before April 1 of each succeeding year.

"25. That before Aug. 1, 1914, it notify the commission what it proposes to do before Nov. 1, 1914, in increasing the amount and reliability of its power supply and providing a reasonable 'stand-by' service.

"26. That before Nov. 1, 1914, it add to its wrecking equipment a motor truck of sufficient size, properly equipped, manned and located.

"27. That it instal a telephone system, exclusively for its use, with telephones, switchboards, and appliances, as described in this report on page 346 and located as indicated; this recommendation to be complied with before Nov. 1, 1914."

In addition to the above recommendations directed to the company, it is respectfully suggested to the municipal authorities that improvement in the enforcement of the ordinance in reference to vehicles obstructing cars would be a benefit to the traveling public in Albany, and that improvement in methods employed by it in removing snow last winter might be materially improved to the benefit of vehicular traffic and street car movement. Also, that rapid transit requires a modification of the present ordinance in reference to passenger stops.

Favorable Board of Trade Report on Fare Increase

The Board of Trade of Vancouver, B. C., has adopted the majority report of the special committee appointed to investigate fares as levied by the British Columbia Electric Railway, Ltd., Vancouver. The majority report follows in part:

"The committee has held ten meetings and has obtained information with respect to the cost of fares and areas served by such fares from Montreal, Toronto, Winnipeg, Edmonton, Calgary, Seattle, Portland, San Francisco and Los Angeles. It has also obtained a great deal of information from officers of the British Columbia Electric Railway, who have invariably treated the committee with courtesy.

"The board finds that the company was justified under existing conditions in raising its fares, but that as soon as the present high proportion of expense to earnings can be reduced a reconsideration of the fares charged will be justifiable.

"The money actually expended up to June 30, 1913, amounted to $45,168,312, and the amount paid out in interest and dividends for the year amounted to $1,888,139, equal to 4.18 per cent on the entire investment. During the last ten years the cost of equipment, supplies and wages has increased at least 25 per cent. The wages paid by the company are about 10 per cent higher than those paid in any other Pacific Coast city, and from 20 to 25 per cent higher than those paid in the cities of eastern Canada.

"Equipment and supplies are about 15 per cent higher in Vancouver than in other coast cities, and 10 per cent higher than in eastern Canadian cities. For example, a car costing $7,407 at Vancouver can be purchased in Seattle for $5,986 and in Toronto for $6,522. With respect to operating expenses the ELECTRIC RAILWAY JOURNAL of Oct. 25, 1913, shows the operating expense ratios of forty of the leading electric railway systems of this continent. The average is 59.09 per cent and the British Columbia Electric Railway has the highest ratio, amounting to 70.03 per cent. The figures given relate only to straight operating expenses and do not include any charge for renewals, depreciation, taxes or accidents reserves.

"It has been put forward in a criticism of the British Columbia Electric Railway that other companies serve a greater area for the same fare. The committee consider that the area served by any railway is no indication of the service rendered to the public unless the population, track mileage and number of cars operated within that area are also considered. The North Vancouver service with nearly 10 miles of trackage and a population of about 8000 covers an area almost as large as the city of Vancouver with a population of 120,000 people and 70 miles of track.

"Another argument advanced in some quarters is that owing to the policy of the company of contesting so many accident claims in court the expenses in connection with this department have been excessive. This statement has not been borne out by the facts, as the following figures will show: The total number of accident cases dealt with by the company from Jan. 1, 1911, to Feb. 20, 1914, was 1420. Of these sixty-six were contested in court and 1354

amicably settled without reference to law. This shows an average contested of less than 5 per cent.

"The committee asked the company to state the cost of power and was informed that it could not answer specifically as to the charge per horse-power on per kw-hr., but the officers submitted the following table showing the cost per car mile in cents for the year ended June 30, 1913, as compared with the cost on other systems in Canada: British Columbia Electric Railway, 2.98; Montreal, 2.62; Toronto, 2.58; Winnipeg, 2.81; Edmonton, 11.22; Calgary, 5.23.

"The revenue per car mile for four of the leading electric railway systems of Canada in 1912 shows Vancouver the least remunerative in that regard. Toronto provided $42,-846 per car mile; Montreal, $30,259; Winnipeg, $23,230, and Vancouver, $22,038.

"The committee finds further that with few exceptions the usual fare charged in the principal cities of the United States is 5 cents. In Canada the fare is usually about the same as that charged by the British Columbia Electric Railway previous to September last. The straight 5-cent fare is charged in nearly all the Pacific Coast cities, including Seattle, San Francisco and Los Angeles. In Portland the fare is 5 cents or fifty tickets for $2.25.

"To the best of the committee's knowledge the British Columbia Electric Railway is the only company on the Pacific Coast selling workingmen's tickets at 4 cents. These are issued in ten tickets for 40 cents, five white and five green, the white tickets being good from 5 a. m. to 8 a. m. and the green good at all hours.

"A good deal has been said about the distance that passengers are carried in other cities for one fare as compared with Vancouver. The committee thinks there is not much to complain of in this respect, as city passengers can travel from Alma Road and Tenth Avenue to Hastings Street and Boundary Avenue, a distance of 8.35 miles, and settlers are carried from Dunbar Street and Wilson Road to Hastings Street and Boundary Avenue, a distance of 11.78 miles, for 5 cents.

"Notwithstanding the fact that the number of passengers carried has been steadily falling off from June last, the company is giving better service than ever. The number of car miles at present averages about 90,000 per year more than in 1912. The growth of traffic in years previous to 1913 warranted liberal outlays in development and equipment, and the operating expenses increased very considerably on account of these outlays. In 1908 the operating expenses of the railway department, exclusive of interest on the outlay, were 71.09 per cent of the gross earnings; this ratio increased to 91 per cent in 1913. In 1913 the gross earnings were three and one-half times as much as in 1908, but the net earnings were the same as in 1908, notwithstanding the fact that three times the amount of capital was employed in 1913 as in 1908. The total capital invested by the company has increased by about $6,000,000 annually for the last five years, and now totals about $45,-000,000. The committee has taken into consideration that securing capital for such undertakings as this is naturally dependent upon a fair return on the investment.

"The conditions justify the increase in fares, call for and have resulted in strict economy in expenses and management, and it may be reasonably expected that in time these economies will reduce the present high proportion of operating expenses sufficiently to warrant a reconsideration of fares charged. Such reductions, however, cannot be expected to influence greatly the return on invested capital until passenger traffic increases."

Hearing on Middlesex & Boston Fares and Tickets

The Massachusetts Public Service Commission recently held a hearing on a petition by the selectmen of Hopkinton for an extension of the fare limit from the Hopkinton station to Elm Street and for the issue of a twenty-five-ride ticket book in addition to the existing fifty-ride book. The petitioners contended that as the length of the proposed extension is 1700 ft., the company would lose no revenue by placing the fare limit at Elm Street. The local fare unit on the road in this section of the system is 6 cents, but the purchaser of fifty-ride tickets gets the benefit of a 5-cent rate.

Chairman McLeod, of the Public Service Commission, stated that with the knowledge the commission has of the general financial condition of the company, it cannot properly consider anything which is likely to mean any serious reduction in present revenues, which are no larger than necessary to enable the company to maintain proper service. In the last analysis the preservation of the service itself was of the very first importance to the community. The board has taken the case under advisement.

Police Chiefs Discuss Uniform Traffic Regulations.—Steps toward uniform traffic regulations throughout the country were taken up at the recent convention of the National Association of Police Chiefs in Grand Rapids, Mich., and a committee composed of one member from each State was appointed to adopt uniform regulations, such as signaling at crossings.

New Express Franchise Desired in Ottawa.—The Chicago, Ottawa & Peoria Railway is circulating petitions in Ottawa, Ill., for the purpose of securing a new passenger, freight, express, baggage and mail franchise for the next fifty years. The company has entirely outgrown its present freight and passenger terminal facilities and it now seeks to change and extend its trackage in Ottawa so as to make that city a more important freight terminal. It is proposed to change the location of both the freight and the passenger stations in Ottawa.

Kansas Commission Orders Fare Adjustment.—The Kansas State Public Utilities Commission has ordered changes in fares between points reached by the Joplin & Pittsburg Railway, as the result of complaints by authorities at Mulberry, Kan. The commission ordered a rate of 15 cents between Pittsburg and Franklin, a distance of 8 miles, instead of 10 cents; 10 cents between Franklin and Mulberry, a distance of 5½ miles, instead of 15 cents; 5 cents from Franklin to Croweburg, and 5 cents between Cemetery Lane and Crowe station, instead of 10 cents. The changes, effective within thirty days, will compel a readjustment of fares at a number of points.

Near-Side Stops Only at Springfield.—The Springfield (Ill.) Consolidated Railway has been ordered by the City Commission to stop its cars on the near side only within certain congested districts in the downtown area. In order to remove as far as possible the confusion which is certain to arise when changes are made in the operation of cars, the signs will be removed in the area affected which announce that all street cars will stop on both sides of the street and for several days the company will employ a man with a megaphone at Fifth and Monroe Streets, the most important street intersection, to announce the change and to aid passengers getting on and off the cars.

Adams Express on Illinois Traction System.—The Adams Express Company will take over the express business on the lines of the Illinois Traction System, Peoria, Ill., when the United States Express Company dissolves on July 1. The United States Express Company had a contract with the Chicago & Eastern Illinois Railroad and as a result was able to place Chicago shipments into Central Illinois territory in remarkably short time. The Adams Express Company has not heretofore reached central Illinois cities to any great extent. The Vandalia, connecting with the Illinois Traction System at Peoria, Decatur and a few smaller points, was previously about the only direct Adams line into the central Illinois agricultural region.

Holiday Transfer Request Before Commission.—The Public Service Commission of Pennsylvania has announced that it cannot order the Pittsburgh Railways to give transfers on July 4, as demanded by the City Council of Pittsburgh, because under the law a complaint against an existing tariff of a public utility must be filed and the defendant company must have fifteen days to reply, and then a public hearing be granted, all of which would carry the matter beyond the date the transfers are asked for. The commission will take the matter up in the regular way if it is desired. The explanation of P. N. Jones, general manager of the company, regarding the peculiar conditions which govern in Pittsburgh on July 4 was referred to in the Electric Railway Journal of June 20, 1914, page 1420.

I. C. C. Case Against Insull Lines.—Manufacturers and shippers in Louisville, Ky., are following with interest the steps which the Indianapolis & Louisville Traction Company, known as the Insull lines, is taking to comply with an order issued May 29, 1913, by the Interstate Commerce Commission. A letter has been published in Louisville from Chairman Harlan of the Interstate Commerce Commission to Chester P. Wilson, president of the Interstate Public Service Company, the principal Insull concern in Indiana, in which the commissioner says that unless the Insull interests comply with the order of the commission by July 1, the commission itself will proceed to enforce the order. The order resulted from an investigation of a complaint made by the Louisville Board of Trade that the electric railways between Louisville and Indianapolis were operating under a system detrimental to the interests of Louisville business.

Sixty Thousand Children Carried Safely at Boston.—On Saturday morning, June 6, the Boston (Mass.) Elevated Railway transported 60,000 children to and from Fenway Park, in connection with an elephant show held on the grounds. Several elephants have been added to the municipal zoo through the contributions of Young America, and the purchasers were afforded the first opportunity to see the beasts at close range on Saturday. The show lasted from 10 a.m. to 12 noon, with a homeward rush between 12 and 1. About 370 extra cars were run, and every available street inspector was detailed to the service. Many of the cars traversed special routes, and the regular service over the Ipswich Street line was diverted during the period of greatest travel, the park being in a sparsely populated section in which the diversion could be accomplished with minimum inconvenience to the public. When the show was over children were directed by megaphone toward large semi-convertible cars on various lines, these being of the prepayment type and affording the maximum protection against accident.

Law Firm Guilty of Irregular Practices.—Held guilty by the court of irregular practices in the bringing of a suit against the Louisville Railway, the members of the Louisville, Ky., law firm of Popham, Trusty & Roose have been suspended until Jan. 1 next and the firm ordered dissolved. The members of the firm, Arthur C. Popham, Samuel L. Trusty and William H. Roose, threw themselves on the mercy of the court, pleading that other attorneys were indulging in practices similar to those of which they were accused. The court held, however, that the uncontroverted charges involved persuading an uninjured man to bring suit for damages and then ordered temporary disbarment. Referring at the close of his opinion to general conditions Judge William H. Field, who himself proceeded against the attorneys, said: "It is well known that these defendants are not the only offenders in the particulars here considered. It may not be out of place to observe that the activities of some physicians who sell their patients to the highest bidders, and of those men commonly denominated as 'runners' are equally offensive to the administration of justice and equally calculated to obstruct it. Doubtless effective processes are available to reach these evils."

Suburban Day in Kansas City.—Wednesday, June 10, was Suburban Day in Kansas City, Mo., merchants and interurban railroads co-operating to attract residents of neighboring towns to Kansas City. Every Wednesday will be suburban day in the future. While the initial occasion is regarded as an unqualified success, plans are on foot whereby the program will pass off more smoothly. On the first day set apart for suburban trade, most of the electric roads running into Kansas City operated extra cars for the benefit of the out of town patrons. The Missouri & Kansas Interurban Railway, known as the Strang line, went a step further and distributed 500 free tickets to women along its route. It will be unnecessary to do this in the future, as the Kansas City Merchants' Association plans to refund transportation to all visiting patrons who purchase a certain amount of goods. It is believed that this method will result in increased traffic for the electric roads and greater business for Kansas City retailers. Posters are being distributed along the routes of the interurban railway to further the project. The placards bear illustrations of cars taking shoppers into the city, buyers on the streets and in the stores and the general activity of a metropolis.

Personal Mention

Mr. W. A. McGovern, formerly with the Oregon Short Line, has been appointed general manager of the Northern Electric Railway, Chico, Cal., to succeed Mr. A. D. Schindler, resigned.

Mr. N. P. Zech has resigned as assistant to the general auditor of H. M. Byllesby & Company to become treasurer and general auditor of the Atlantic Gas & Electric Company, with headquarters in New York City.

Mr. H. A. Tolberg has been appointed superintendent of the Edwards River power plant of the Rock Island Southern Traction Company, Monmouth, Ill. Mr. Tolberg has been serving as chief engineer and purchasing agent of the company.

Mr. Hugh McCoy has been appointed chief engineer and purchasing agent of the Rock Island Southern Traction Company, Monmouth, Ill., to succeed Mr. H. A. Tolberg, who has been appointed superintendent of the Edwards River power plant.

Mr. E. M. Scofield, president of the Scofield Engineering Company, Philadelphia, has been appointed vice-president of the Texas Southern Electric Company, financed by Warner, Tucker & Company, Boston, Mass., and owning and operating public utilities in southern Texas.

Mr. D. A. Faut has been appointed master mechanic of the Birmingham Railway, Light & Power Company, Birmingham, Ala., to succeed Mr. F. M. Weld, resigned. Mr. Faut was formerly superintendent of shops of the Chicago (Ill.) City Railway but resigned that position in 1909 to engage in other work.

Mr. John H. Adams has been appointed engineer in the power department of the West Penn Traction Company, Pittsburgh, Pa. Mr. Adams was born in Augusta, Ga., in 1874. He began work at the age of sixteen years in the motor winding department of the Augusta (Ga.) Railway, now the Augusta-Aiken Railway & Electric Corporation, and worked through the car shops, power stations, overhead line department, maintenance of way department, etc. He was made chief engineer and assistant to the general manager of the company at the time the late Edward H. Harriman purchased the property at Augusta in 1908 and continued in this capacity until J. G. White & Company, New York, took over the operation of the property, when he was made engineer of maintenance of way and superintendent of motive power. Mr. Adams resigned from this last position to become connected with the West Penn Traction Company.

Mr. F. M. Weld has resigned as master mechanic of the Birmingham Railway, Light & Power Company, Birmingham, Ala. Mr. Weld began his railway career in 1901 with the Wakefield & Stoneham Street Railway, Wakefield, Mass. Later he was employed as an armature winder with the Haverhill & Amesbury Street Railway, Haverhill, Mass. He also served for a time as master mechanic of the Creighead-Kintz Company in Massachusetts. In 1895 Mr. Weld accepted the position of master mechanic of the Interstate Consolidated Street Railway, Attleboro, Mass., which position he resigned to become master mechanic of the Evansville & Southern Indiana Traction Company, Evansville, Ind. In 1908 he was transferred to the Chicago, South Bend & Northern Indiana Railway as master mechanic, both of these properties being controlled by the same syndicate. In September, 1910, he resigned from the Indiana properties to become master mechanic at Birmingham.

Mr. Arthur W. Redderson, formerly acting superintendent of shops, Chicago (Ill.) Railways, has been appointed superintendent of motive power of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., to succeed Mr. F. J. Stevens, resigned. Mr. Redderson began his electric railway career in November, 1895, in the office of Mr. F. T. Brydges, superintendent of equipment of the West Chicago Street Railway. At the end of the first six months he was transferred to the car shops storeroom where he served as storekeeper until December, 1899, at which time he was placed in charge of all shop materials as general material man. In addition to the duties inci-

dent to the foregoing position, he had charge of all shop time-keeping. In December, 1902, he was assigned to the position of general timekeeper in charge of materials and stores, which position he held until November, 1904, when he was made assistant superintendent of shops. Following the death in February, 1912, of Mr. R. J. Foulkes, then superintendent of equipment of the Chicago Railways, Mr. Redderson was appointed acting superintendent of shops, which position he held until May, 1913. During the period Mr. Redderson was in charge of the Chicago Railways' shops he assisted in the design and constructed the first 250 arched-roof cars used in Chicago.

Mr. G. W. Dunlap, superintendent of equipment of the International Railway, Buffalo, N. Y., has been appointed superintendent of power and equipment of that company. Mr. Dunlap became connected with the International Railway in November, 1912, as mechanical engineer, and in February, 1913, took over the work with that company which was performed previously by Mr. P. J. Mitten, who resigned as master mechanic to become connected with the Philadelphia Rapid Transit Company. Before becoming connected with the International Railway, Mr. Dunlap was electrical engineer for the Public Service Commission of the First District of New York in charge of the bureau of transit inspection under Mr. E. G. Connette, now president of the International Railway. Mr. Dunlap was born in North Berwick, Maine, and was connected with industrial work and steam railroading for a number of years before he entered the public service field. He has been chief engineer of the Waltham Gas & Electric Company, Waltham, Mass.; chief engineer of the Newton (Mass.) Street Railway, and chief engineer of the Hyde Park Electric Company. He also was largely responsible for equipping the power plant of the Biddeford & Saco Street Railway, Biddeford, Maine. Before becoming connected with the Public Service Commission of New York, Mr. Dunlap was engineer of power stations of the Worcester (Mass.) Consolidated Street Railway.

Mr. P. P. Crafts, vice-president and general manager of the Iowa & Illinois Railway, Davenport, Ia., has resigned that position to become manager of the Mobile Light & Railroad Company, Mobile, Ala. Mr. Crafts began work in a small power house when he was sixteen years old. His first important position was that of night foreman of the Hawkins Street station of the Boston (Mass.) Edison Company. After about two years' service with the Boston Edison Company he resigned to become electrician of the Brookline (Mass.) Gas Light Company, in charge of generating apparatus, meters, and arc lamps. In 1898, after successfully passing an examination for electrician of the Charleston Navy Yard, he entered the employ of Stone & Webster. During the period he was employed by the latter company his work included the inspection of heavy maintenance, and the reorganization of power house operation, testing and other practical engineering work. Subsequently he reorganized the operating department of the Brockton & Plymouth Railway, Brockton, Mass. Just prior to his leaving Stone & Webster Mr. Crafts was appointed receiver of the Minneapolis (Minn.) International Electric Company. In 1902 he resigned as receiver to become general manager of the Saginaw Valley Traction Company, Saginaw, Mich., which position he held until 1904, when he was appointed general manager of the Iowa & Illinois Railway. At the time of the purchase of the last-mentioned property by the United Light & Railways Company, in February, 1913, Mr. Crafts was retained as vice-president and general manager, and in addition was placed in charge of the Davenport & Muscatine Railway.

P. P. Crafts

Mr. Albert H. Stanley, managing director of the London Underground Electric Railways, London United Tramways, Ltd., the Metropolitan District Railway and the London General Omnibus Company, Ltd., London, England, was knighted by King George on June 21, together with twenty-seven others upon whom titles were conferred in recognition of distinguished public service. Mr. Stanley is very well known in the United States. He was born in England about forty years ago and began his career with the Detroit City Railway in the horse-car days. After serving the company and its successor as timekeeper, bookkeeper, traffic superintendent, division superintendent, assistant general superintendent, and finally as general superintendent, he was in October, 1903, appointed assistant general manager of the street railway department of the Public Service Corporation of New Jersey. In February of the following year he was appointed manager of that department. In January, 1907, Mr. Stanley assumed the duties of the general manager of the corporation, but resigned three months later to accept the general managership of the Underground Electric Railways, London. In 1910 he was in addition appointed managing director of the London United Tramways. This company owns and operates an extensive surface railway system in the northwestern part of London, and its stock is largely owned by the Underground Electric Railways. This appointment came to Mr. Stanley as an extension and broadening of his duties. In his position with the London United Tramways he succeeded the late Sir J. Clifton Robinson, long one of the most prominent figures, if not the most prominent, in tramway circles in England. In 1912, in a long biographical sketch covering Mr. Stanley's career, the London *Evening News* referred to him as the traffic king of London. The high esteem in which Mr. Stanley is held by the other railroad officials of the British Isles was illustrated by his selection to accompany the officers of the Midland Railway of England to the United States last fall in an extensive tour which those gentlemen made for the purpose of studying important steam railroad electrifications and operating practices preparatory to the electrification of the Midland Railway in London and vicinity.

OBITUARY

Albert Sherman, superintendent of transportation of the Saginaw-Bay City Railway, Saginaw, Mich., for several years, is dead.

James J. Robison died in Toledo, Ohio, on June 11, of apoplexy at the age of fifty-nine years. With his father and brother Mr. Robison organized the Toledo Street Railway in 1888 and was identified with the company as general manager until the concern was absorbed by the Toledo Traction Company, now the Toledo Railways & Light Company.

New York Subway Section Contracts

The Public Service Commission for the First District of New York has awarded the contract for the construction of Section No. 7 of Route No. 5, the Lexington Avenue subway in Manhattan, to the Rapid Transit Subway Construction Company, the lowest bidder, for $1,915,164. This subway is for operation by the Interborough Rapid Transit Company and will be connected with the existing subway south of Forty-second Street. Section No. 7 covers that portion of the line in Lexington Avenue between Forty-third and Fifty-third Streets. With this section all the Lexington Avenue work north of Forty-third Street is under contract. The connection with the existing subway, which will include the diagonal station under Forty-second Street, is yet to be awarded.

On June 16 the commission for the First District opened bids for the construction of Section No. 1 of Route No. 12, the Eastern Parkway subway in Brooklyn. This subway is to be operated by the Interborough Rapid Transit Company. Four of the tracks will be used for the Interborough Rapid Transit Company and the other two for the New York Municipal Railway Corporation. The lowest bidder was the Cranford Company, Brooklyn, at $2,195,296.

Construction News

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

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

RECENT INCORPORATIONS

***San Bernardino (Cal.) Mountain Railroad.**—Incorporated in California to build an electric or steam railway. Capital stock, $50,000. Directors: J. Treanor, G. A. Fisher and O. K. Dunham.

***Cincinnati, Indiana & Ohio River Railway, New Albany, Ind.**—Incorporated in Indiana to build an electric railway from Cincinnati, Ohio, to Louisville, Ky. L. S. Cook, Cincinnati, incorporator.

***Gleasonton & Paddy Run Railroad, Gleasonton, Pa.**—Incorporated in Pennsylvania to build an electric railway from Gleasonton to a point north of Renovo, 10 miles. I. W. Gleason, Gleasonton, president.

Berks & Lancaster Railway, Lancaster, Pa.—Chartered in Pennsylvania to build an electric railway from Lititz, Lancaster County, to Womelsdork, Berks County, via Lebanon County. Capital stock, $200,000. Incorporators: Frank J. Duckett, T. Holland Paist, William Grimshaw, Oscar R. Dare, Howard Hendricks, Joseph J. Dimond, Frank J. Reilly and H. B. Longbottom, Philadelphia, and V. J. McGlesney, Phoenixville. [E. R. J., June 20, '14.]

FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has asked the Council for a forty-year franchise to build a double-track elevated electric railway on private right-of-way and over certain streets. The Board of Public Works has adopted a resolution requiring the company to apply for franchises for the operation and maintenance of tracks on Long Beach Avenue between Ninth Street and Slauson Avenue. The company also is ordered to lower its tracks on Long Beach Avenue in Los Angeles.

Oakland, Cal.—The San Francisco-Oakland Terminal Railways has asked the Council for a franchise to reconstruct its roadbed in Twelfth Street from Fallon Street to Jefferson Street and from Market Street to Union Street in Oakland. The company is also contemplating the reconstruction of its Telegraph Avenue and San Pablo Avenue lines in Oakland.

San Diego, Cal.—The Point Loma Railroad's twenty-one-year franchise over its present line on Point Loma and for extensions to the wireless station and to the government reserve at La Playa was recently accepted by the Council in San Diego.

Augusta, Ga.—The Augusta-Aiken Railway & Electric Corporation has received a franchise from the Council to extend its lines from the intersection of Walton Way and Monte Sano Avenue westwardly on Walton Way to the city limits of Augusta in the direction of Aumond.

Des Moines, Ia.—The Des Moines City Railway has asked the Council for a twenty-five-year extension of its present franchise in Des Moines, as noted on page 1472 of this issue of the ELECTRIC RAILWAY JOURNAL.

Emporia, Kan.—The Emporia Railway & Light Company has received a franchise from the Council to extend its tracks on South Avenue to Oak Street in Emporia. The grant releases the company from building a track on Rural Street.

Hutchinson, Kan.—The Hutchinson Interurban Railway has asked the Council for a franchise to build a single track loop about ½ mile in length in Hutchinson. This loop is in anticipation of the construction of an interurban line from Hutchinson to Wichita, as well as for local use.

Salina, Kan.—The Salina Street & Interurban Railway has changed its original plans of routing in order to extend its lines to the eastern section of the city and has asked the City Council to widen an alley on the east side for use as a street. H. C. Smither, president.

Boston, Mass.—The Dedham & Medway Street Railway has asked the Public Service Commission of Massachusetts for authority to exercise the franchise rights of the Dedham & Franklin Street Railway and the old Medfield & Medway Street Railway, through Medford, Millis, Medway and Franklin, in connection with a plan to reopen and operate the electric line through these towns. The Dedham & Medway Street Railway has been organized as a successor to the Dedham & Franklin Street Railway.

Columbia, Mo.—An election will be held at Columbia, Mo., on a date not yet set for the purpose of voting a franchise to F. S. Mordaunt, Chicago, who proposes to construct an electric railway in Columbia. M. G. Quinn, secretary of the Columbia Commercial Club, is handling the matter. Mr. Mordaunt and his associates also expect to operate an interurban line which will extend to a pleasure resort to be established and into the coal fields near Harrisburg, Mo. [E. R. J., June 20, '14.]

Buffalo, N. Y.—The International Railway has asked the Council for a franchise to extend its lines westerly from Military Road into the Reusens Park section of Northwest Buffalo, through the new Skillen Street extension between Military Road and Ontario Street and later on to O'Neil Street, and to Riverside Park.

Cortland, N. Y.—The Public Service Commission, Second District, has issued an order giving authority to the Cortland County Traction Company to construct in Cortland a double track railroad (instead of a single track now existing) beginning at a point in Main Street and running thence northerly along said street to North Main Street and along North Main Street to the north line of Lincoln Avenue, together with the necessary connections.

Brantford, Ont.—The Ontario Legislature has authorized the Brantford Council to take over and operate the Grand Valley Railway, which includes the old Brantford Street Railway, and the line from Brantford to Paris and Galt. The act provides for the appointment of a commission to manage the line. It is said that it is not intended to appoint such a commission until the municipal elections in January, 1915. In the meantime a manager will be appointed by the Council, and it was decided to advertise for one.

Toronto (Ont.) Railway.—Corporation Counsel Geary has forwarded to the City Council a copy of the order issued by the Ontario Railway Board approving of plans for the construction of an intersection at the corner of King and Front Streets, the double tracking of Spadina Avenue from Front Street to King Street, and curves on Spadina Avenue at the junction of the King Street line. This work will be carried out as an extension of the company's railway.

Avoca, Pa.—The Wilkes-Barre Railway has received a franchise from the Council for an extension into West Avoca.

Philadelphia, Pa.—The Philadelphia Rapid Transit Company has asked the Public Service Commission for permission to complete the rerouting of the surface lines in Philadelphia. The final step in the rerouting, as planned by the company, will provide better transportation in that section of the city lying between Spring Garden Street and Allegheny Avenue, Twenty-first Street and the Schuylkill River, and on Green Street, through the combination of four routes into two, the elimination of one route entirely, and changes in four other routes.

Shippensburg, Pa.—The Chambersburg & Shippensburg Railway has asked the Council for a franchise to extend its tracks to the Western Maryland Railroad in Shippensburg without involving the payment of $2,000 asked by the Council for permission to cross the cement bridge over the "Branch."

Nashville, Tenn.—The County Court of Davidson County, Tenn., will be asked at the July meeting to grant a right-of-way along the Murfreesboro pike for an electric railway to reach from Nashville to the town of Una. This extension, the Nashville Traction Company already holding a franchise which takes its line to the edge of the city, will be a part of the Nashville-Gallatin Interurban Railway, which is projected. This line is to connect Goodlettsville, Ridgetop and Springfield.

Dallas, Tex.—The Dallas Consolidated Electric Railway has received a thirty-year franchise from the Council in Dallas, to double-track its Highland Park Street Railway to the Southern Methodist University in Dallas, a distance of 1 mile.

TRACK AND ROADWAY

Tuscon (Ariz.) Rapid Transit Company.—A 1-mile extension in Tuscon will be built at once by this company from the present terminus at the gate of the university grounds north on Park Avenue and east on Speedway. The right-of-way has been donated to the company for the extension.

Norwalk & New Canaan Street Railway, Norwalk, Conn.—At a recent meeting of the stockholders of this company directors were chosen, who will in turn choose the officers of the company, which will then be formally organized. This is part of a plan to build an electric railway between Norwalk and New Canaan. [E. R. J., Dec. 16, '11.]

St. Petersburg & Gulf Railway, St. Petersburg, Fla.—Plans are being considered by this company to double track its lines on Central Avenue and several other streets in St. Petersburg.

Central of Florida Street Railway, Daytona, Fla.—An extension of its lines is being built by this company in Daytona.

Savannah (Ga.) Electric Railway.—Plans are being considered by this company to extend its Habersham Street line to Forty-fourth Street in Savannah.

Kewanee, Bradford & Henry Interurban Railway, Kewanee, Ill.—A meeting of the citizens of Osceola was held on June 19 for the purpose of considering plans to build the 35-mile electric line from Kewanee through Osceola, Bradford and other towns to Henry on the Illinois River. C. G. Lampman, Cedar Rapids, is interested. [E. R. J., May 2, '14.]

Mattoon, Shelbyville, Pana & Hillsboro Traction Company, Pana, Ill.—Interest has been revived in the construction of this line and it is reported that financial backing has been secured to build the line between Mattoon, Shelbyville, Pana and Hillsboro. Robert Jones, Pana, president. [E. R. J., Feb. 21, '14.]

Pekin (Ill.) City Railway.—Sealed proposals for the construction, rehabilitation and equipment of about 3½ miles of electric railway in Pekin, Ill., will be received at the office of the city clerk until 7:30 o'clock p. m., July 6, 1914, and will be opened at 8 o'clock p. m. on the same day. Bids are based upon the plans and specifications adopted by the City Council and now on file in the office of the city clerk.

Chicago, Peoria & Quincy Traction Company, Peoria, Ill.—At a directors' meeting held in Peoria a number of the men active in the promotion of this line were present and great interest was taken in the affairs of the company. C. D. Chapman, of the Chapman Construction Company, who is to build the railway, was present and he has made the preliminary plans for the work. John L. Soebbing, president.

Emporia Railway & Light Company, Emporia, Kan.—Work has been begun by this company on the extension on South Avenue and repaving and improving certain sections of its lines in Emporia.

***Limestone, Maine.**—Preliminary surveys are being made to build a 9-mile electric railway between Caribou and Limestone. George Cook, Caribou, is interested.

***Abington, Mass.**—Plans are being considered by the Brockton Chamber of Commerce and representatives from the boards of trade from South Weymouth, Pond Plain, West Abington and Abington to build an electric line between Brockton, through West Abington and South Weymouth, to the south shore. Among those interested are William S. O'Brien, Abington; Arthur Andrews, Brockton; Henry H. Morse and F. J. Wheatley, Abington.

Winnipeg (Man.) Electric Railway.—This company is extending its line in the municipality of Fort Garry from the end of the present line to St. Norbert, a distance of 3 miles.

Muskegon Traction & Lighting Company, Muskegon, Mich.—This company has been asked to extend its Allen Street line in Muskegon.

Minneapolis & Central Minnesota Railway, Minneapolis, Minn.—Work has been begun by this company on the section of its line between Minneapolis, Kimball, Maine Prairie and St. Cloud. James MacMillan, Minneapolis, is interested. [E. R. J., April 11, '14.]

***Burlington, N. J.**—Electric railway developments of importance to New Jersey and to adjacent parts of Pennsylvania are to follow the construction of the proposed Burlington-Bristol bridge across the Delaware River, according to reports circulated. An electric line giving Bucks County, Pa., a direct route to the New Jersey seashore is one of the possibilities of the rumored extensions by the Public Service Railway. Burlington is to be the Delaware River terminus of the reported electric line to Atlantic City. A route has already been surveyed through Lumberton, Medford, Atsion and on to Hammonton, connecting with the present Burlington County Traction Company's line at Mount Holly. It is rumored that the Absecon-Pleasantville electric line is to be extended to Hammonton.

Public Service Railway, Newark, N. J.—The new Hawthorne Avenue line from Elizabeth Avenue to Wolcott Terrace has been placed in operation by this company. This new line will operate in conjunction with the Mulberry line.

New York & Long Island Traction Company, Hempstead, N. Y.—Plans are being made by this company to connect its present lines in the Jamaica section with the elevated extension on Liberty Avenue, Jamaica. A certificate of extension was filed recently with the Queens County Clerk. The company will extend a line from the Rockaway Plank Road to Liberty Avenue at Ozone Park, where connection will be made with the new elevated line, and will add a loop on Ocean Avenue.

Buffalo, Lockport & Rochester Railway, Rochester, N. Y.—Frank A. Dudley, vice-president of this company, has confirmed the closing of a contract between this railway and the Niagara, Lockport & Ontario Power Company to use the transmission line right-of-way of the power company for its line between Lockport and Niagara Falls.

Cincinnati (Ohio) Traction Company.—This company is asked to consider plans to extend its Gilbert Avenue line out Fairfax, Wold and Hewitt Avenues in Cincinnati.

Columbus Railway & Light Company, Columbus, Ohio.—Plans are being considered by this company to double-track its Oak Street line in Columbus.

Dayton & Xenia Traction Company, Dayton, Ohio.—The State Public Utilities Commission has approved the financing of this railway.

***Dayton, Ohio.**—Work has been begun on the line from Delco Dell to the tracks of the Ohio Electric Railway in Dayton. While this line is being built by private individuals it will be operated by the Ohio Electric Railway.

Lake Erie & Youngstown Railroad, Youngstown, Ohio.—As soon as the necessary financial backing is secured by this company work will be begun at several points by the Caldwell Construction Company to build the electric line between Erie and Youngstown. [E. R. J., Nov. 1, '13.]

Bartlesville (Okla.) Interurban Railway.—Work has been begun by this company to build 2 miles of new track for city loop extensions in Bartlesville.

Toronto (Ont.) Railway.—Plans are being considered by this company to reconstruct its entire line. Among the improvements will be the relaying of 13½ miles of track.

Toronto, Ont.—The City Council was on June 15 informed by the secretary of the Hydro-Electric Power Commission of Ontario that the chief engineer had been instructed to confer with the commissioner of works for the city, respecting a system of radial railways under the hydro-electric railway act, running into and from Toronto, particularly the contemplated railway from Toronto to Port Perry, Uxbridge and Newmarket.

***Columbus, Tenn.**—A group of electric railway men spent several days recently in the vicinity of Franklin and Columbia, Tenn., going over the two proposed routes of the projected electric line from Columbia to Franklin. In the party, which covered the territory in automobiles, were J. T. Newman, New Orleans; T. H. Tutwiler, manager of the Memphis Street Railway, and a number of engineers.

Nashville Railway & Light Company, Nashville, Tenn.—This company has begun construction of a loop from its Nolensville line to connect with the Tennessee State Fair grounds. This will give the company a second line to the grounds, and it is estimated that the extension will be about ½ mile in length.

Austin (Tex.) Street Railway.—Work has been begun by this company on the extension of its line on East Sixth Street in Austin.

Texas Traction Company, Dallas, Tex.—Plans are being contemplated by this company to double-track Main Street in Dallas.

Dallas (Tex.) Consolidated Electric Railway.—Plans are being made by this company to double-track some of its lines through the business section of Dallas.

***Hillsboro, Tex.**—A meeting of commercial organizations will be held at Hillsboro, Tex., in the immediate future to make arrangements for the construction of an electric railway between Fort Worth and Mexia, Tex. E. N. Farris, secretary of the Hillsboro Commercial Club, is among those interested. Three companies are said to be ready to build the line.

Pier Railway, Port Arthur, Tex.—This company, recently incorporated, plans to build an electric railway from the corner of Austin Avenue and Procter Street to the end of the causeway on the pleasure pier in Port Arthur. All material has been ordered and work will be begun at once. J. W. Williams, is interested. [E. R. J., June 20, '14.]

San Antonio, San José & Medina Interurban Railway, San Antonio, Tex.—A contract was signed on June 15 for the construction of one section of the proposed electric railway between Alamo City, Tex., and the Medina dam. The distance of the first section will be 13 miles, from San José to Kirk. The proposed route of the line is through Castroville, La Coste, Kirk and San José, 38 miles. J. G. Miller, San Antonio, general manager. [E. R. J., June 6, '14.]

Ogden (Utah) Rapid Transit Company.—Contracts for the construction of the extension to Huntsville has been awarded by this company to the Utah Construction Company. Construction will be begun at once. All material has been purchased.

***Weston, W. Va.**—Right-of-way is being obtained to build a new electric line to connect Buckhannon and Weston, and from Buckhannon to Philippe, there to connect with the proposed line of the Monongahela Traction Company, from Clarksburg to Philippi. F. N. Schanley is interested.

Eastern Wisconsin Railway & Light Company, Fond du Lac, Wis.—Plans are being considered by this company to extend its lines in both the east and west sections of Fond du Lac.

SHOPS AND BUILDINGS

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind.—Work has been begun by this company rebuilding its carhouses on Holman Street and Chestnut Street in Fort Wayne.

Dallas (Tex.) Traction Company.—This company has acquired a site for its new terminal station in Denison at the corner of Houston Avenue and Woodard Street. The cost of the station is estimated to be about $25,000.

POWER HOUSES AND SUBSTATIONS

Meridian Railway, Light & Power Company, Meridian, Miss.—This company's power plant, in the western section of Meridian, was wrecked on June 8 by a boiler explosion. The two boilers which were wrecked have been replaced with a 750-hp and a 350-hp Sterling boiler.

Moncton (N. B.) Tramways, Electricity & Gas Company, Ltd., Moncton, N. B.—This company is installing three 200-hp boilers of high pressure, to replace four low pressure boilers which have been used for several years. A portion of the plant is already equipped with high pressure boiler and when these additional ones are installed the entire plant will be worked by high pressure boilers. A. B. Coryell, superintendent.

Hershey (Pa.) Transit Company.—This company has awarded a contract to Stohler Brothers, Hershey, to build a new power house near Gingrich's Meeting House, about 2 miles from Hershey. The structure will be 38 ft. x 28 ft., one story high and of stone construction. The company has been purchasing the power for the operation of its line between Lebanon and Mount Pleasant from the Edison Electric Company. The purpose of the new power house is to enable the company to provide its own current.

Manufactures and Supplies

ROLLING STOCK

New York State Railways, Rochester, N. Y., has been sending out inquiries on prices for equipment for a number of new single-end interurban cars.

Manila Electric Railroad & Light Company, Manila, P. I., is completing the construction of six double-truck, center-entrance closed cars in its own shops.

Chicago (Ill.) Elevated Railways has placed an order for 122 additional all-steel motor cars with the Cincinnati Car Company. This makes a total of 250 all-steel cars now being constructed in this shop for the elevated railways.

United Traction Company, Albany, N. Y., has been recommended in a report to the Public Service Commission published elsewhere in this issue, to replace forty of its 20-ft. cars by new cars seating not less than forty persons, twenty of these to be replaced by Nov. 1, 1914, and twenty to be replaced by Nov. 1, 1915.

Manhattan Bridge Three-Cent Fare Line, Brooklyn, N. Y., has specified the following details of equipment for the six cars which were recently ordered from the Southern Car Company: brakes, Giant; heaters, Gold; headlights, Crouse-Hinds; trolley bases and sand boxes, Sterling. The above details are corrections of those which, owing to an unavoidable error, were formerly specified in the ELECTRIC RAILWAY JOURNAL of June 20, 1914. The cars are not prepayment as formerly noted.

Third Avenue Railway, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of April 18 as having ordered twenty-three single-truck, low-level, end-entrance, pay-within semi-convertible cars from The J. G. Brill Company, has specified the following details for this equipment:

Weight, car body only, 15,270 lb.	Couplers ..... Brill
Length of body.22 ft. 11½ in.	Curtain fixtures.Cur. Sup. Co.
Length of vestibule, 33 ft. 11¾ in.	Curtain material..Pantasote
Width over sills.8 ft. 2 ⅜ in.	Destination signs....Hunter
Height, rail to sills....31 in.	Gongs ..... Brill
Body, metal posts and carlines	Hand brakes ..... Brill
Headlining ..... Agasote	Headlights .... Incandescent
Roof .....plain arch	Motors.....West. No. 328
Underframe..... metal	Registers ..... International
Air brakes, National Brake & Elec. Co.	Sanders ..... Brill
Bumpers.....Brill angle	Seats ..... Brill
Car trimmings..... Brill	Seating material .....cane
	Trucks ..... Radiax
	Ventilators .....Ry. Utility
	Wheels .....24 in.
	Casting .....iron

Jacksonville (Fla.) Traction Company, noted in the ELECTRIC RAILWAY JOURNAL of April 18 as having ordered fifteen double-truck, single-end prepayment cars from the American Car Company, has specified the following details for this equipment:

Seating capacity 42	Destination signs....Hunter
Bolster centers, length, 22 ft. 2 in.	Fare boxes.....Johnson
Length of body.29 ft. 6½ in.	Fenders .....H. B.
Length over all.41 ft. 3½ in.	Gears and pinions.....West.
Width over sills...8 ft. 4 in.	Gongs..Elec. Serv. Sup. Co.
Width over all....8 ft. 8 in.	Hand brakes....Am. Car Co.
Height, rail to sills..32⅞ in.	Headlights ....Crouse-Hinds
Height, sill to trolley base, 8 ft. 10 in.	Motors, 2 West. No. 307, inside hung
Body .....composite	Paint.....Flood & Conklin
Roof .....plain arch	Registers ..... International
Underframe..... metal	Sash fixtures.O. M. Edwards
Air brakes.....West. S-M-3	Seats....Hey Bros. & Wake.
Axles ..... Baldwin	Seating material.....rattan
Cables ..... West.	Springs ..... Baldwin
Car trimmings.....Dayton	Step treads.....Feralun
Conduits and junction boxes, Am. Car Co.	Trolley retrievers...Knutson
Control .....K-36 J	Trolley base.....West.
Couplers.....Am. Car Co.	Trucks .....Baldwin
Curtain fixtures.Cur. Sup. Co.	Varnish .....Berry Bros.
Curtain material..Pantasote	Ventilators.....Am. Car Co
	Wheels ..... Baldwin

TRADE NOTES

U. S. Metal & Manufacturing Company, New York, N. Y., has discontinued the Eastern agency of the Pollak Steel Company of Cincinnati, Ohio.

Rail Joint Company, New York, N. Y., has appointed George C. Isbester in charge of its Chicago office, No. 215 Railway Exchange. Mr. Isbester has been for the past three years connected with the New York office of this company.

Welding Material Company, New York, N. Y., has appointed W. B. Elliott of the Hicks Motor Manufacturing Company as president, with offices at 114 Liberty Street, New York. The Welding Material Company is sole agent for the Lincoln arc welding equipment.

Lord Manufacturing Company, Brooklyn, N. Y., has added the services of R. V. Mackey to its sales force. Mr. Mackey was formerly in charge of the test work for the car equipment department of the Interborough Rapid Transit Company. He will represent the Lord Manufacturing Company in the Middle West.

Niles-Bement-Pond Company, New York, N. Y., has received a first prize of $20,000 from the Chilean Parliament as an award for the best designs out of those submitted by competitors from various parts of the world for a general railroad shop having capacity for 500 to 600 locomotives, 500 passenger cars and 6000 freight cars.

Electric Service Supplies Company, Philadelphia, Pa., has secured a number of large orders for protected rail bonds this spring from electric railway properties, electrified steam roads and electrically operated coal mines. Four of the important orders received are from the Boston (Mass.) Elevated Railway for a total of 34,500 protected rail bonds; Brooklyn Rapid Transit Company for a total of 25,000; the Norfolk & Western Railroad for their steam line electrification has ordered 13,500; the Pennsylvania Railroad Company has ordered for the Philadelphia-Paoli electrification a total of 17,150, together with all high tension porcelain insulators and hardware for this new project.

Traylor Engineering & Manufacturing Company, Allentown, Pa., has completed arrangements with Charles A. Jacobson for the manufacture and sale of his gas engines. Mr. Jacobson will give his entire attention to the designing, building and selling of his engines with the aid of the engineers of the organization of the Traylor Company. The Jacobson gas engine is of the scavenging type and can be used on natural producer and illuminating gases of all kinds. The starting device is an air starter, assuring ease in starting the engine. The engines are built with single and multiple cylinders and are particularly adapted for direct connection to alternators running in parallel.

The J. G. Brill Company, Philadelphia, Pa., has recently equipped a car with the Safety electric brake, an apparatus which has been thoroughly tested and is to be immediately placed on the market. The manufacturers claim that this type of brake secures an unusually quick and smooth start, thus tending to reduce operating and maintenance costs, lower the wear on brake shoes and prevent flattening of wheel treads. The brake, which is of light weight, is applicable to both single and double track cars and to standard brake rigging. It is said to decelerate automatically at a constant rate, giving a straight line stop, as shown on the curve sheet.

ADVERTISING LITERATURE

Pittsburgh Transformer Company, Pittsburgh, Pa., has issued a catalog describing its pressed steel case distributing transformers.

Reading Specialties Company, Reading, Pa., has issued a folder describing its trolley rerailers, reversible railbenders, step joints and guard-rail clamps.

Link-Belt Company, Chicago, Ill., has issued a catalog describing its Ewart detachable link belt and sprocket wheels for general industrial purposes.

F. M. De Weese Company, Chillicothe, Ohio, has issued a booklet describing its lifting jacks for heavy lifting purposes, such as lifting cars for inspection purposes.

The "Engineer," London, England, has issued a directory for engineers. The directory contains an abridged and classified index to articles published in the *Engineer* during 1913. The directory also contains a foreign buyers' guide, which constitutes an alphabetical list of technical terms translated into French, German, Italian and Spanish.

Dielectric Manufacturing Company, St. Louis, Mo., has issued a data booklet which contains curves and tables showing the insulating properties of its various insulation products.

Mahl Manufacturing Company, Minneapolis, Minn., has issued folders illustrating its kerosene torches for burning paint off of cars and portable torches for use in steel car repairing, boiler shops and foundries.

American Electrical Works, Phillipsdale, R. I., has issued a folder which gives data and prices on its bare copper wire and cables, galvanized iron, coarse magnet, flat magnet, annunciator and rubber covered wire and pendant lamp and reinforced portable cord.

Western Electric Company, New York, N. Y., has issued a catalog which describes in detail its various systems and apparatus of inter-phones and supplies. The catalog also contains helpful suggestions as to the selection and installation of interior telephone systems.

Pratt & Whitney Company, Hartford, Conn., has issued a large catalog describing and illustrating its side head boring mill. A feature of this boring mill is its independent side head, which may be lowered below the work table thus permitting an increased swing. Rapid traverse is provided in all directions for vertical and side heads. All controlling levers are placed within arm's reach of the operator and are advanced in the direction in which the movable member is to travel.

Railway Improvement Company, New York, N. Y., has issued a catalog describing its Rico terminal clock for accurately and automatically recording running time at terminals or time points. In this system each motorman is provided with a daily card or envelope, as shown by a sample envelope in the catalog, on which he automatically records his arrival and leaving time at all terminals and time points. This system is designed to overcome the inaccuracies of the ordinary "pencil" method. Illustrations of the clock in service on the Third Avenue Railway, British Columbia Electric Railway and Manhattan Elevated Railway are shown.

Electric Service Supplies Company, Philadelphia, Pa., has issued a new loose-leaf catalog containing descriptions and list prices of its line of Keystone truss pins. On account of the many additions continually being made to the Keystone line it was deemed advisable to arrange this catalog in loose-leaf form so that customers may at once be furnished with information and data on new designs of pins as they are placed on the market. Illustrations showing methods of installation and assemblage of Keystone pins accompany descriptions of each type. Another catalog recently issued by this company describes its portable and stationary types of Keystone lamp guards. The features of strength and durability in the guards are effectively shown by an illustration.

Hubbard & Company, Pittsburgh, Pa., who have taken over the business of the Pittsburgh Reinforcing Pole Company, have issued an attractive catalog entitled "Net Results," which describes the Orr process of pole reinforcing. In this process a hole about 6 in. wide is opened around the decayed pole. The rotted wood is chopped away, reinforcing rods are driven into the sound wood above and below the decayed section, and the upper part of these rods encircled with a strip of expanded metal. The concrete is then poured around the pole, forming a protective sleeve which comes above the ground in the form of a slightly tapering collar and extends below the rods underneath the ground. The catalog contains letters, showing satisfactory practical results from reinforced poles from the standpoint both of physical permanence and cost compared with renewed poles, from the following electric railways: Baton Rouge (La.) Electric Company; San Francisco, Napa & Calistoga Railway; Iowa Railway & Light Company; Helena Light & Railway Company; East St. Louis & Suburban Railway; Oregon Electric Railway; Pensacola (Fla.) Electric Company; Owensboro (Ky.) City Railroad; Niagara, Lockport & Ontario Power Company. The end of the catalog contains interesting photographs and statistics showing results of tests made on reinforced poles.