

Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

Volume 53

New York, Saturday, January 11, 1919

Number 2

Skip Stops Demand Better Car Signs

MANY American operators do not fully appreciate the revenue and public-satisfaction value of destination and route signs that can be read by the would-be passenger for the length of an ordinary city block, say one-fifteenth or one-twentieth of a mile. Now with the coming of the skip stop, the need for such signs is all the greater because with the longer distance between stops, the car is going at a good rate of speed while it is one block away from the next permissible stop instead of being at a standstill. If the man in the street cannot make out the sign, he will either signal for an unnecessary stop or else start to walk. The latter action is more likely if he is only a mile or so from his destination. Since it cannot be denied that the skip stop has a tendency to discourage short riding, it would be a serious mistake to accelerate that tendency by continuing the use of car signs that are indistinct both night and day. It is so easy to use conspicuous initial or route number signs as an identification to the native rider at least, that further retention of wooden block and ground-glass monitor lettering is inexcusable.

If You Can't Buy, Try Installments or Rental

WHEN the maker of a money-saving or money-earning device has convinced the railway prospect that he is telling the truth and nothing but the truth, the latter will often throw up his hands, expel a heart-felt sigh and say: "I guess you're right old man, but where in Helvetia can I get the money for your stuff?" If the salesman at this point can go no further than a sincere expression of sympathy, both the sale and the savings are off.

It may be a misfortune, but it is certainly necessary in many instances for the manufacturer to finance the customer by taking his payments in long-time installments or in rentals. Although this means a higher initial cost than outright cash purchase, there is an important advantage in that the manufacturer has the strongest possible incentive to make good because he will not get his money until the customer is satisfied. This policy, of course, works out most logically with devices that need personal instruction, enthusiasm and follow-up to be a success, such as fare-collection and car-checking instruments. If the latter are sold outright, the customer is too prone to make no allowance for these very factors that bring him the highest returns.

When asked for the secret of the perfect blending of the paints in the pictures which he produced, the great

Reynolds replied that he mixed his paint with brains. So, too, the makers of efficiency devices also have had to mingle brains with metals and mechanisms. Therefore, they cannot sell their apparatus at a manufacturing profit over the cost of their copper and steel as does the maker of a stock article. They must charge a figure that includes both inventive ability and continuing service to the buyer. Surely, if such manufacturers have the faith that the money for long credits or rentals can be made directly out of savings, the electric railway manager should show equal faith in accepting such opportunities in the helpful spirit in which they are made.

Solve This Business Problem in a Business Way

ONE of the tangible results of the recent reconstruction conference at Atlantic City, held under the auspices of the United States Chamber of Commerce, was the passage of a resolution calling for the appointment of a committee of the chamber "to investigate and study the question of local transportation as it relates to the control of rates and service, franchises, taxes, the attraction of capital into the business, and such other questions which the committee may find pertinent." The scope of the investigation is national in character, and, for its decision to carry the greatest weight, we believe that the members of the proposed committee should be of national standing.

The leaders of the Chamber of Commerce of the United States who have to do with the naming of committees could serve the public interest well if, in appointing this particular committee, they select men capable of broad-gage views and conclusions, with a good knowledge of public relations, as well as some contact with power and electric railway companies. The type of man who should come last in the list of those to be named on the committee is the public utility official who is that and no more.

The war has taught us to think in terms of the public utility industry rather than in terms of special interests in the industry. A consciousness has been aroused among public utility men that they are part of a great national industry instead of being merely officials of local plants and local industries. Public utility men themselves are now beginning to understand this, and they should be the first to come forward and urge that there should be named on the committee, for instance, men such as the following: the president of a great life insurance company—any one of them—in view of the fact that the big insurance companies are owners of from \$250,000,000 to \$300,000,000 worth

of public utility securities; the president or general manager of a great industrial plant using power and local transportation which suffered and which thereby caused industrial war production to suffer during the war because of the lack of power and local transportation; leaders, such as one who sprang to the rescue in Boston, in the organization of street railway and power company security owners; and last but not least, some representative of the public utilities who has been closely in touch with the industry in a national way during recent years and knows its problems.

A big, broad-gaged committee, which touches at all points the public, namely, the users and the owners, rather than the operators, of the public utilities is what is needed for this work. It could do much to advance the prosperity of the country through the improvement of its local transportation systems.

New York Situation Looks Somewhat More Hopeful

THE New York City situation appears a little more hopeful as a result of the events of the past week. The appointment of a receiver for the Brooklyn Rapid Transit Company and the frank statements from Mr. Shonts of the deplorable condition of the Interborough and New York Railways lines under a 5-cent fare have brought a realization to the public that something must be done. A special feature of the case is that with both the B. R. T. and the Interborough, under the dual subway agreement, the companies are entitled to preferential treatment in the division of the income of the rapid transit system. But the new lines are not yet paying—indeed, are not yet completed—and the rise in operating expenses has robbed the 5-cent fare of its profit and the companies of their ability to finance themselves until things again become normal. The acceptance by Mr. Garrison, formerly secretary of war, of the Brooklyn receivership has installed confidence that the interests of the company will be well cared for, and the treatment of the traction crisis in the press is generally sympathetic. This is considered indicative that the city may be brought to consider some service-at-cost or other plan under which the subway extensions may be completed as proposed and the integrity of the traction properties may be preserved.

The obvious immediate step to be taken is an advance in fare. It is a notable fact that although New York provides the most expensive electric railway construction per mile of track of any city in the country and probably the longest ride for a single fare, it is among the very few cities left which have not permitted an increase in the fare from that which existed before the war. The admission of Comptroller Craig that under municipal ownership fares would have to be raised shows the justice of the demand that they be increased now. The whole theory of the modern public service corporation is that it is entitled to a reasonable return. New York City ought not to run the risk of such obloquy as will surely always attach to it if it deliberately withholds a living fare from properties which up to the outbreak of the war were prosperous and paying dividends. It is running such a risk by employing the tactics which have brought the local railways to their present pass.

"Hooverize" Time by Cutting Out Unnecessary Delays

IN A Middle Western city recently an electric railway company found it necessary to indicate the new stopping places under a skip-stop system by suspending the signs from the overhead wires. These signs were placed at locations exactly over the spot where persons were expected to board the cars. The resulting time saving from having the people wait at the proper distance from the street intersection was quite noticeable and had an appreciable effect on the scheduled movement of the cars. The change was especially worthy of comment because the same company previously had marked stopping places by signs on the nearest trolley poles, even though these supports happened to be 50 or more feet from the spot where persons were expected to board the cars.

We do not refer to this experience with the idea of recommending that all companies should change the location of stop signs, regardless of expense, where they do not happen to conform to this plan. We believe, however, that the incident is worthy of mention as showing how improved operation may result from a discovery brought about by the adoption of the skip-stop system.

The "man on the street" has no idea of the value of minutes, still less of seconds, as connected with railway operation. He is peeved perhaps when a car passes him by and causes a wait of two minutes or so for another. In fact, those two minutes are likely to measure up as a much longer period in his mind. This is what Doolittle calls one of the psychological aspects of street railway service. But he rarely thinks that the railway company is interested in saving time.

The thoughtful railway operator, however, has to give serious consideration to this factor in providing transportation, especially under crowded city conditions. That is why, for instance, he adopts a simple transfer system which eliminates, say, one punch mark even though a more elaborate form of transfer would safeguard the revenues more closely if the conductor had the time to punch every hole or look for every mark painstakingly. That is why there is a constant demand for quicker fare collection methods—especially now that more pennies are being handled. This accounts also for the continual effort toward the development of mechanical devices which will have a tendency to speed up the movement of the car.

When we consider how much thought is given by some officials to details of this kind, we may well wonder why no improvement is made to correct other conditions which should have a very strong tendency to accelerate traffic movement. Take, for instance, the matter of clearing the right-of-way from vehicular obstructions—and, as a necessary corollary in crowded districts, preventing the parking of automobiles along the tracks. Wonderful results are said to have been secured in this last particular in Chicago where the downtown streets formerly were impassable outside of the car tracks. Now, during the rush hours, this nuisance is practically eliminated, with a resultant time saving for every car passing through the "loop district."

These are only a few of the items to be considered in improving car service. Traffic studies made from time to time, such as the one reported for Dallas in our Dec. 7 issue, call attention to many similar instances where transportation facilities may be bettered. It is well to

have such recommendations come from experts. The people are more likely to be impressed by such reports from disinterested sources. But, after all, no good can come of even the best traffic study unless it be followed by proper co-operation from the public and the local authorities. The trying times through which we are passing call for such co-operation.

Why the Automatic Substation Is Coming Into Its Own

EVERY technical development involves the balancing of rival financial and other considerations, true engineering being the selection of equipment and methods of operation which are in the long run most economical. This is well illustrated in the progress of electric railway power distribution. At first the electric power was generated and distributed in direct-current form for this purpose, but the distance to which it could be transmitted at the low voltage of 500 or 600 was so small as greatly to hamper progress. For interurban lines and long city lines alternating-current transmission was a necessity. However direct current was practically the only kind available in the early days for use in the motors so that the connecting link, the rotary converter and therefore the rotary converter substation, had to be developed. This institution was accepted as a necessary evil, although from the operating standpoint it was a success practically from the start. It involved extra investment in equipment and expense for operating labor. Hence the number of substation units was limited by the cost. A balance had to be struck between savings produced and cost to produce them.

The necessity for using rotary substations was a prime cause of the interest in the alternating-current motor for cars. The difficulties that had to be overcome in producing a satisfactory motor for this purpose were very great but they were overcome and a number of roads adopted these motors. Here again was the balancing of costs, that of the rotary converter substation against the higher cost of rolling stock. In general the rotary "won out." But while all of this progress was going on labor and equipment costs were mounting. The economic limit set to the number of substations possible on many lines was too low. At this point the automatic control came in to permit the number of stations to be increased without increase in labor cost. Here again the economic balance is being redetermined—with the labor factor largely eliminated.

In last week's issue of this paper a list of practically all of the automatic substations installed or ordered to date was given. By means of this it is possible to trace the story from 1915 to date, the short period covered by the actual operation of railway substations of this type. A considerable number of equipments are still to be delivered, so that it will be possible to keep track of progress for some time to come with the aid of the table. The Des Moines City Railway and the Inter-Urban Railway of the same city are the largest users of this type of substation to date. Next comes the Chicago, North Shore & Milwaukee Railroad, the equipment of which form the basis of an article by Charles H. Jones in this week's issue of this paper. Mr. Jones shows in a very convincing way just how and why the automatic control fits in with the equipment of this very important heavy interurban line.

Putting "Square Pegs" in Square Holes, i. e., Selecting Employees Scientifically

EMPLOYERS of labor have not harassed their gray matter very much during the last couple of years about the best manner of selecting employees. The obtaining of help of any kind has been a prime cause for worry, and the finding of a man best fitted for a certain kind of work has not usually been within the realm of practical possibilities. The signing of the armistice has wrought some kaleidoscopic changes, however. War industry workers are scurrying to the cover of more stable if less profitable employment, and peace renders our vast army of fighters a potential host of employment seekers. Because of the inherent stability and attractiveness of the work it seems likely that public utility service will attract many of those who are now or soon will be seeking employment. From the standpoints both of efficiency of work performed and of loyalty to employees the question, "How shall I select my employees?" is a vital one to railway executives to-day.

In the two or three years preceding the era of labor scarcity from which we are just emerging, considerable progress had been made in the methods of hiring employees by a number of companies. The old haphazard methods were being replaced by those which brought out to some extent the pertinent fact of whether the man was suited for the work in hand. Fitting the man to the job, or the job to the man as the case may be, getting the "square pegs" out of the round holes and into the ones in which they do fit, is scientific selection of labor and yields worth-while results to both employer and employee. The war has given an extraordinary impetus to the development of special tests and methods of determining a man's ability to achieve results along a given line. This is the work of trained practical psychologists, and since our entry into the war the government has had many such experts developing tests and methods of selecting men suited to the innumerable jobs that exist within the confines of a modern military organization. Over one-third of the enlisted personnel of the army has been given these tests. They have been used as the basis of selection of men for positions ranging from field officers to cooks and from air pilots to sappers.

Obviously no one universal test can be employed. A given employment requires a test which will bring out the prospective employee's ability to achieve results in that particular employment. At first glance many of the tests used seem foolish, but one is prone to change his opinions about the matter after taking one of them himself even if it is only one of those devised for the most ignorant and illiterate of the various classes of recruits who so recently were pouring into our cantonments. Of course such tests should be wisely employed and their results should not be regarded as all conclusive. They should not be seized upon as the grand panacea for all the ills that beset the employment office. The results of the War Department's experience have not yet found their way into print, but the growing use of the tests gives some indication of the regard in which they are held and points to their probable value to all employers of labor. At any rate they should be of assistance on electric railways in sifting out worthless applicants for positions.



Automatic Substations on the North Shore Line

**Three New Substations in Operation and a Fourth Under Construction
Save 177 Miles of 500,000-Circ. Mil Cable Worth \$650,000**

BY CHARLES H. JONES

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THE Chicago, North Shore & Milwaukee Railroad is a high-speed interurban line running between Milwaukee, Wis., and Evanston, Ill., a suburb of Chicago, where it connects with the Northwestern Elevated Railroad, one of the elevated lines entering the city. The interurban road is double track throughout practically its entire length, and among the places of interest located along the line are the largest naval training station in the United States, situated at Great Lakes, Ill., and an army post at Fort Sheridan, Ill. An outline map of the road is given in Fig. 1.

The rolling stock consists of 106 passenger cars, of which thirty are 45-ton steel interurban cars equipped with four 140-hp. motors each, and forty are 38-ton wood interurban cars equipped with four 75-hp. motors each. There are also ten express cars, four locomotives and 150 freight cars, together with the usual complement of line cars, work cars, plows, sweepers, etc.

An hourly high-speed limited service is given between Evanston and Milwaukee, a distance of 73 miles, and half-hourly service on Saturday afternoon, Sunday and holidays. The schedule speed throughout the run is 37 m.p.h. For 21 miles on the southern end of the system the line runs through towns requiring many stops and slow-downs so that on the balance of the run it is necessary to maintain a speed of 60 m.p.h. for a large part of the distance. For this service steel trains

of two, three and four cars are used. A half-hourly express service is maintained between Evanston and Waukegan, a half-hourly local service between the same points and a two-hourly local service between Evanston and Milwaukee. On Saturday, Sunday and holidays, and on Wednesday, which has been visitors' day at the Naval Training Station when a public review has been held with an attendance as large as 30,000, service has been added between Evanston and the Naval Training Station so that an average interval of seven minutes for three-car trains has been maintained. In order to accomplish this it was necessary to rent considerable equipment.

In addition to the above passenger service an extensive merchandise dispatch service is maintained on the entire line, and over a portion of the line a great deal of carload freight is handled. This consists mostly of coal, gravel and crushed stone.

As an indication of the rate at which traffic has increased during the past few years, the car-miles run per annum are given as follows: 1915, 2,833,221; 1916, 3,292,559; 1917, 4,742,293; 1918, 6,023,582.

Power is purchased from the Public Service Company of Northern Illinois at Waukegan or Evanston, as the supply company sees fit, and from the Milwaukee Electric Railway & Light Company at Milwaukee. The current is furnished at 25 cycles, 13,200 volts, and is

the system of 498, and approximately 177 miles of 500,000-circ.mil cable would have been necessary. As this would cost approximately \$650,000, while it was estimated that the additional substations could probably be installed for \$150,000, assuming that new equipment was used in each of these added stations, it is quite apparent that the power system could not be built up economically by adding feeder copper. There were many complications to be considered in a proposed change in trolley voltage, due to the fact that in many places the line was operated through towns where it was not considered safe to use the higher voltage on the trolley. Therefore the control equipment would have had to be provided to take care of two line voltages. Furthermore, there were a great many old-type 600-volt motors in use which would have had to be discarded if the trolley voltage was

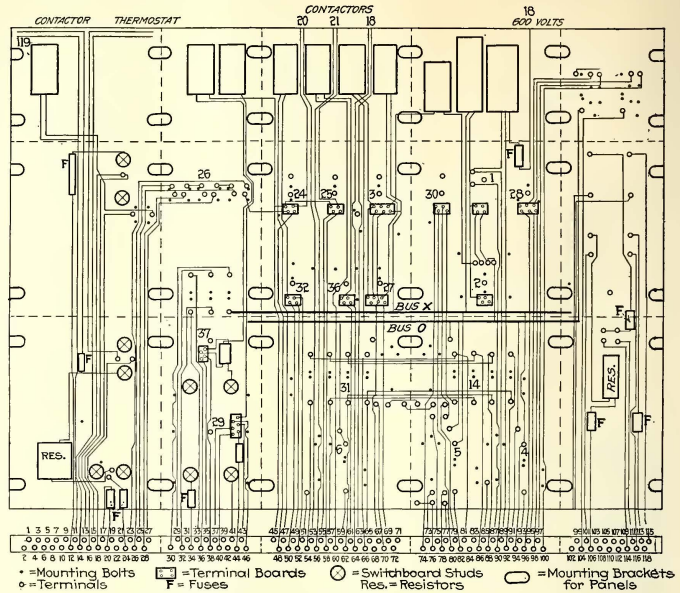


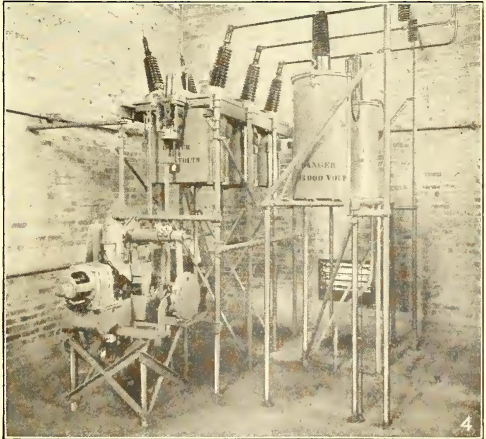
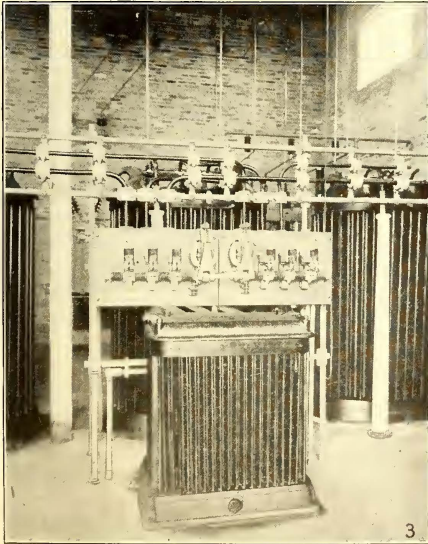
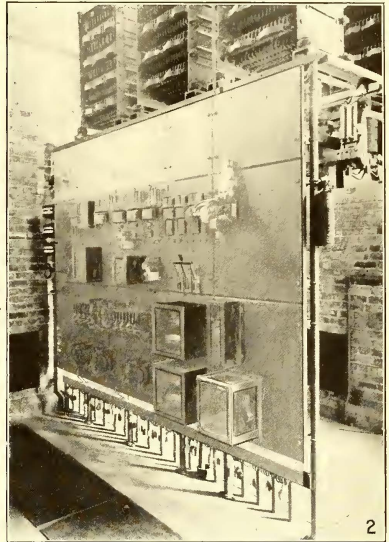
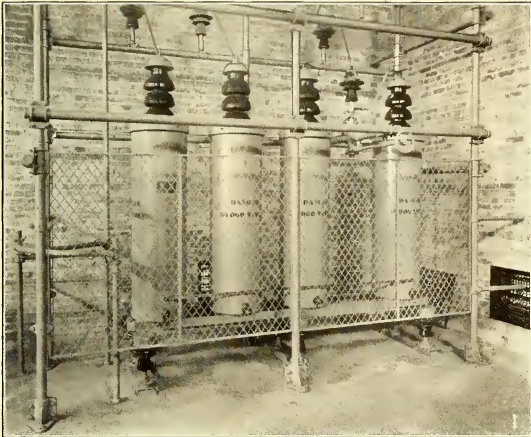
FIG. 5. WIRING LAYOUT ON BACK OF SWITCHBOARD (See table for details)

TERMINAL BOARD DETAILS							
No.	To Switchboard	To Apparatus	To Apparatus	No.	To Switchboard	To Apparatus	To Apparatus
7	Over speed limit	Series field shunt coil	Ground	61	Relay No. 36	Ground	
8	Over speed limit device	Under speed limit device	No. 12 controller	62	Shunt field bus	Rotary shunt field	
9	North bearing thermostat	South bearing thermostat	No. 20 controller	63	Contact No. 18	Interlock	
10				64	Relay No. 36	No. 44 and controller	
11	Resistance grid thermostat	North bearing thermostat		65	Shunt field bus	Rotary shunt field	
12	Positive bus	No. 116		66	Exciter field bus	Exciter pos. controller	
13	Circuit breaker interlock	No. 211		67	Relay No. 27	No. 22	
14	Resistance grid thermostat	No. 69		69	Relay No. 27	No. 14	
15	No voltage release C.B.	Over speed limit No. 12		70	Top contact 31 interlock	Controller No. 4	
16	Circuit breaker interlock	Ground		71	Top contact No. 5	Controller No. 5	Interlock No. 10
17	Fuse and No. 20	No. 50		73	B'U' contact 5 interlock	Controller No. 23	No. 94
18	Contacts, series relay No. 23	Ground		74	Relay No. 30	Ground	
20	Fuse and No. 17	One-third tap on contact No. 10		75	B'U' contact 14 interlock	Ground	
23	Contact on relay No. 26	No. 67		76	B'U' contact 5 interlock	Controller No. 15	
24	D.C. wattmeter	Each low tension current transformer		77	B'U' contact 5 interlock	No. 40	
25	All coils on relay No. 26	Three wires—ground		78	Top contact No. 5 interlock	Controller No. 19	
26	Contact on relay No. 26	No. 135		80	Relay No. 30	Bottom contact No. 16 interlock	
27	Coil on relay No. 26	No. 116		81	Exciter field bus	Rotary shunt field No. 4	
28	Coil on relay No. 26	No. 58		82	Contact No. 5	Controller No. 1	Oil sw. closing coil
29	3-pole switch bus O No. 2	Control transformer		83	Coil of contact No. 8	No. 16	
30	3-pole switch bus X No. 1	Control transformer		86	Exciter field bus	Rotary field No. 3	
32	Three-pole switch No. 3	No. 104		87	Voltmeter No. 1	Ground	
33	Three-pole switch No. 3	No. 47		88	Exciter field bus	Rotary field No. 2	
34	Rev. current relay No. 29	Controller No. 7		89	Resist. for voltmeter No. 1	No. 35	
35	Underload relay No. 37	No. 106		90	Voltmeter No. 1	No. 38	
36	Three-pole switch No. 3	Auxiliary contact, oil switch		91	Coil of contact No. 4	South bearing thermostat	
37	Underload relay No. 37	No. 90		92	Exciter field bus	Field rheostat No. 2	
38	Underload relay No. 37	No. 77		93	Contact No. 4	Controller No. 13	
39	Machine positive	Controller No. 14(2)	Rheostat No. 1	94	Contact No. 4 bus X	No. 73 controller 23	
40	Rev. current relay No. 29	Exciter negative	Controller 21 (1 wire)	95	Relay No. 28	No. 73 controller 23	
41	Underload relay No. 37	No. 64		96	Relay No. 28	South high tension current transformer	
42	Rev. current relay No. 29	No. 54		97	A. C. bus circuit breaker	North high tension current transformer	
43	Underload relay No. 37	No. 33		98	Relay No. 28	No. 1 trip coil oil switch E	
44	Rev. current relay No. 29	North low tension current transformer		99	Relay No. 28	Oil switch trip coil, high tension current transformer	
45	Resistance for relay No. 24	Controller No. 2		100	A. C. bus circuit breaker	Oil switch opening coil	Ground
46	Resistance for relay No. 24	No. 17		101	Reactive volt ampere ind.	Oil switch trip coil No. 1	Controller No. 24
47	Relay No. 24	Controller Nos. 16, 17, 18		102	A. C. bus circuit breaker	No. 32	
48	Relay No. 24	Top contact No. 16 interlock		103	Reactive volt ampere ind.	No. 36	
49	Relay No. 32	Controller No. 10		104	A. C. bus circuit breaker	No. 36	No. 1 lead power transformer
50	Relay No. 32	No. 46		106	Reactive volt ampere ind.	No. 12	
51	Contact No. 6	South low tension current transformer		107	Reactive volt ampere ind.	No. 3 lead power transformer	
52	Relay No. 32	Controller No. 11		111	Voltmeter receptacle	No. 41	
53	Contact No. 6	Rotary shunt field		112	Voltmeter receptacle	No. 27	
54	Ex. field contact No. 31	Controller motor		113	D.C. voltmeter	O.S. auxiliary contact	Controller 14 under-speed device 13
55	Relay No. 25	Controller No. 41		114	Reactive volt ampere ind.		
56	Contact No. 20			115	Reactive volt ampere ind.		
57	Shunt field bus			116	Reactive volt ampere ind.		
58	Relay No. 20			117	Reactive volt ampere ind.		
59	Contact No. 6			118	Reactive volt ampere ind.		
60	Resistance for relay No. 36						

changed. Therefore, the only plan that appeared feasible was to add new substations, and this was adopted. A careful study was next made of installations of automatically-operated substations, with the result that two equipments were ordered. The rotary converters for use in these two stations were obtained by installing a 1000-kw. rotary in Winnetka substation, thereby releasing two 500-kw. machines. Two more equipments have since been installed and a fifth is on order. Some details of the construction follow.

The substation buildings are one story in height without basement, and have shallow machine pits, the floor being raised about 2 ft. above the surrounding ground level to prevent water accumulations in the pit. The

foundations are of concrete and extend to a point about 6 in. above the floor level, the walls from this level up being built of brick. Pressed brick is used on the outside and common brick on the inside. The roof, which is of 3-in. reinforced concrete, is supported by heavy steel beams, one steel column being located approximately in the center of the building. The floor is of concrete, 6 in. thick, laid on a cinder foundation. Light is admitted through wire-glass windows set in steel frames just below the ceiling level on three sides, and a pair of double doors are located on the track side of the building for use in bringing in the equipment. In one of these doors is set a small door for general use. Ventilation is provided by louvers on all sides just above



APPARATUS IN A CHICAGO, NORTH SHORE & MILWAUKEE AUTOMATIC SUBSTATION
 No. 1—Lighting arresters. No. 2—Switchboard with resistors above. No. 3—Transformers and resistance coils.
 No. 4—Oil switch with operating mechanism, and current transformers.

the floor level and Burt ventilators in the roof. Two ventilators are used in the 500-kw. stations and three in the 1000-kw. stations. The high-tension line entrance is made through the roof, with 45,000-volt entrance bushings. Figs. 3 and 4 show an elevation and floor plan of the stations giving the general arrangement of the equipment, while the head piece of this article furnishes a good idea of the external appearance of a typical station.

All high-tension work is made of $\frac{3}{8}$ -in. copper tubing mounted on pipe racks suspended from the ceiling. Oil

All control wiring is installed in iron conduit buried in the concrete floor, and the switchboard is mounted in one corner of the building about 6 ft. from the wall. Ample working space is thus provided behind the board. A trench is located in the floor at the rear of the switchboard and in this all control conduits terminate, short pieces of conduit extending through the floor into this trench from the terminal strip located at the bottom of the switchboard. The trench is provided with a slate cover.

The controller is mounted on an angle-iron table

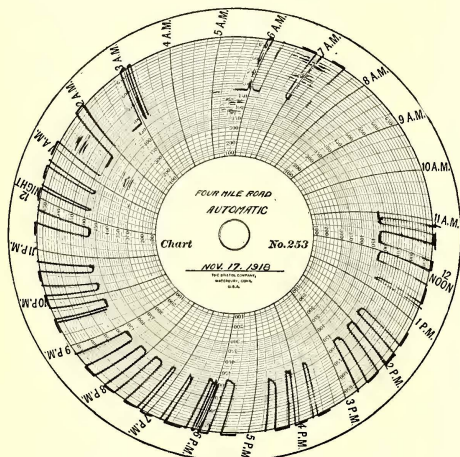


FIG. 6—SAMPLE SUBSTATION VOLTMETER RECORD CHART

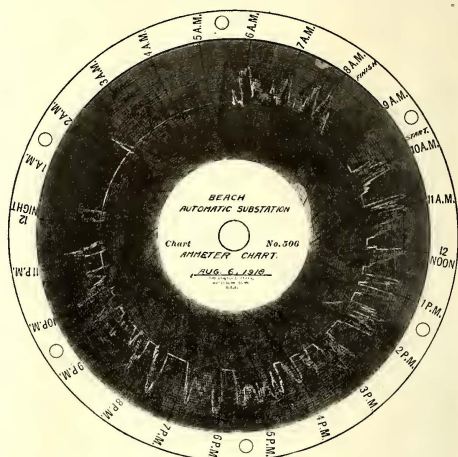


FIG. 7—RECORD, ON SMOKED PAPER, FROM RECORDING AMMETER

switch, control transformer, current transformers and potential transformers are elevated above the floor on pipe racks, the lowest point to which high-tension bus or exposed connections are brought being 9 ft. 6 in. above the floor, so that it is impossible for anyone to come in contact with them without deliberately planning to do so. The arrangement of all apparatus is such that it is not necessary to reach across any "high tension" to work upon disconnecting switches or fuses. A 33,000-volt outdoor-type lightning arrester is installed within the building, wire guards being placed on the front of it to prevent anyone from accidentally coming in contact with the tanks.

The oil-switch operating mechanism is mounted on a pipe rack about 2 ft. above the floor and a direct connection is made between the operating mechanism and the shaft, instead of the usual connection on the side. This makes possible a better arrangement between the switch and the mechanism.

Low-tension connections between the transformer and the alternating current side of the rotary are made with rubber-insulated, lead-covered copper cable mounted on a pipe framework set up in front of the transformers. The starting and running contactors are mounted in front of the middle transformer and directly over the external reactance. An air duct is provided from one of the intake ventilators to the rotary converter pit to furnish cool air to the rotary during hot weather.

about 2½ ft. above the floor, thereby providing easy access to it. Wires from the controller are carried in a 3-in. iron conduit which extends from the wire trench to one leg of the table, then up the leg and along underneath the controller with three 1½-in. short nipples welded in the horizontal run so as to bring the wires out at their proper place.

The current-limiting resistors are mounted on channel iron racks supported at one end by the building wall and resting on the switchboard stanchions at the other end, with the shunting contactors suspended from the bottom of the resistance grid supports. These supporting irons are mounted at such a height as to give at least 6 ft. clearance from the bottom of the contactor to the floor level. All connections between resistance boxes, contactors and circuit-breaker studs on the board are made with bar copper.

SWITCHBOARD WIRING GREATLY SIMPLIFIED

The switchboards themselves were wired on the job. Additional panels were provided above the regular instrument and equipment panels and on the back of these all instrument and apparatus resistors were mounted. At the bottom of the board is a slate strip on which terminals are provided, all control wiring being run direct from the apparatus through the conduit in the floor to these terminal strips, and all connections from the instruments and apparatus on the panels being run down to this same terminal strip. This arrangement,

and the mounting of the resistors at the top of the board, make it possible to install very straight and direct switchboard wiring, eliminating practically all wiring crosses on the back of the board. Fig. 5 (page 85) shows the wiring layout on the back of the board, together with the terminal strip, and the table accompanying the drawing shows where each of the wires leads from the terminal post.

A system of ground cables was laid in the concrete floor. This was connected to a ground cone and the track rail, and all pieces of apparatus were connected to this system. All grounding connections were made by welding with an acetylene torch. All through the station a great deal of work was done with these welding and cutting torches, as in making up the control transformer and controller stands and many special pipe fittings.

The buildings are of sufficient size to accommodate a machine of larger capacity, and if it should ever become necessary to provide a two-machine station, the extension for the second machine would be made at the side toward the controller so that the switchboards would join.

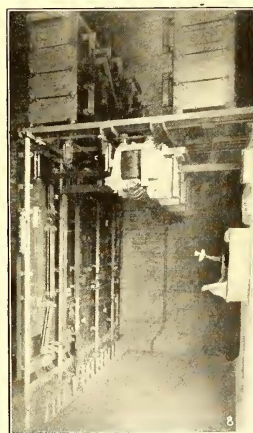
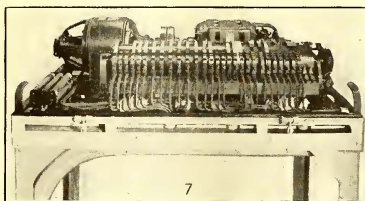
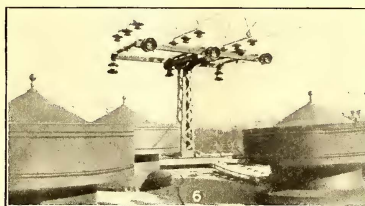
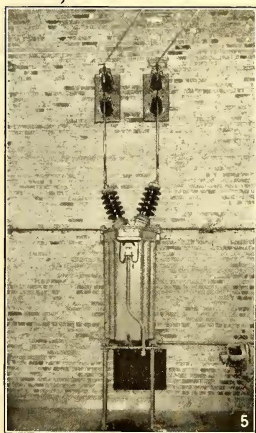
Each of these stations is tapped off from the high-tension line. Therefore, in order to make each one as flexible as possible, pole disconnecting switches are provided on both sides of each station so that it is possible to work on the high-tension line on either side of the station and still keep the station running. On the last station built, two steel towers were used in

First a recording voltmeter, with stops arranged to limit the range of motion of the pen, is used to indicate when the station is running and when it is shut down. This gives a record of the length of time the station is running, indicates false starts and also serves to indicate failures of any pieces of the apparatus. A sample chart is shown in Fig. 6.

Second, a recording ammeter is used to give a record similar to that obtained with the voltmeter. It also shows the load which the station carries while it is on the line and gives more information about equipment failures than the voltmeter. A sample chart from this instrument is given in Fig. 7.

Third, as a further check on operation, mechanical counters are being installed on the following apparatus: Controller, main contactor, shunting contactor, thermostats and no-voltage relays. By means of these it is possible to determine the number of times these pieces of apparatus operate. By following the registration of these counters from day to day, any failures of apparatus can be observed. A daily inspection of stations is made at which time the charts are changed, counters and meters are read, apparatus is inspected and cleaning done. This, however, is not sufficient and a record of what takes place when nobody is in the station is very desirable.

The first of these stations was put into service as an "automatic" in December, 1917, and went through the following severe winter with very gratifying re-



DETAILS OF THE SUBSTATION EQUIPMENT, SUPPLEMENTING THOSE SHOWN ON PAGE 87

No. 5—Control Transformer. No. 6—High-tension Connections on Roof. No. 7—Main Controller.

No. 8—View Behind Switchboard, Resistors above with Shunting Contactors Beneath Them

place of the wooden poles, with very pleasing results, the operating rod for the switch being extended down inside the station walls.

For the purpose of checking operation considerable experimental work has been done in order to obtain a record from which some information will be available daily as to determine what is occurring in the stations. A summary of some of the plans tried follows, and, while no one of them gives all the information desired, each has some merits. Further experiments are being conducted along these lines.

This station carries an extremely steady load and runs continuously about eighteen hours per day. The second station was put into service in the early part of April, 1918. It operates practically 50 per cent of the time during eighteen hours of the day. The third station was put into service in the early part of November, 1918, and runs about 50 per cent of the time, but it does considerable more starting and stopping than either of the other two stations. The fourth station is now under construction and will be put into service during the early winter. This is a 1000-kw. station. It

will carry a heavy load for about twenty hours per day with very little starting up and shutting down.

The construction work on these stations was carried out by Caesor Antonio, construction foreman, under the supervision of the writer.

Rehabilitating the Disabled French Soldier

The Author Tells How Steps Are Being Taken to Utilize Disabled Soldiers in the Electric Railway and Other Industries

BY LUCIEN A. H. PAHIN
Pontoise, France

THE French law of April 17, 1916, provided under special conditions for the employment of soldiers and sailors invalided home, or retired on account of infirmities resulting from wounds received or diseases contracted at the front in the course of actual warfare. One article of this law provides that certain public departments, as well as industrial or commercial enterprises which enjoy concessions, monopolies, or state, departmental or communal subsidies, must furnish lists of occupations and indicate the conditions under which employment may be secured by returned soldiers and

following: (1) The category into which each occupation falls in accordance with a classification under four heads established by a law of Aug. 26, 1905. (2) For the various parts of the body, those which when affected by wounds will not necessarily interfere with employment in the occupation in question. (3) The conditions which the applicants must fulfill in order to be employed in the several lines of work. (4) The ratio of the number of disabled soldiers and sailors to the total which the employer considers preferable. (5) The probable annual number of vacancies for disabled men. (6) The wages or salaries to be paid, and the rights of the employees with respect to pensions.

It is understood that former employees who have been injured but are available for re-employment will be reinstated without delay by their former employers either in the lines of work previously occupied or in different work.

To illustrate the kind of report which is prepared the accompanying list from the Arpaion railway is reproduced. Those of the other railways are similar in general, varying only in accordance with local conditions.

Of course in regard to all parts of the body there are certain tasks which impose restrictions not indicated

TABLE OF OCCUPATIONS FOR DISABLED SOLDIERS AND SAILORS

Classification Number	Occupations	Parts of Body Which May Be Wounded Without Disqualifying the Worker	Special Conditions of Employment, Examinations, Etc.	Proportion of Rehabilitated Men Desirable	Probable Number of Annual Vacancies	Wages or Salary—Right to Pension
2	Accountants, draftsmen.....	Skull, face, eyes, ears, neck, chest, genital organs, back, pelvis, thigh, leg, foot.....	Written and oral examinations...	50 per cent	Rare	5 fr. per day
3	Copyists, clerks, warehousemen, storekeepers, etc.....	Skull, face, eyes, ears, neck, chest, genital organs, back, pelvis, thigh, leg, foot.....	Written and oral examinations...	50 per cent	Rare	5 fr. per day
3	Inspectors.....	Skull, chest, genital organs, arms, thigh, leg, foot.....	Written and oral examinations...	15 per cent	Rare	5.5 fr.
4	Conductors.....	Same except omit skull	Must be able to read, write and calculate.....	15 per cent	Rare	5 fr.
4	Doorkeepers, night watchmen	Skull, face, chest, genital organs, thigh, leg, foot.....	Written and oral examinations...	10 per cent	2	5 fr.
4	General workmen.....	Skull, face, chest, genital organs, thigh, leg, foot.....	Must be able to read, write and calculate.....	10 per cent	2	5 fr.
4	Locomotive drivers.....	Face, genital organs.....	Same plus professional knowledge	15 per cent	Rare	5.5 fr.
4	Chauffeurs.....	Face, genital organs.....	Same plus professional knowledge	15 per cent	Rare	5.5 fr.
4	Motormen.....	Face, chest, genital organs, thigh, leg, foot.....	Same plus professional knowledge	15 per cent	Rare	5.5 fr.
4	Mechanics.....	Skull, face, eyes, neck, chest, abdomen, genital organs.....	Same plus professional knowledge	10 per cent	1	0.45 to 0.70 fr. per hour

sailors, and must give their order of preference in these lists. They must also include the proportion of such openings with respect to their total staffs which have not been "reserved" in accordance with previous military laws.

In applying the provisions of the above law four electric railways in and about Paris have established lists of the occupations which will be available for the disabled soldiers and sailors, and the President of the Republic has approved the plan of the companies by a decree under date of May 13, 1918. The railways referred to are the one connecting Paris and Arpaion, the north-south subway line in Paris, the Bois de Boulogne railway and the tramway line on the left bank of the Seine in Paris.

Each list indicates in regard to each employee the

in the table. For example, for the hands, arms and feet the infirmity can involve only a certain amount of functional disability. Again in most of the cases it is necessary that the employee be able to talk.

The Paris lines have been cited as examples, but similar provision has already been made or will ultimately be made in the case of many other railway lines. The tables which they have prepared do not differ essentially from those prepared earlier. The law of April 17, 1916, provided that in future no industrial or commercial enterprise may obtain a concession or monopoly, or state, departmental or communal subsidy, except on the condition of reserving for the military purposes mentioned a certain number of positions, and they will be expected particularly to consider the cases of fathers of large families.

Canadian Lines Near Breaking Point

Despite Higher Costs of Operation, Municipal Authorities Demand Old Fares and More Service—Municipally Owned Lines Are Losing Money—Service-at-Cost Plan, as Adopted in Massachusetts, Is Being Sought by Ontario Investors

By ERNEST P. FREDERICKS

Publicity Director Association of Holders of Public Utility Securities, Toronto, Ont.

ELECTRIC railway history is repeating itself in Canada, where the cost of operation is more than it is in the United States and where most of the lines are getting less than a 5-cent fare. The inevitable has happened, and it is hardly surprising that practically every railway in the Dominion is in financial difficulties. This does not except those that are municipally owned.

For some time prior to the war there were evidences that the tramways of Canada were destined to suffer from the same conditions that have since become country-wide in their influence. Rising costs in every department of operation, scarcity of labor and a pronounced political antagonism have rendered the position of the tramways in Canada well-nigh intolerable. What aggravates the situation is that there is very little apparent inclination on the part of municipal authorities to meet the issue half-way.

In most cases the tramways have contracts in the respective cities running anywhere from twenty-five to thirty years. In a number of instances these contracts provide that when the agreement expires the city can take over the roads, as has already been done in a number of the smaller communities. To appreciate fully the trend of conditions, one must realize that Canada is the hotbed of municipal ownership. Yet, on the record of past performances, one is justified in wondering why this feeling is so intense or why municipalization is regarded as the panacea for all tramway ills. Certain it is that public ownership of tramways in Canada has anything but a clean slate.

MUNICIPAL OPERATION SHOWS DEFICITS

In Port Arthur and Fort William, the publicly-owned tramways are losing about \$100,000 a year; this, too, despite the fact that fares are double what they were when the war started. The London & Port Stanley Railway, a municipal enterprise, through favorable action on one application has had an increase in fares allowed and is now asking for another.

The Toronto Civic Railway, which has been operated by the city for the last four years, will show a deficit this year of about \$200,000. For the four years it will show an aggregate loss of \$687,000.

In Saskatoon, St. Thomas and Edmonton the municipal tramways are working on the wrong side of the ledger and have been for some time.

The Brantford Municipal Railway was compelled to readjust its rates this summer in order to overcome a \$12,000 deficit.

Calgary has been in a bad way and even after being bolstered up is barely breaking even on its municipal tramways. A year ago the Calgary Municipal Railway

showed a deficit of more than \$19,000; this year, up to the end of August, there was a surplus of a little more than \$7000, but owing to a 4 per cent tax which was placed on the railway in June by the City Council this surplus will be eaten up.

The Regina Municipal Railway for the nine months ended Sept. 30 showed a deficit of more than \$40,000, and it is believed that this will be increased to \$50,000 by the first of the year.

All things considered, public ownership has not proved the ideal arrangement that its advocates would have us believe.

OBSTRUCTIONS OFFERED TO HIGHER FARES

In the few cases where increased fares have been allowed in Canada the companies have found it almost impossible to put the new schedules into effect because of injunctions and other court proceedings prompted from a variety of sources. The case of the British Columbia Electric Railway is a striking example of how some of the rate situations have been handled. In this case, the Vancouver City Council granted the company the right to charge a 6-cent fare. As a result of this decision the company began paying increased wages and thereby averted a strike. Some weeks later, after the order had been signed by the city clerk, the Mayor refused to sign it. Thereupon the City Council decided that it had overstepped its powers in granting the increase. The question was finally put up to the people for a vote, and, as in the case of other referendums on the same question, the increase was turned down by the people.

The company then issued a statement in which it said that there was no doubt that the City Council had authorized the increase and that the company would proceed forthwith to charge the 6-cent fare. The city applied for an injunction, but the court refused to issue one and the case has been thrown into the courts to be fought out at a later date. Such cases are not unique either in Canada or in the United States, but they stand out more clearly in the Dominion because rate increases are so seldom allowed.

Despite the inevitable consequence of trying to pay yesterday's liabilities with next week's assets, the railways are being held strictly to the fare schedules of twenty or more years ago. The result is that in a number of cities as many as nine rides for a quarter are being sold, and 25 cents for six rides is almost everywhere the maximum charge. The companies say they cannot continue under such rates, and the City Councils, which in most cases are the clearing houses for tramway troubles, are almost unanimous in declaring that the companies must not only continue at the old

fares but must give additional service. It is evident, from this condition of affairs, that the breaking point is not far distant.

ONTARIO SECURITY HOLDERS ORGANIZE ASSOCIATION

As far as Ontario is concerned, the shareholders of the tramway companies have organized for the purpose of devising a plan of relief that will tide over the situation. The Association of Holders of Public Utility Securities, organized along much the same lines as the Massachusetts association a year ago, is conducting a campaign of education to let the riding public know just what the real conditions are and to urge the adoption of the service-at-cost plan of operation for the Ontario roads that need relief. The plan proposed will be formed along the lines of the general service-at-cost plan adopted for Massachusetts with such changes as may be necessitated by the local conditions.

Articles explaining the proposed form of relief are being sent to the leading papers of the Province, and literature giving more detailed explanation of the service-at-cost plan is being prepared for general distribution. Much publicity has already been secured, and the plan has been very favorably received outside of Toronto, where the City Council candidly admits that it wants, and expects, service at less than cost. Perhaps later on, if the city takes over the railway in 1921, the people may be willing to contribute several hundred thousand dollars a year out of the city treasury to make up the deficit resulting from a less-than-cost service.

In the meantime an effort is being made to put the electric railway business of Ontario on a business basis. Montreal has already done this through the service-at-cost plan; Winnipeg is about to launch such a plan, and Ottawa is looking into the merits of the zone system. The Ottawa Electric Railway franchise expires in 1923, and if the city does not acquire the property the franchise will automatically continue for a further period of five years. The company has been asked to make a number of extensions and improvements, but it is not felt that these large expenditures can be made in view of the uncertainty that confronts the company. As far as the zone system is concerned it is not generally indorsed in Canada because experience has shown that where traffic is heavy the fare collection problem is one that makes the zone system impractical.

SERVICE-AT-COST IDEA GAINING FAVOR

In Toronto the situation is about as acute as it is anywhere in the Dominion. On Oct. 9 the Toronto Railway, which is the privately owned railway in the city, petitioned the City Board of Control for its co-operation in obtaining a straight 5-cent fare. Without any investigation of the merits of the case the board decided unanimously to refuse to entertain the proposal. This refusal was subsequently supplemented by what many consider a continuous performance of persecution, and at the present time the city is trying to collect a fine of \$24,000 and \$1,000 a day imposed by the Board of Control because the company failed to increase the number of its cars as ordered by the board. Just what the outcome will be no one can prophesy, but in view of the present unfriendly attitude of the city government the company can hardly look for much co-operation from that source. In justice to the company it should be

said that the service in Toronto is as good as, if not better than, that in most cities of the same size anywhere on the continent and much better than in a number of cities where fares are much higher.

In Hamilton the Radial Electric Railway secured permission to increase its rates last summer, but there was such unanimous opposition that the company decided to waive the proposed increase and announced instead that it would reduce the service. This also met with widespread opposition, and the company was ordered to maintain its regular schedule. Matters have been allowed to drift along from month to month without much sign of improvement, and the company has now announced that one of three things must be accomplished: (1) an increase of fares sufficient to meet expenses of operation; (2) the cessation of operation entirely and realization on the company's physical property at the present high prices of material, or (3) the adoption of the service-at-cost plan of operation. [Since this article was written the Hamilton Radial Electric Railway completely suspended service.—EDS.]

The situation in London is also rather interesting. For a little over a year the London Street Railway has been trying to get the City Council to approve a service-at-cost plan of operation, but thus far efforts have been unavailing. Nor can the company get any other form of relief. The inconsistency of this position is attested by the fact that the London & Port Stanley Railway, which is a municipally controlled road, made a plea for relief on exactly the same grounds as the London Street Railway did and the municipal line was at once authorized to make a sufficient advance in fares to cover the increased costs of operation and to provide a sufficient surplus for taking care of its capital obligations. It has never been clearly explained or understood why relief was granted in the case of the municipal line and denied the privately-owned company.

The opinion generally throughout the Province of Ontario is that it is only a question of time when the tramways, municipal as well as privately owned, will be on a service-at-cost basis. Sir Adam Beck, one of the most stalwart advocates of municipalization, in pleading for increased fares for the London & Port Stanley Railway, is credited with saying that "all the road wanted was enough to cover the cost of service." This is characteristic of the position that is being taken by everyone in the Dominion who has investigated tramway conditions and who realizes that the lines cannot continue to give adequate service if they are obliged to sell this service at less than its actual cost. When this self-evident fact becomes generally recognized, the tramways of Canada will be on the road to a solution of their problem, and the riding public will be more likely to secure the kind of service that manifestly cannot be given by companies constantly hovering on the verge of financial disaster.

In his annual report for the year ended March 31, 1918, C. J. Spencer, until recently manager of the Bradford Corporation Tramways, states that excellent results have been secured with a railless trolley battery vehicle which has been used to carry stores required for car repairs, sand, etc. The cost of operating the vehicle is less than that of gasoline lorries engaged in similar work.

Equipment Accessories Desirable in Electric Arc Welding*

Proper Protection for the Operator Is Essential and Conveniences Added Insure Better Workmanship

TO INSURE a high class of workmanship in arc welding and properly to protect the worker from injury, certain equipment accessories have come to be recognized as absolutely essential in carrying out electric welding.

Face shields are of great value. The practice is to provide two types for protecting the eyes and skin from the light rays of the arc when welding. One is a shield so constructed that when it is held in front of the face by one hand, the arc will be observed through a combination of colored glasses located in the center. The shield is of such size as to cover the entire face in order that the skin will not be blistered by the rays from the arc. Fig. 1 shows a sketch of such a shield designed to be held in the hand. This type has been found to be satisfactory. Such a shield is cooler than the helmet type and as a rule is preferred for "down-hand" welding, since ordinarily this class of welding does not require a free hand to steady the body. A face shield should always be made of material which is a non-conductor. Where a metal shield is used, holes will accidentally be burned in it, after which it is often used to the detriment of the operator's eyes. Also slight shocks are often felt when welding with a metal face shield in close places, especially when the face and hands are

in a standing position, a shield of the helmet type should be provided, in order that the operator may be able to use one hand to steady himself. Many different satisfactory designs of head helmets are on the market. Fig. 2 shows a face shield of the helmet type. A combination of glasses which has proved satisfactory is two red glasses, one green glass and one clear glass. The clear glass is used between the colored glasses and the work to protect the

former from being pitted by the flying particles of hot metal. It is replaced when it becomes so badly pitted as to interfere with the vision. All glasses should be of single strength thickness.

In practice it is found that the density of the coloring in the glasses does not run uniform, *i. e.*, one red glass may be very dark while another may be comparatively very light. The same holds true with green glasses. This variation can be used to advantage by operators as it permits them to select a set of glasses having coloring of such density as is best suited to their eyes. The requirements vary greatly among the differ-

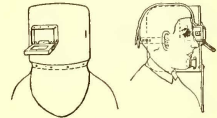


FIG. 2—HELMET TYPE OF FACE SHIELD

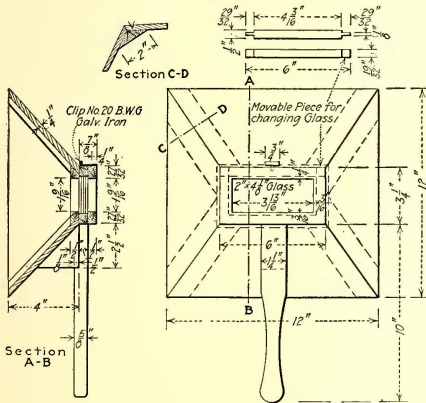


FIG. 1—WOODEN FACE SHIELD FOR HAND USE

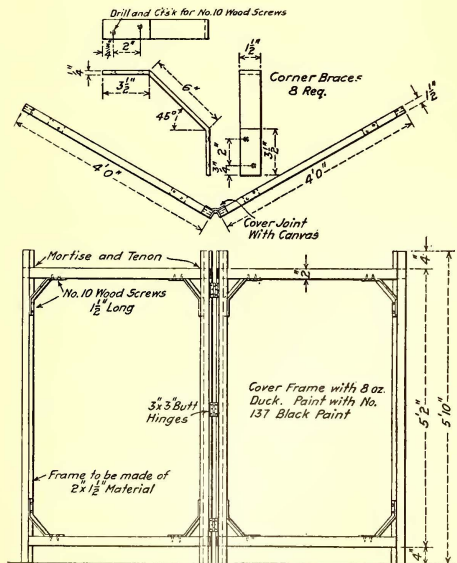


FIG. 3—PORTABLE HINGED-PANEL SCREEN

moist from perspiration. This tends to make an operator nervous and may result in a poor weld.

For the more difficult operations, such as overhead welding, or welding which requires the operator to be

*From 1918 report of committee of Association of Railway Electrical Engineers. While prepared for railway electrical engineers primarily, this report contains much information of value in the electric railway shop or on the track.

ent operators. Special glasses put out under various trade names are also satisfactory.

Since there is a considerable amount of welding to be done in the shops and out in the open on parts that are too heavy to be transferred to a welding booth, sets of portable screens are provided which can be placed at one side or completely around the work on which the welding is being done, to provide protection for other men working in the near vicinity from the light of the arc. The portable screens are made of two panels hinged together, and usually two portable screens for each welder are provided. When it is desired completely to surround a part, two screens will be required. Fig. 3 shows a sketch of such a screen now in use.

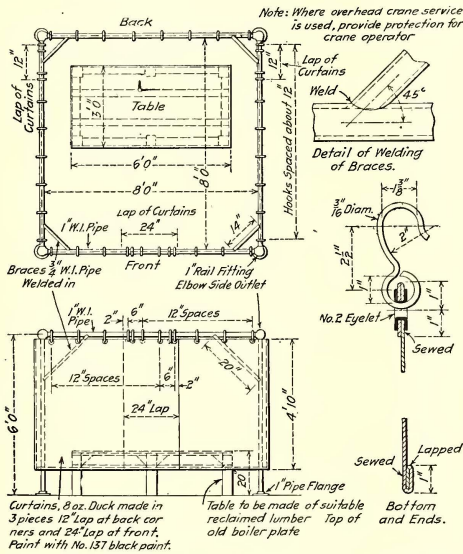


FIG. 4. BOOTH FOR WELDING MISCELLANEOUS PARTS

There should always be one or more stationary welding booths located at some convenient place in the shop, where all the small miscellaneous parts may be brought for welding. Fig. 4 shows a sketch of a booth designed for this purpose. The curtains are hung in such manner as to permit parts to be brought into the booth from any one of the four sides. A space between the table and the curtains is provided to prevent sparks from lodging on, and burning holes in, the latter. The booth may be made smaller than that shown if space is limited.

The work on which welding is to be done forms one of the poles of the circuit, and it is necessary that the connection to the work be secure to aid the flow of the current. The practice in most cases has been to connect the ground wire to a plate, the plate then being laid on the work. This kind of a ground connection is very poor unless the plate is tack-welded to the work. A better method for connecting the ground wire is to use an extra heavy forged clamp having an opening of at least 4 1/2 in., and a threaded bolt that can be tightened down with a wrench.

The ground wire should be permanently connected to the clamp, and the point on the work where the clamp is to be attached should be perfectly clean and bright so as to insure a good connection between the clamp and the work.

For cleaning the dirt and oxides from surfaces on which welding is to take place there is nothing that will do the job quite as well as the sand blast. There are cases where the scale is so heavy and hard that the use of a roughing tool is required to loosen the scale, after which the sand blast is used to remove the small particles untouched by the roughing tool. It is found that a small portable type of sand blast is best suited for this class of work, as it can be taken into restricted spaces,

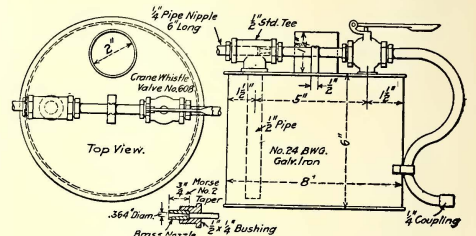


FIG. 5. SMALL SAND BLAST OUTFIT

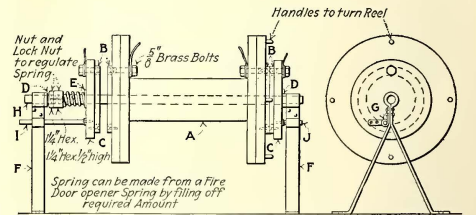


FIG. 6—CABLE REEL FOR PORTABLE WELDING OUTFITS

and its weight is not so great but what it can be handled with reasonable ease. Fig. 5 is a sketch of a small sand blast which has been in use for some time and has given good results.

As the use of a sand blast is necessary on a large number of the operations, a shield to protect the eyes and skin from the sand is required when the blast is being used. The removal of the colored glasses from one of the face shields, the clear glass being left in place, permits the face shields to serve for this purpose.

For removing dirt and oxides which are very light, two steel wire brushes are provided; one is about 2 1/2 in. wide by approximately 6 in. long, the other is very narrow, approximately 1 in. wide, and 4 or 5 in. long. The narrow brush is used for cleaning in close places.

A selection of carbon blocks and rods should be carried in stock for the purpose of making forms. The blocks are often used as a backing when closing a gap from one side where it is desired that the finished weld be flush and smooth on the opposite side from which the welding was done. The carbon rods are used to

insert in holes when it is necessary to do welding on parts which are drilled, without filling in the holes.

When the welding machines are made portable, it is found to be good practice to mount a cable reel on the end of the truck on which the welding circuit cables are wound. The use of a cable reel will preserve the wire and will save considerable time in the handling of the cables.

A sketch of a reel designed for this purpose is shown in Fig. 6. Collector rings are placed at each end to provide for the flow of the current between the terminals of the machine and the cable on the reel. A spring is placed at one end to keep the rings firmly in contact with each other. A reel like that shown has been in service for approximately two years without giving any trouble.

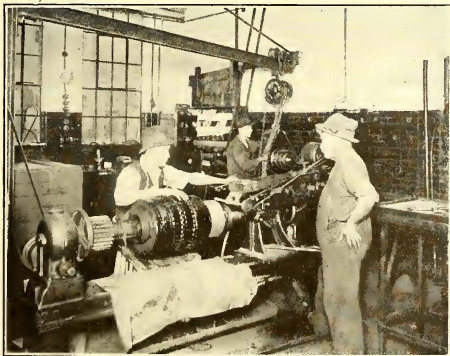
System in the Armature Room

An Armature Rack Conserves Space, Facilitates Handling and With Lathes Adjacent to Crane Much Labor Is Saved

By GEORGE E. PELLISSIER

Assistant Manager Holyoke (Mass.) Street Railway

AN ACCOMPANYING illustration shows a type of armature rack which we have at our shop and which has proved of great convenience. The advantages of this particular method of storing armatures lie in the small amount of space taken and the facility with which each armature can be reached by chain block without interfering or damaging other armatures in the rack. To remove an armature it is rolled out to the end of the bracket on which it rests where the sling for lifting it is adjusted, and the armature can then be lifted out with the home-made traveling hoist



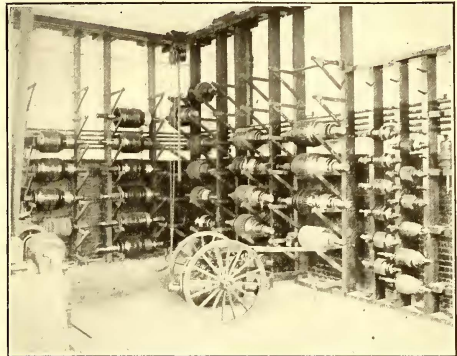
CORNER OF SHOP USED FOR BANDING ARMATURES AND TURNING AND SLOTTING COMMUTATORS

which serves the rack. After the armature is dropped it is picked up by the armature buggy and carried to the motor for installation.

This rack will accommodate thirty-five armatures with one on each pair of brackets, and seventy armatures with two on each pair of brackets. The rack for storing air-compressor armatures shown at the right in the photograph will store twenty armatures.

In the construction of this rack we used 3-in. x 8-in.

wooden uprights to which the brackets were attached by $\frac{3}{8}$ -in. bolts. The top pieces of the brackets were made of 2-in. x $\frac{3}{8}$ -in. strap iron and the braces were 2 in. x $\frac{1}{2}$ in. The brackets extended out a distance of 20 in. from the uprights and the top piece was installed with $\frac{1}{2}$ -in. pitch to prevent the armatures rolling towards the end. The ends of braces also projected above the top surface to act as a stop. The uprights



ARMATURE STORAGE RACK OF THE HOLYOKE STREET RAILWAY

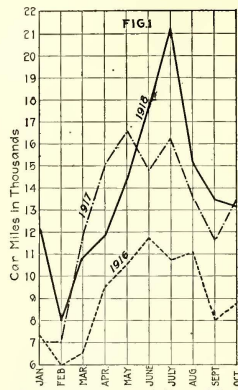
were set out from the wall a sufficient amount to clear the steam pipes which may be seen in the illustration.

By installing a machine for banding armatures and slotting the commutators adjacent to the lathe used for turning down commutators the same jib crane is used to serve both machines.

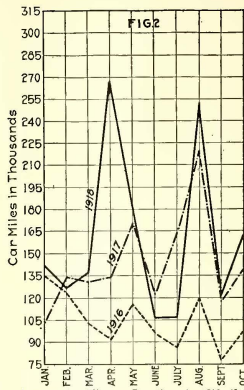
One of the accompanying illustrations shows the arrangement, together with the banding and slotting machine used which was made by the American General Engineering Company, New York City.

A. S. M. E. Takes Over the Engineering Index

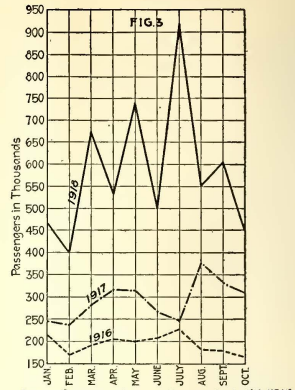
THE American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York City, has acquired the engineering index formerly published by the *Engineering Magazine* and later by its successor, *Industrial Management*. The society will issue the index in three forms: As a part of the journal, as a separate monthly publication and as an annual volume. This famous index originated with Prof. J. B. Johnson of Washington University in 1883. For twelve years it was prepared under his direction and for the following twenty-five years had the personal attention of John R. Dunlap, president of the Engineering Magazine Company. The index will be published with the following classifications: Mechanical engineering, thirty-one subheads; electrical engineering, eleven subheads; civil engineering, nine subheads; mining engineering, fourteen subheads; metallurgy, seven subheads; aeronautics, nine subheads; marine engineering, four subheads; organization and management, thirteen subheads; industrial technology; railroad engineering, fifteen subheads; munition and military engineering; general science, three subheads.



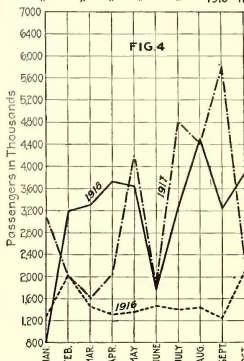
Average Car Miles per Collision 1916 = 6,625
1917 = 11,659
1918 = 12,945



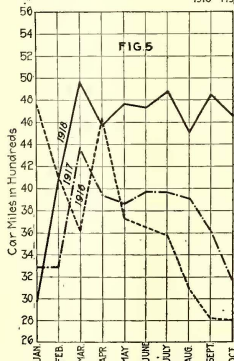
Average Car Miles per Derailment in 1916 = 10,609
1917 = 12,044
1918 = 145,650



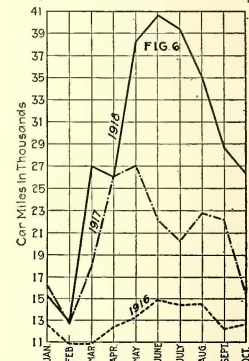
Average Passengers Carried per Passenger Hurt in 1916 = 35,110
1917 = 35,548
1918 = 55,525



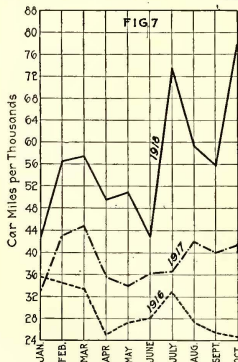
Average Passengers Carried per Passenger Hurt in 1916 = 45,8364
1917 = 243,620
1918 = 220,754



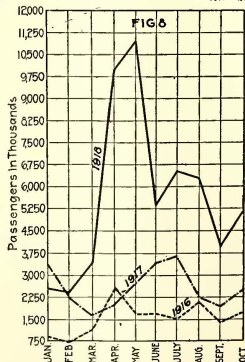
Average Car Miles per Automobile Struck in 1916 = 3,529
1917 = 3,690
1918 = 4,346



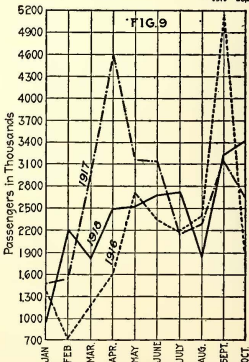
Average Car Miles Run per Vehicle Struck in 1916 = 12,831
1917 = 19,225
1918 = 25,202



Average Car Miles per Pedestrian Hurt by Car in 1916 = 29,655
1917 = 36,011
1918 = 54,512



Average Passengers Carried per Passenger Falling from Car in 1916 = 1,567,56
1917 = 2,421,377
1918 = 4,603,004



Average Passengers Carried per Passenger Hurt while on Car in 1916 = 171,578
1917 = 239,906
1918 = 371,191

GRAPHICAL RECORD OF SAFETY OF SKIP-STOP OPERATION IN DETROIT

Fig. 1—Chart showing car-miles run per collision of cars.
Fig. 2—Chart showing car-miles run per derailment of cars.
Fig. 3—Chart showing passengers carried per passenger hurt in boarding and alighting.
Fig. 4—Chart showing passengers carried per passenger hurt otherwise than by boarding and alighting.
Fig. 5—Chart showing car-miles run per automobile struck.

Fig. 6—Chart showing car-miles run per vehicle struck (including animals but excluding automobiles).
Fig. 7—Chart showing car-miles run per pedestrian hurt.
Fig. 8—Chart showing passengers carried per passenger falling from car.
Fig. 9—Chart showing passengers carried per passenger hurt while on car.

Skip Stops Spell Safety

Records from Detroit Are Quoted to Show that the Skip Stop Means Greater Safety to the Passenger as Well as to the Vehicle and Pedestrian on the Street—The Data Are Shown Graphically and Cover Ten Months in 1916, 1917 and 1918

By E. J. BURDICK

Assistant General Manager Detroit United Railway

AS ALL of us know, every progressive measure ap-
 pertaining to street railway operation meets
 with opposition—sometimes with those of the
 craft, I am sorry to state; more often, because more
 naturally, the opposition comes from the public.

Of these progressive measures probably none has
 been so bitterly attacked as skip-stop operation, and
 without sane reason, for such operation is conservation
 of great import and of the highest type.

I feel certain now that all operating officials, and
 certainly the public where the system is effective, fully
 appreciate the conservation of time. The engineering
 staff of the National Fuel Administration has most
 thoroughly demonstrated that the system is a great
 conserver of fuel. Our own records prove conclusively
 that skip-stop operation in densely-populated communi-
 ties is a most important reducer of accidents.

Surely, then, a measure conserving all these things I
 have mentioned is entitled to a vigorous propaganda
 until it becomes a fixed and settled institution through-
 out the country.

From the very first study I gave to this method of
 operation I was convinced of its usefulness as a safety-
 first measure. The deeper I went into it the more this
 feature appealed to me, and the longer skip-stop opera-
 tion has been in effect upon the city service lines of the
 Detroit United Railway the greater the proof piled up.

The figures given herein and the charts prepared
 therefrom are based upon the actual records of the com-
 pany as to car mileage, passengers carried and accident
 reports, major and minor, filed with our claims depart-
 ment. The population figures are the estimates from
 the issuers of our city directory, and the figures of
 automobile licenses issued are officially from the State
 authorities, as issued to the residents of Detroit. They
 cannot, of course, include automobiles from other com-
 munities that traverse our streets, but this has no bias
 in the comparison as the conditions thereto have been
 the same during the period under discussion.

In 1916 Detroit did not have skip-stop operation; in
 1917 there was partial skip-stop operation, and through-
 out 1918 there has been full skip-stop operation.

It should be borne in mind that throughout the years
 referred to there has been no difference in the other
 well-recognized measures of safety. In all three years
 there have been safety zones, near-side stops and safety-
 step cars (though these have been added to, there being
 an increase in 1917 over 1916). On the other hand,
 the class of platform men deteriorated with us as with
 others, due to war enlistments and profiteering labor
 shifts, and it is safe to say that had the force of plat-
 form men of 1918 been of the standard of ability pre-
 vailing in 1916 the advantage of the skip stop as a
 measure of safety would have been even more start-

lingly illustrated. The figures I give are for the first
 ten-month period of the years mentioned.

For the first ten months of 1916 within the one-
 fare zone we carried 1,458,964 passengers for every one
 injured. With skip-stop operation gradually developing
 in 1917 the factor of safety increased to one injury for
 every 2,437,628 passengers, and in 1918 under adverse
 labor conditions becoming much worse we carried safely
 2,506,754 passengers to one hurt.

Similar evidence of safety by skip-stop operation is
 demonstrated by comparing the number of car-miles
 operated to every collision between street cars:

AVERAGE NUMBER OF CAR-MILES OPERATED TO EVERY
 CAR COLLISION

Non-skip-stop, 1916	8,625 car-miles
Partial skip-stop, 1917	11,659 car-miles
Complete skip-stop, 1918	12,945 car-miles

And this is despite the labor conditions!

Opponents of skip-stop operation have often muddled
 themselves as between increased speed and decreased
 running time due to the elimination of stops and hence
 less wastage through acceleration, and have feared that
 faster operation would increase the element of danger.
 There has, of course, been no increase of maximum
 speed so that their fears are unfounded.

A corollary to the collisions between the company cars
 may be taken as the collisions between the company cars
 and the growing number of automobiles. Here again is
 ample proof of the safety to be found in the skip stop.

In 1916 we operated 3539 car-miles to every automo-
 bile struck; in 1917 this was increased to 3690 car-
 miles and in 1918 to 4388 car-miles. Certainly the ob-
 servation of none of us can possibly lead to the credit
 going to any increasing care being taken by the mass
 of automobile drivers.

Again proof of the safety to be found in skip-stop
 operation through the elimination of the number of
 places where passengers may board and alight is most
 clearly shown in the number of accidents of platform
 nature—those in boarding or alighting. Here is the
 table of comparison:

AVERAGE NUMBER OF PASSENGERS CARRIED PER PAS-
 SENDER INJURED IN BOARDING OR ALIGHTING

Non-skip-stop, 1916	193,110 passengers
Partial skip-stop, 1917	283,488 passengers
Complete skip-stop, 1918	555,575 passengers

The detailed tables follow, Table I showing the same
 data as Fig. 1, Table II as Fig. 2, etc. No especial ex-
 planation is required as to their compilation except
 possibly with Tables V and VII, shown graphically in
 Figs. 5 and 7. In determining the proper allowance in
 Table V, for the increasing number of automobiles in
 use, the number of licenses issued for 1918 was taken

as the unit 1.00. It was then found that the population in 1917 was 0.82 of the 1918 figure and that in 1916 it was 0.66 of the 1918 figure. These constants, multiplied by the passenger car-miles for their respective year, were taken as giving the relation of the passenger car-miles each year one to the other. This result is divided by the number of "automobiles struck" to determine the car-miles per automobile struck. The same general plan was followed in Table VII, which gives the car-miles run per pedestrian hurt. The population in 1918 was taken as the unit 1.00, and it was found that the unit constant for the population in 1916 was 0.83, and for the population in 1917 was 0.92. These constants, multiplied by the passenger car-miles for their respective year, give the relation of the passenger car-miles each year one to the other. This result is divided by the number of "pedestrians hurt by car" to determine the car-miles run per pedestrian hurt by car. Surely, skip stop means "safety first."

TABLE I—SHOWING CAR-MILES RUN PER CAR COLLISION

Month	1916		1917		1918	
	Pass. Car-Miles	C.M. per Collision	Pass. Car-Miles	C.M. per Collision	Pass. Car-Miles	C.M. per Collision
January	3,092,395	7,311	3,696,929	7,015	3,395,650	12,348
February	2,962,281	5,960	3,377,579	7,056	3,166,590	7,956
March	3,187,272	6,528	3,770,825	11,310	3,569,089	10,454
April	3,112,040	9,546	3,605,150	15,083	3,216,331	11,868
May	3,257,674	10,599	3,761,212	16,569	3,456,461	14,349
June	3,186,853	11,716	3,658,864	14,753	3,300,340	16,462
July	3,282,132	12,626	3,745,624	16,206	3,400,871	17,124
August	3,351,320	11,660	3,739,385	15,548	3,262,398	15,104
September	3,350,306	8,015	3,523,197	11,589	3,085,026	13,443
October	3,631,965	8,773	3,509,600	13,498	3,082,483	13,117
Total	32,413,238	8,625	36,316,853	11,659	32,816,239	12,945

TABLE II—SHOWING CAR-MILES RUN PER CAR DERAILMENT

Month	1916		1917		1918	
	Pass. Car-Miles	C.M. per Derailment	Pass. Car-Miles	C.M. per Derailment	Pass. Car-Miles	C.M. per Derailment
January	3,092,395	13,452	3,696,929	10,262	3,395,650	14,485
February	2,962,281	12,438	3,377,579	13,503	3,166,590	12,664
March	3,186,272	10,783	3,770,825	13,130	3,569,089	13,927
April	3,112,040	9,153	3,605,150	13,524	3,216,331	268,028
May	3,257,674	11,346	3,761,212	17,054	3,456,461	181,919
June	3,186,853	9,671	3,658,864	11,992	3,300,340	106,465
July	3,282,132	8,674	3,745,624	16,766	3,400,871	106,802
August	3,351,320	11,690	3,739,385	21,964	3,262,398	250,953
September	3,350,306	77,914	3,523,197	117,440	3,085,026	125,633
October	3,631,965	98,161	3,509,600	140,384	3,082,483	162,256
Total	32,413,238	101,609	36,316,853	137,044	32,816,239	145,850

TABLE III—SHOWING PASSENGERS CARRIED PER PASSENGER HURT IN BOARDING AND ALIGHTING

Month	1916		1917		1918	
	Passengers Carried	Per Passenger Hurt	Passengers Carried	Per Passenger Hurt	Passengers Carried	Per Passenger Hurt
January	31,732,257	215,866	37,097,629	247,318	30,373,116	467,279
February	30,303,538	171,206	33,867,547	238,504	28,668,032	398,167
March	33,690,601	191,424	38,278,999	263,548	32,904,264	671,516
April	35,476,121	200,430	37,920,658	242,420	32,744,744	745,971
May	35,194,325	209,400	36,817,210	268,739	31,974,760	499,606
June	34,922,954	228,255	36,697,586	247,957	32,525,219	929,297
July	35,476,121	183,837	36,378,844	249,420	31,440,627	545,102
August	36,217,310	180,186	34,808,529	334,697	32,138,851	606,393
September	37,237,442	164,767	34,570,768	310,547	30,755,893	445,737
October	37,237,442	206,874	34,570,768	230,478	30,755,893	384,448
Total	344,315,549	193,110	363,206,622	288,488	313,344,271	555,575

TABLE IV—SHOWING PASSENGERS CARRIED PER PASSENGER HURT OTHERWISE THAN BY BOARDING AND ALIGHTING

Month	1916		1917		1918	
	Passengers Carried	Per Passenger Hurt	Passengers Carried	Per Passenger Hurt	Passengers Carried	Per Passenger Hurt
January	31,732,257	1,469,289	37,097,629	3,091,469	30,373,116	843,697
February	30,303,538	2,020,256	33,867,547	1,992,208	28,668,032	3,185,337
March	33,690,601	1,264,809	38,278,999	1,594,958	32,904,264	3,290,426
April	33,692,728	1,295,874	37,920,658	2,042,625	29,970,500	3,724,938
May	35,194,325	1,406,430	36,817,210	1,840,860	31,974,760	2,766,375
June	34,922,954	1,336,913	36,697,586	2,822,891	32,525,219	3,252,582
July	35,476,121	1,399,938	36,378,844	2,425,123	31,440,627	4,495,629
August	36,217,310	1,248,873	34,808,529	3,801,422	32,138,851	3,213,983
September	37,237,442	2,068,747	34,570,768	2,304,718	30,755,893	3,844,448
October	37,237,442	2,068,747	34,570,768	2,304,718	30,755,893	3,844,448
Total	344,315,549	14,586,964	363,206,622	24,327,628	313,344,271	25,066,754

TABLE V—SHOWING CAR-MILES RUN PER AUTOMOBILE STRUCK

Month	1916		1917		1918	
	Pass. Car-Miles	C.M. per Auto Struck	Pass. Car-Miles	C.M. per Auto Struck	Pass. Car-Miles	C.M. per Auto Struck
Jan.	3,092,395x0.66	4,791	3,696,929x0.82	3,288	3,395,650x1.0	2,943
Feb.	2,962,281x0.66	4,116	3,377,579x0.82	3,282	3,166,590x1.0	4,044
Mar.	3,187,272x0.66	4,791	3,770,825x0.82	3,465	3,569,089x1.0	4,951
Apr.	3,112,040x0.66	4,636	3,605,150x0.82	3,942	3,216,331x1.0	4,569
May	3,257,674x0.66	3,734	3,761,212x0.82	3,860	3,456,461x1.0	4,761
June	3,186,853x0.66	3,645	3,658,864x0.82	3,974	3,300,340x1.0	4,735
July	3,282,132x0.66	3,569	3,745,624x0.82	3,911	3,400,871x1.0	4,883
Aug.	3,351,320x0.66	3,085	3,739,385x0.82	3,911	3,262,398x1.0	4,512
Sept.	3,350,306x0.66	2,820	3,523,197x0.82	3,602	3,085,026x1.0	4,850
Oct.	3,631,965x0.66	2,804	3,509,600x0.82	3,162	3,082,483x1.0	4,636
Total	32,413,238x0.66	3,539	36,316,853x0.82	3,690	32,816,239x1.0	4,388

1916 = 28,050 = 66 per Cent. of 1918
1917 = 34,850 = 82 per Cent. of 1918
Automobiles

TABLE VI—SHOWING CAR-MILES PER VEHICLE STRUCK (INCLUDING ANIMALS AND EXCEPTING AUTOS)

Month	1916		1917		1918	
	Pass. Car-Miles	C.M. per Vehicle Struck	Pass. Car-Miles	C.M. per Vehicle Struck	Pass. Car-Miles	C.M. per Vehicle Struck
January	3,092,395	12,622	3,696,929	16,214	3,395,650	15,227
February	2,962,281	10,971	3,377,579	17,960	3,166,590	12,820
March	3,186,272	10,944	3,770,825	12,906	3,569,089	16,970
April	3,112,040	12,448	3,605,150	15,216	3,216,331	25,938
May	3,257,674	13,351	3,761,212	27,059	3,456,461	38,405
June	3,186,853	14,892	3,658,864	22,175	3,300,340	40,744
July	3,282,132	14,459	3,745,624	20,236	3,400,871	31,071
August	3,351,320	14,571	3,739,385	22,663	3,262,398	35,080
September	3,350,306	12,272	3,523,197	22,158	3,085,026	28,645
October	3,631,965	12,655	3,509,600	15,461	3,082,483	26,246
Total	32,413,238	12,801	36,316,853	19,225	32,816,239	25,942

TABLE VII—SHOWING CAR-MILES PER PEDESTRIAN HURT BY CAR

Month	1916		1917		1918	
	Pass. Car-Miles	C.M. per Pedest. Struck	Pass. Car-Miles	C.M. per Pedest. Struck	Pass. Car-Miles	C.M. per Pedest. Struck
Jan.	3,092,395x0.83	35,648	3,696,929x0.92	32,704	3,395,650x1.0	42,446
Feb.	2,962,281x0.83	34,565	3,377,579x0.92	43,107	3,166,590x1.0	56,546
Mar.	3,186,272x0.83	33,476	3,770,825x0.92	44,743	3,569,089x1.0	57,421
Apr.	3,112,040x0.83	25,078	3,605,150x0.92	35,664	3,216,331x1.0	50,830
May	3,257,674x0.83	27,312	3,761,212x0.92	33,925	3,456,461x1.0	49,582
June	3,186,853x0.83	28,139	3,658,864x0.92	36,193	3,300,340x1.0	48,119
July	3,282,132x0.83	32,821	3,745,624x0.92	36,398	3,400,871x1.0	37,574
Aug.	3,351,320x0.83	27,541	3,739,385x0.92	41,954	3,262,398x1.0	59,316
Sept.	3,350,306x0.83	25,500	3,523,197x0.92	40,017	3,085,026x1.0	55,728
Oct.	3,631,965x0.83	24,709	3,509,600x0.92	41,395	3,082,483x1.0	79,938
Total	32,413,238x0.83	28,835	36,316,853x0.92	38,011	32,816,239x1.0	54,512

1916 = 83 per Cent of 1918
1917 = 92 per Cent of 1918
1918 = 100 per Cent

Population	1916	1917	1918
Detroit	820,778	914,896	986,699
Highland Park	22,125	39,000	39,000
Hamtramck	21,520	20,000	20,000
St. Clair Heights	18,000	13,000	13,000
Total	876,298	975,021	1,056,699

TABLE VIII—SHOWING PASSENGERS CARRIED PER PASSENGER FALLING FROM CAR

Month	1916		1917		1918	
	Passengers Carried	Per Passenger Falling	Passengers Carried	Per Passenger Falling	Passengers Carried	Per Passenger Falling
January	31,732,257	881,452	37,097,629	3,372,512	30,373,116	2,531,093
February	30,303,538	739,111	33,867,547	2,257,836	28,668,032	2,989,063
March	33,690,601	1,161,745	38,278,999	1,664,304	32,904,264	1,113,933
April	33,692,728	1,294,518	37,920,658	2,042,825	29,970,500	3,363,107
May	35,194,325	1,689,339	36,817,210	2,708,618	31,974,760	4,091,581
June	34,922,954	1,675,920	36,697,586	3,167,210	32,525,219	4,505,044
July	35,476,121	1,518,369	36,378,844	3,669,759	31,440,627	6,005,044
August	36,217,310	1,208,722	34,808,529	2,273,553	32,138,851	3,293,978
September	37,237,442	1,392,973	34,570,768	2,469,240	30,755,893	6,125,978
October	37,237,442	1,773,214	34,570,768	2,629,290	30,755,893	3,417,321
Total	344,315,549	13,866,576	363,206,622	24,231,373	313,344,271	46,008,004

TABLE IX—SHOWING PASSENGERS CARRIED PER PASSENGER HURT WHILE ON CAR

Month	1916		1917		1918	
	Passengers Carried	Per Passenger Hurt	Passengers Carried	Per Passenger Hurt	Passengers Carried	Per Passenger Hurt
January	31,732,257	1,379,663	37,097,629	1,483,905	30,373,116	949,160
February	30,303,538	1,721,513	33,867,547	1,539,434	28,668,032	2,231,513
March	33,690,601	1,161,745	38,278,999	2,944,538	32,904,264	1,828,015
April	33,692,728	1,604,416	37,920,658	4,5		

Service at Cost for Youngstown

M. & S. Line Secures New Twenty-Five Year Franchise With Initial Fare of Five Cents and Penny for Transfer

THE city of Youngstown, Ohio, has released the Mahoning & Shenango Railway & Light Company from its obligation to furnish transportation at the rate of six tickets for a quarter, and it has granted the company a renewal of railway rights for twenty-five years on the service-at-cost plan. The new franchise is effective from Jan. 16. The old grant still had fifteen years to run.

The action of the city ends a controversy between the company and it on the subject of service and a more recent dispute between the company and its employees regarding wages. The company contended that its revenue from six-for-a-quarter fares was inadequate under present service and high costs. The trainmen last September threatened to suspend work unless their wages were increased. The city engaged Peter Witt, former street railroad commissioner of Cleveland, who investigated and reported that the company was unable to meet either the service or wage requirements on its present revenues.

BASIS FOR RATE OF RETURN

For purposes of the ordinance, the value of the property covered was agreed to be \$4,000,000. On this the return to the company will be made monthly from the stabilizing fund at the rate of 7 per cent per annum. Return on additions to capital value is to be made at the rate per cent at which the company in good faith is able to secure the money for such additions.

The capital value thus determined and the return thereon should not be confused with the existing capitalization of the owning company. The corporate rights of the company are unabridged. The settlement is, in effect, a lease of the property at a fixed rental with option to purchase, lessor and lessee being partners in the leasehold. Should the company organize a new corporation to take over the property covered by the ordinance and give opportunity to Youngstown citizens to purchase stock of such new company at its par value, the capital of the proposed new corporation being limited to the then capital value of the segregated property, the city binds itself in the event of purchase to pay 10 per cent additional to the capital value at the time of purchase, unless this be at the expiration of the grant. No plans at present are being made for the formation of such a corporation.

The salient features of the new Youngstown franchise are:

1. *City Supervision:* City fixes schedules, routes, character of cars, amount of service, but should company's return be threatened under rate of fare in force or under any higher rate by service requirements, arbitration may be had. City inspects and approves accounting, disagreements to be submitted to committee on standard classification of accounts of the American Electric Railway Accountants' Association. City may check and supervise all additions and betterments, and the cost of same shall not be added to capital value except on its approval. Salary of Street Railroad Commissioner is not to exceed \$600 a month, and those of assistants \$900 per month.

2. *Arbitration:* Any difference arising must be arbitrated save with respect to capital value, fixed return to company, methods of accounting, and city's right to prescribe service except when company's return is threatened. Arbitration board forms quickly. Party demanding arbitration may name board on fourth day after demand if other party does not join. Both parties naming representatives, the United States District Judge for the Youngstown district names third arbitrator if first two cannot agree on third within three days. Board must decide question within twenty days from date of appointment of third arbitrator or unanimously agree to extension of time. Expenses of arbitration are fixed by board as part of award and paid as operating cost unless in excess of \$1000 in any six months' period, when they shall be paid from the stabilizing fund. Questions arbitrated may not be arbitrated again within three months from date of first finding. Failure to comply with award is penalized; if on city's part, the rate of return to the company increases; if on the company's part, the rate decreases—in neither instance more than 1 per cent.

3. *Allowances:* For operating costs, 22 cents per car mile is allowed for motor-cars and 60 per cent of trailer-car mileage; and for maintenance, repair and renewal costs, 8 cents per car mile for motor-cars and 60 per cent of trailer-car mileage. Should gross revenue at any time be insufficient to pay these allowances, deficiency shall be taken from stabilizing fund. Any residue of the operating cost allowance unexpended at the end of each calendar year shall be transferred to the stabilizing fund. Either allowance may be increased or decreased by agreement or arbitration.

4. *Stabilizing Fund:* This is constituted by setting aside \$100,000 of the agreed capital, credited monthly with interest earned thereon, to which are added monthly the gross receipts of the property less the allowances noted above. From this fund is paid monthly the 7 per cent return to the company, as well as taxes as they become due.

5. *Rates of Fare:* Nine rates of fare are provided, with more possible. A charge of 1 cent for transfer is made under each rate. The scale follows:

A.....	3 cents cash, nine tickets for	25 cents
B.....	5 cents cash, eight tickets for	25 cents
C.....	5 cents cash, seven tickets for	25 cents
D.....	5 cents cash, six tickets for	25 cents
E.....	5 cents cash, no tickets	
F.....	6 cents cash, nine tickets for	50 cents
G.....	7 cents cash, eight tickets for	50 cents
H.....	8 cents cash, seven tickets for	50 cents
I.....	9 cents cash, six tickets for	50 cents

At such time as Rate B becomes effective, Council shall establish a further lower rate bearing the same relation to Rate A as Rate A bears to Rate B, and should Rate H become effective Council shall establish a further higher rate bearing the same relation to Rate I as Rate I bears to Rate H, to the end that there shall always be two rates of fare higher or lower than the fare in effect.

Rate E, 5 cents cash and 1 cent for a transfer, will be the initial rate. Whenever the amount in the stabilizing fund at the end of any calendar month exceeds \$150,000 the next lower rate becomes effective; whenever the amount in the stabilizing fund is reduced to \$50,000, the next higher rate becomes effective. Should such change fail to reduce the balance in the stabilizing fund below \$150,000 at the end of the next calendar month after change is made, then the next lower rate becomes effective, and so on until the balance in the stabilizing fund is reduced to \$150,000. The rate of fare then in effect shall remain until the fund is reduced to \$50,000. Similarly, the fare shall be increased monthly when the fund is less than \$50,000 until it is more than \$50,000. The rate then in effect shall remain until the fund exceeds \$150,000.

The fare may be changed by agreement but not by arbitration; changes must be automatic, dependent upon the balance in the stabilizing fund. Whenever a change in rate is made, tickets under former rate are not acceptable as fares, and they are redeemable only within thirty days

from date of change at any office of company at cost. School or special tickets may be sold at rate to be fixed by city and company, but such tickets are invalid Sundays and holidays and between the hours of 4.30 p.m. and 7.30 a.m. on week-days. Any child under six years of age accompanied by person paying fare shall be carried free; two such children shall pay for a single fare. Free transportation is limited to motormen, conductors, linemen, shopmen and trackmen, going to or returning from work.

6. *General Provisions:* The company must maintain all pavements within outer rails and 1 ft. outside each outer rail, but it shall not be required to pave or repave except where repaving is necessitated by reconstruction of track or building of extensions. In the former case, such repaving shall be charged to maintenance, repair and renewal account and in the latter to the cost of the extension. All expenses of change in tracks and paving necessitated by public improvements shall be paid by the city. Damage claims arising in connection with work or improvements shall be considered part of the cost of such work and paid for out of funds and added to capital value.

The company shall charge to operating costs a rental for offices, supplies and equipment used under the new plan, the amount to be fixed by agreement between the company and the city. Outstanding damage claims against property covered by the ordinance shall be charged to operating cost. The company's portion of grade crossing eliminations shall be paid by the company and added to capital value. Either the company or the city may propose extensions, but the city loses this right whenever the unexpired term of the franchise is less than fifteen years. Any replacements in excess of the cost new of the property replaced shall be capitalized to the extent of such excess cost, the balance being charged to maintenance account. Additions to capital value shall be at the par value of the securities sold or debt created for the extension or betterments.

PLANS FOR SPEEDING UP SERVICE

During the consideration of the new grant, the company joined the city in working out re-routing and stop-elimination plans to speed up service. All lines were terminated at the center of the city, known locally as the "Diamond," and operating supervision was established at that point.

Because of the lateness of the season, however, and the impossibility of securing all of the needed special work for the change the complete layout for the "Diamond," which includes waiting rooms and loading platforms, was deferred. Temporary rooms have been constructed, however, and cars are now operating on routes and past the points scheduled in the new plan.

Mayor A. W. Traver has named W. L. Sause, former Director of Public Service, as City Street Railroad Commissioner. The pay-leave system of fare collection will be used on out-bound cars and the pay-enter system inbound. The company is pledged to the immediate conversion of such of its cars as do not now permit the use of this system.

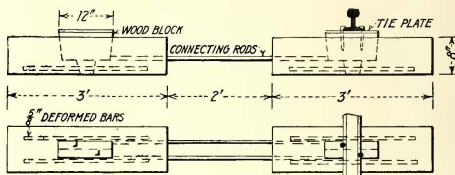
Paper Substitutes for Driving Belts in Germany

Foreign papers state that machine-driving belts made of paper substitute are being introduced in German workshops. The belts are woven or braided and may be either of the paper fabric or paper thread type. The paper fabric is first cut into bands and a core of strengthening material, either cotton or sheet metal, is interposed. The core is surrounded with paper strips and the whole sewn with strong thread. The tensile strength of the woven belt is stated to reach from 550 to 700 lb. per inch width.

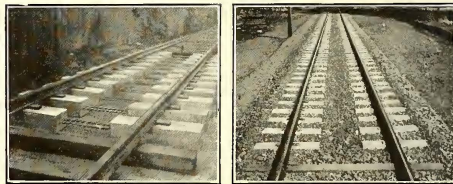
New Type of Track Tie

UP TO the present time wood or steel ties have been used quite generally in track construction. Concrete, however, has considerable possibility as a tie material, and a specially constructed tie, developed by Edgar N. Goodlett, is worthy of study. Quantities of ties of this type have now been in experimental service for four years and are reported to be giving good satisfaction.

This special tie is made up of two reinforced-concrete end sections. Each end block is 10 in. x 36 in. face and 8 in. deep and the blocks are held together by two steel rods. In the middle of each face is an open slot 4 in. x 12 in. at the top and going down at a slight bevel to a 3½-in. x 11½-in. seat at the bottom. The rail



DETAILS OF CONCRETE TIE CONSTRUCTION



NEW TYPE OF CONCRETE TRACK TIE

At left, ties in place ready for ballasting on the Municipal Railway of San Francisco. At right, stretch of track with concrete ties on the Oakland, Antioch & Eastern Railway

is spiked in the usual manner to wooden blocks which are inserted in the slots. These blocks protrude about 1 in. above the concrete and take the weight of rail, providing resilience. The open construction and the wooden spiking blocks are said to overcome the objections which have been made against the use of concrete ties. In service the wooden block inserts compress into the beveled recesses, conducing to durability and increasing the spike holding power of the ties.

Repair work with these ties is very simple. To remove the wooden insert a bar is placed between the two joining rods and the tie is pried over onto its side. A hole in the tie running through the bottom permits the introduction of a tool by which the wooden block can be driven out and a new one inserted. The tie can then be again turned over and adjusted for service. As the wood block insert is protected by the concrete, its life should be much greater than that of the ordinary wood ties. The reinforced-concrete structure is practically permanent.

These ties have been tested by the Municipal Railway of San Francisco, by the Southern Pacific Railroad, and by the Oakland Antioch & Eastern Railway. The accompanying illustrations show some typical construction.

What the Governors Say

Public Opinion Is Usually Reflected Accurately in the Messages of the Chief Executives of the States to the Legislatures

NOT since the cycle of economic legislation which started more than ten years ago and ushered in the system of state regulation of the utilities as it stands at present have the sessions of the legislatures of the many states been looked forward to with more concern than they are this year. The electric railway situation is acute. In many cases fair play to the utilities is possible only after legislation. Thus the legislatures, more than ever, would seem to be the destiny that will help to shape the ends of the industry at this time. The legislative directing force in most cases will be the Governors. The instances are few in which their messages do not sense or reflect public feeling accurately. For this reason the ELECTRIC RAILWAY JOURNAL plans to publish extracts from the messages promptly as received. This week there follow remarks of the Governors of New York, Massachusetts and Connecticut.

ONE STRONG COMMISSION AND MUNICIPAL OWNERSHIP DESIRED IN NEW YORK

Governor Smith of New York, in his inaugural address, declared for a single headed public service commission and for municipal ownership. He said in part:

There is widespread dissatisfaction, particularly in New York City, with the Public Service Commissions. In the First District, a radical change should be made in the structure of the commission itself, if it is to accomplish results. At the time of its formation, in 1907, there was expressed grave doubt as to whether or not it would work out well. There were many who believed that the function of constructing rapid transit railroads for the city of New York should be divorced from the function of regulating public utility corporations generally. In my opinion, experience has demonstrated that they were right.

For years the trend in New York City, as well as in the State, has been toward single headed commissions, to the end that the responsibility may be fixed upon one man. During the recent war, the federal government taught us the lesson that results can best be obtained by a single executive, clothed with proper power, when any great work is to be carried out successfully. What we do in time of trouble is brought about by the very best judgment we can exercise. Why is it not sound in time of peace?

It is my belief that the subway rapid transit system of the city of New York can be built better and quicker under the direction of a rapid transit commissioner whose entire time, brains and energy would be devoted to the completion of the subway system. The regulatory functions of the commission in the First District also might be performed by a single public service commissioner. Not only will this result in an economy of administration but it will be productive of results. The argument has been made that a separation of the functions of the commission might interfere with the work. This I do not believe to be the fact.

I therefore recommend that legislation be enacted to bring about this change, and I make this recommendation after years of observation.

Upon the same principle outlined above, I also believe that the affairs of the Public Service Commission in the Second District will be more economically and more efficiently managed by a single headed commission, and I recommend that legislation be enacted to bring this about.

I further call your attention to the weakness of the law itself in not giving to the commissions sufficient power to enforce their orders. These weak spots history has taught us seem to have been inserted for the benefit of the corporations to be regulated. Without enumerating them in detail in this message, I would refer you to that part of

the report of the joint legislative committee, appointed to investigate the Public Service Commissions transmitted to the Legislature on March 10, 1915, and I ask you to enact such legislation as will remedy these defects and strengthen the arm of the commissions that they may more effectively carry out the functions for which they were organized.

Recent years have been marked by a great opening of the popular mind to the true scope of enlightened municipal administration. There is everywhere a recognition that it is only through the application of progressive conceptions of public duty that life can be made tolerable in our teeming cities with their unprecedented growth in population and the consequent living conditions.

From every city in the State, represented by their chief executives in conference, there comes the demand that the State confer upon the cities the power to acquire, own, operate and control their public utilities. The supply of transportation, light, heat and power is of the utmost importance to each local community. The services rendered have become a necessity to the life, health, comfort, convenience and industry of the cities. These great services are monopolies, and whatever is of necessity a monopoly should be a public monopoly, especially where it offers a service of universal use.

I therefore recommend that legislation be passed granting to our cities the power to acquire, own, operate and control their public utilities.

RAILWAYS IN MASSACHUSETTS SHOULD BE ON ENDURING BASIS

Governor Coolidge of Massachusetts says that public ownership is no answer to the electric railway problem, as it would not increase revenue. The Governor turned to the electric railway situation after touching upon railroad questions. He said:

But this (steam railroad problem) is not so urgent as the *street railway problem*. While sufficient data are not at hand for a final and complete solution, and conditions are changing much from day to day, yet there are some things which are apparent and which must be kept in mind seeking a remedy. Street railway service in some form is now a public necessity. It ought to be supplied at moderate rates of fare to workers, to children and to the public generally. It has been provided as a private enterprise. It was expected to be more profitable than it ever turned out to be, and for that reason, and because it used the public street, certain extra taxes were laid on it, and conditions requiring expense were often attached to grants of location.

The problem is where to get more money. There are only two sources—increased fares and the public treasury, directly by grant or indirectly by remission of taxes or other payments. Public ownership is no answer to this problem, as it would increase no revenue. The question is one of our needs and our duty, and must be squarely met. As a business enterprise the government desires its success, but no more so than any other private enterprise. As a public necessity the government is warranted in giving aid. As it is a public enterprise the public ought to realize that whatever revenue it has they must furnish. Fares have been increased, but in some places there is no rate high enough to pay for operation, for raising rates too high diminishes the number of passengers.

So long as a street railway can be operated with fair service, paid for by its patrons, it is on a sound and enduring basis. That ought to be the standard. The moment that is abandoned there is no standard to measure the soundness of the principle applied. No one knows how to assess the benefits or where they apply. Any other standard should be adopted with great caution and for a very limited period.

The only other course is by local and State aid. This shifts the burden, but does not diminish it. Instead of paying the fare on the car it is paid in taxes, in rent and

the cost of living. But in the period of readjustment we may have to apply extraordinary remedies.

The information even to state the problem accurately is not at hand. It is therefore recommended that there be at once a survey of the street railway situation by experts to report the amount of deficiency in revenue, the amount of taxes and other public charges paid, and what, if any, part of the deficiency should be met by remission of taxes and other public charges, and by appropriations of money, coupled with public control, by the localities and the Commonwealth in order to keep necessary transportation facilities in operation. Knowing the requirements and the resources, it ought not to be difficult to make them balance.

The question of the policy toward public utilities should be taken out of politics. No greater harm can be done the public than by an attempt to make the operation of these agencies, which ought to be purely a matter of business, a means of partisan advantage. Unless this is done there can be no hope of reaching a proper solution.

SPECIAL INVESTIGATION COMMISSION SUGGESTED

Governor Holcomb of Connecticut regards the electric railway situation as very serious and recommends that a special commission be appointed to consider the matter and report at the present session. He said in part:

The electric railway situation in Connecticut is such as to require serious consideration. Our whole industrial fabric is in a measure dependent upon our electric railway systems and it is of the utmost importance to the future welfare and development of our State that their operation should be efficient and their facilities ample. The report of the Public Utilities Commission just rendered shows that practically all the street railway companies are operating at a loss, which if continued long enough must result in dissolution, loss of investment and suspension of service. The commission in its report states:

There are numerous contributing causes for present street railway conditions, some inherent, some temporary, and some apparently permanent. Among the principal may be mentioned general war conditions involving high cost and difficulty of procuring material and supplies; high and constantly increasing cost of labor, and difficulty on account of the advantages afforded by private and governmentally controlled industrial enterprises of securing sufficient and competent help; the increasing burden of taxation; the municipal and statutory requirements of laying and maintaining street pavement; the loss of patronage naturally incident to the use of privately owned automobiles; and the more or less unrestricted competition of public service automobiles or "jitneys" so-called, operating at the option of the owner in the most profitable sections of the street railway company's chartered territory, during favorable weather conditions and on improved highways.

The report further states:

It is the opinion of this commission that the best interests of the State require and will continue to require electric street railway service as an essential transportation agency, but if both of these competing transportation agencies are to survive and render proper service, some protecting legislation should be enacted whereby the necessary burdens would be more equitably apportioned and competitive rights more definitely limited.

Under the street railway transportation system in Connecticut, the indirect taxation for street pavement in certain localities creates a burden upon other localities not thus favored, and requires the companies to construct and maintain a right of way not only for themselves but for competing transportation agencies which are not at present required to contribute their proportionate share toward the maintenance of such rights of way. The jitney or public service automobile, carrying passengers for hire, is in every sense of the word a public utility and as such should be as in the case of all other similar agencies, be brought under the regulation of the Public Utilities Commission, and the traveling public should be protected in the matter of accident or damage from irresponsible common carriers and in the service they render. This whole electric railway situation is so serious and it is a matter involving to so great an extent the general welfare of our people, that it seems to me to be advisable for your honorable body to appoint forthwith a special commission to take it under consideration and to report at this session.

A misprint occurred in the heading of the first column of the table published on page 59 of last week's issue. The heading of this column, which showed a total of 991, should have read "number of companies" instead of "number of cars." The accompanying text showed that companies were intended.

Women in Steam Railroad Service

Increase of 40,000 in Number of Women Employed by Railroads in Ten Months—All Fields of Service Covered

IN JANUARY, 1918, the number of women employed by steam railroads in the United States was 60,000. By July it had increased to 81,000, and by Oct. 1 to approximately 100,000. These figures were presented on Dec. 6 before the labor reconstruction conference of the Academy of Political Science at Columbia University, New York City. The speaker was Pauline Goldmark, manager women's service section United States Railroad Administration.

Of the 81,000 employed on July 1, 61,000 were working as clerks of all kinds, stenographers, accountants, comptometer operators, etc. In this class appear women ticket sellers and bureau of information clerks, who served the public for the first time. The next largest group of 4000 comprised cleaners. Women had long been cleaning stations, offices, etc., but 800 were also employed in the yards to clean coaches and Pullman cars, both inside and outside, and in the roundhouses to wipe locomotives. In personal service, including work in dining rooms and kitchens, as matrons and janitresses, 2000 were found. In the railroad shops, women entered the greatest variety of new occupations. Three thousand were employed, ranging from common laborers to skilled mechanics earning the machinist's or carman's rate of pay. The policy of equal pay to men and women for equal work has been followed by the United States Railroad Administration.

The skilled steam railroad operations in which women have become proficient, according to Miss Goldmark, are as follows: They are operating a number of machines such as bolt threaders, nut tappers, drill presses, for which no great skill or experience is needed, but they are also employed for highly skilled work. A number have succeeded as electric welders and oxy-acetylene burners. They have been found well adapted for work on the air-brake equipment and are cleaning, testing and making minor repairs on triple valves. In some places they are now working in a separate group on the lighter weight valves, weighing not more than 40 pounds. Women are found now performing the duties of crane operators and hammer operators in the shops, of turntable operators in the roundhouses and of packers of the journal boxes in the yards. They are acting as attendants in tool rooms and storehouses, and they are doing block signal work and acting as lever women in the signal towers.

In the post war period, while there is federal control of the railroads, Miss Goldmark states, the women will retain their own seniority rights, including the privileges of promotion. The railroads will of course recognize the seniority rights of all their employees returning from military service, but as far as the new employees are concerned, women will have the same privileges as other new employees in retaining their positions or being assigned to other jobs. The present indications, however, are that they will remain as a permanent part of the great army of clerical workers, rather than in the out-of-door occupations and in the shops and roundhouses where the environment is oftener unavoidably unsuitable.

More Terminal Loops

**New Plan Relieves Congestion in San Francisco—
Approximately 290 Cars an Hour During
Rush Periods Pass Over Loop**

THE ferry loop at the foot of Market Street in San Francisco has been the limiting factor in the rush-hour traffic for some time. When the municipal lines began sending cars to the ferry on the new outer tracks on Market Street, the loops had to handle an additional forty cars per hour. This at once produced serious congestion. In the rush hours cars were blocked for five to eight squares from the loops, and the system could not serve the commuters who had to catch boats. Then the loop arrangement was changed and the change has been so effective that the limiting factor in the system has been shifted to another point, that is, cars can now be loaded and moved out of the loops faster than they can move along Market Street.

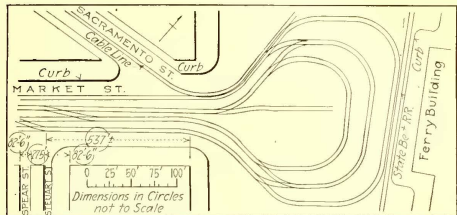
The changes made at the loop provided for three tracks instead of two, the new arrangement being as shown in the accompanying drawing. The inner loop remains as it was, the middle loop is a new track and the outer loop is the original outer loop moved over closer to the Belt Line Railway. Operation of the steam line is not frequent enough to interfere seriously with the street cars. Sixteen cars can now stand on the three loops as compared to nine, which was the limit of the old double loop. With sixteen cars on the loops there is still space for 8-ft. and 12-ft. traffic lanes between the standing cars so that access to the inner loops is provided.

During the morning and evening rush hours about 290 cars per hour now pass around the loops, 110 on the inner track, eighty on the middle track and 100 on the outer track. This is no faster than the rate at which the old loops were handling cars, but now the increased standing capacity on the loops makes it possible for cars to remain there long enough to afford

ample time for loading. Meantime the vehicular traffic along the Embarcadero crosses the neck of the loops. When this is stopped a number of loaded cars are ready to leave the loops promptly as an equal number of cars enter.

LOOPS HAVE RESERVE CAPACITY

The capacity of the loops could be increased 20 per cent over the figures above given, it is believed, were it not for the fact that the cars cannot be operated out of Market Street away from the ferry any faster than they are now being put around the loops. That is,



PLAN OF TRACKS AT FOOT OF MARKET STREET

with 152 cars per hour going out on the outer Market Street tracks, there is a headway of only twenty-six and one quarter seconds. This is not sufficient to allow passengers to get through to the inner tracks and as passengers cannot safely stand between moving cars on the inner and outer tracks, the outbound cars are blocked while the inner cars are loading. At present 137 cars per hour move from the loops onto the inner track and 153 onto the outer track. The congestion on the outbound tracks, while not so serious as that formerly obtaining at the loops, delays cars so that at Sansome Street, where the first United Railroads cars turn off, they are seven to twelve minutes late during the rush-hour periods.



THERE ARE NOW THREE LOOPS IN FRONT OF THE MARKET STREET FERRY

Simplifying the Automatic Substation Wiring Diagram

ONE of the most recent automatic substations to be commissioned is the Warrenville substation of the Aurora, Elgin & Chicago Railroad, of which E. S. Gillette is electrical engineer and S. E. Johnson is superintendent of substations and lines. This substation contains a number of ingenious devices but the present note is intended primarily to call attention to a simplified form of circuit diagram of its wiring which has just been developed by the substation and line department. In its usual form this kind of diagram is decipherable only to the expert, but it is desirable if possible to have a diagram in which the circuits can be traced out by an intelligent maintainer. The A. E. & C. diagram developed for this purpose is reproduced herewith.

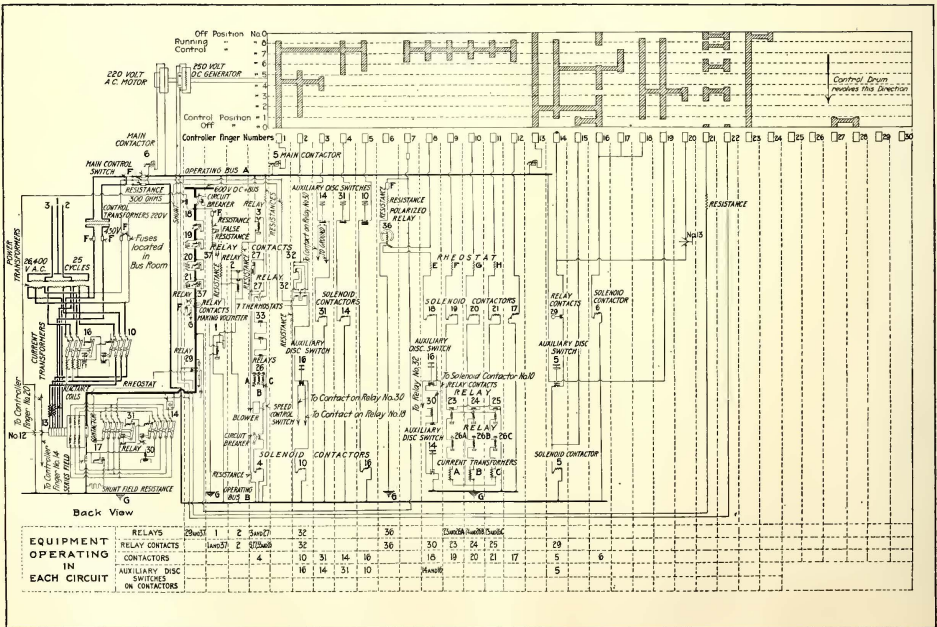
In this diagram the controller is developed and stretched out across the top of the drawing, with the contact fingers and segments plainly indicated and numbered. The main power apparatus is set off at the left, all power wires being indicated by heavy lines. The control apparatus and circuits are laid out as nearly as possible vertically in line with the controller fingers so as to facilitate the use of the diagram. To this end the same relay or contactor will ordinarily be shown in two places, one in the control circuit and the other in the power circuit. Each piece of equipment is labelled as well as numbered. The standard numbering of the apparatus is used, however, so that anyone at all familiar with substation diagrams will feel perfectly at home with this one.

At the bottom of the chart is a table showing graphically as well as by numbers the pieces of apparatus in circuit when each controller finger is engaged with a segment. This permits almost instant checking because the finger numbers are given directly below the controller fingers. To aid the eye and prevent error light vertical lines are drawn between fingers. The original diagram also contain an auxiliary table, omitted in the cut for simplicity, showing the relay settings. This table is as follows:

RELAY SETTINGS FOR AUTOMATIC SUBSTATION

Relay Number	Time Setting	Current Setting D.C. in Amperes at 600 Volts	Current Setting A.C. in Amperes at 450 Volts/second	Remarks
37	.....	Close at 150 amp.	.....	Under load relay.
36	.....	Close at 300 volts D.C.	.....	Open on wrong polarity.
32	.....	.....	.....	Close at 190 volts. Open at 180 volts.
30	.....	Close at 2 amp. Open at 0.78 amp.	.....	Reverse power relay.
29	.....	Open at 50 amp. reverse	.....	Close at 190 volts. Open at 180 volts.
27	.....	.....	.....	Close at 190 volts. Open at 180 volts.
26	.....	.....	.....	Overload in reverse T.L.
25	12 sec.	.....	1400	Opens instantaneously.
24	10 sec.	.....	1500	Opens instantaneously.
23	8 sec.	.....	1600	Opens instantaneously.
3	5 min.	.....	.....	.....
2	Instantaneous	.....	.....	Opens on short circuit.
1	3 sec.	.....	.....	Close at 500 volts D.C.

An excellent diagram in the usual form was given in connection with W. C. Slade's article in the issue of this paper for Dec. 14, 1918, page 1040. It will be of interest from comparison with the simplified diagram.



SIMPLIFIED DIAGRAM OF AUTOMATIC SUBSTATION CIRCUITS, AURORA, ELGIN & CHICAGO RAILROAD

Exterminating Ground Squirrels on the Pacific Electric Railway

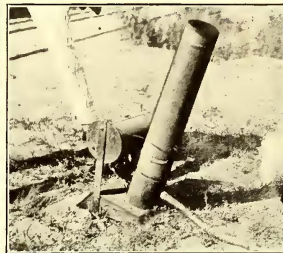
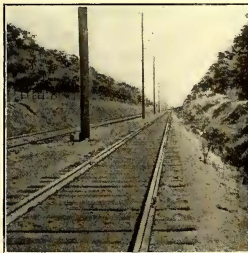
BY CLIFFORD A. ELLIOTT

Cost Engineer Maintenance of Way Department, Pacific Electric Railway, Los Angeles, Cal.

THIS company has experienced considerable trouble with the ground squirrel pest, which imposed a difficult maintenance problem upon the way department. Climatic conditions in southern California favor the breeding of these squirrels in large numbers. The rodents burrow into the banks of cuts along the right of way and also honeycomb the roadbed. The resulting porous condition of the ground is the cause of softening of roadbeds and cuts. The most damage is done during the rainy season, when storm waters enter the openings, loosen the cuts and cause landslides. The depredation of the squirrels in the embankments of bridges is also extensive. These pests infest some

which produces a white vapor. The gas when generated is forced into the burrows, effort being made to have the wind in the operator's favor so that the gas may be forced deeper into the burrows. Adjacent holes are carefully watched for the vapor to appear and these are then tamped up at least 1 ft. deep by the operator's assistants. The vapor displaces the air in the holes and effectively disposes of the rodents. Usually when the large chamber, or main burrow, is gassed six to eight other outlets for the escaping vapor are discovered and these are immediately closed in order to get the desired results. The gas is not ignited when discharged into the burrows, the vapor alone accomplishing its object. When the complete gassing process has been efficiently undertaken, the burrows are refilled with vapor and the hole in which the gas discharge pipe has been operating is then closed.

Upon entering a cut to gas, one foreman and four assistants are engaged. Two men with a gas machine



"GASSING" OUT RODENTS ON PACIFIC ELECTRIC RAILWAY

At left, typical infested right-of-way; in middle, group of men "gassing" out squirrels; at right, device used in producing destructive vapor.

localities quite extensively and considerable trouble is experienced in wiping out their villages. The constant undermining of the tracks by them soon results in a general deterioration of the roadbed. During the spring months the rodents leave the company's right-of-way, going into adjoining fields to destroy the growing crops.

The damage to the crops on abutting farms each year is very great, and the farmers complain continually of the pests which inhabit the company's right-of-way. The company each year co-operates with the farmers in carrying on a campaign to eliminate them, and additional aid is given by the State Horticultural Commission.

Attempts have been made to exterminate the squirrels by putting out poison-soaked hulled barley. This has done some good, but during the spring season the plan is of no avail as the ripe, juicy roots of growing grain in the fields are more appetizing, and the rodents refuse to eat the barley that has been scattered near their burrows.

The company has recently found in the market an automatic distillate vapor machine for gassing the squirrels in true war-time fashion, and the use of this device has gained excellent results. The squirrels are gassed in their burrows, as well as other small animals, such as rabbits, badgers, snakes, owls, etc., which unfortunately inhabit the same holes as the squirrels.

Regular engine distillate is used in the machine,

work on one side of the cut, while two more with a second machine work on the opposite side. The best time to gas is after a rain, when the holes have been opened up by the water. One foreman and four men will average eighty main burrows in a ten-hour day, the two machines consuming 3 gal. of distillate during this period.

Electric Railway Section, N. S. C., Inaugurates Monthly News Letter

The first of a series of monthly news letters signed by H. B. Adams, chairman electric railway section National Safety Council, has been sent to the 131 company members of the section. This letter contains an article on "Efficiency and Accident Prevention," and it also raises a number of points of interest to electric railways generally.

Among other things, the executive committee of the Safety Council desires to know if there is considerable demand for special electric railway safety films for moving picture machines, and to what extent electric railways have produced such films or arranged with outside firms to have them produced. Mr. Adams sets as a standard for the nine months before the next Safety Congress a reduction of one accident per mile of track represented in the membership. As the present members operate 14,542 miles the standard is thus placed at 15,000 accidents, or at the rate of 20,000 per year.

LETTER TO THE EDITORS

Cinders for Ballast Should Receive More Consideration

UNION TRACTION COMPANY OF INDIANA
ANDERSON, IND., Jan. 7, 1919.

To the Editors:

In the JOURNAL for Dec. 21, 1918, R. C. Cram set forth very clearly the necessity for using ballast in sufficient quantity and of proper quality. As stated by the author, ballast is the foundation that transmits the load from the track structure to the subgrade. The character of the foundation depends on the amount of load on the track structure, eliminating, of course, unusual conditions in the subgrade.

For electric interurban railway tracks other than those located in paved streets, having axle loads up to 37,500 lb., the writer believes that cinders should not be placed so far down the list of desirable materials as

penditure for loading, hauling and placing. Cinders must be loaded, hauled to destination and placed, but then they are on hand and some disposition must be made of them.

Concerning the track-center distance where more than one track is used, the best practice for permanent main-line structures, such as poles, platforms and bridge support is a minimum distance of 7½ ft. from the center of the track. Center-pole line construction will require a track-center distance of 16 ft. assuming that the diameter of the pole is 1 ft. at the point of minimum clearance from the car body.

L. A. MITCHELL,
Engineer of Maintenance of Way.

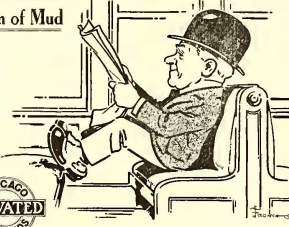
Putting Ideas Across in Chicago

THE car posters reproduced herewith constitute part of a series of eight which were recently used by the Chicago (Ill.) Elevated Railways. The first appeared about July 1. The posters, which measure 18 in. x 10 in., are glued onto the windows in a conspicuous location.

Soldiers in France Complain of Mud

So do passengers on the Elevated cars. Help remove the cause of complaint by keeping your feet on the floor.

THANK YOU.



Plant A War Garden

How are you using that extra hour of daylight?

Have you planted a War Garden?

It is your patriotic duty to do so.

The War Garden Committee of the State Council of Defense will help you.

Call on it at 120 WEST ADAMS STREET



EXAMPLES OF POSTERS USED BY THE CHICAGO ELEVATED RAILWAYS TO LAY ITS PROBLEMS BEFORE THE PUBLIC

Mr. Cram places them. Cinders can be worked at lower temperatures than most other ballast materials, especially bank run gravel, and they can be worked after heavy rains in wet weather. Cinders also retard the growth of vegetation.

It may be that cinders produced from some kinds of coal, when used as ballast, will decrease the life of ties, but the writer's experience with this material for eight years, as produced by the power plants of the Union Traction Company of Indiana, is that cinders do not in any way decrease the life of ties.

Cinders should not come in contact with the rails, especially where track circuits for automatic signals are used, as there probably will be greater leakage of return currents through cinder ballast than through any other kind of material used. Leakage of electric current should not be a criterion, however, in the use of cinders, as all ballast material should be kept from contact with the rails. When ballast is up to the top of the ties at the rails, small particles will work between the rails and the ties and increase the mechanical wear of the tie by breaking down the wood fibers.

Cinders are a by-product of steam generating power plants and should not be wasted unless the financial condition of the railway will permit. They cost nothing as ballast. Any other kind of ballast material must be purchased, and then in addition there is the usual ex-

The title of each poster and the "Thank You" are always printed in red, and in some cases also the company insignia.

The posters have brought forth some letters of suggestion from the public and have been mentioned in the local papers. They will be continued and will be used to present some of the serious problems confronting the company.

Future Electrification in Great Britain

In his presidential address before the Institution of Civil Engineers of Great Britain Sir John A. Aspinall had considerable to say with regard to electrification of steam railroads. "It has been remarkable," said he, "how when each suburban line has been worked by electrical trains with great frequency and increased rapidity there has been a very great growth of passenger traffic.

The probable course of events will be that we shall find that electrification of the lines immediately around our great towns will quickly take place all over the country, but it is not until these widening circles begin to touch one another that we shall see electrical energy used for long-distance passenger trains. The additional revenue required to pay interest on the large capital outlay can be made most rapidly from the suburban traffic in well-selected districts."

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Buffalo Talks Purchase

International Railway Willing to Relinquish Control If Guaranteed 8 Per Cent on Valuation

After the return of Mayor George S. Buck and the other members of the City Council of Buffalo, N. Y., from Cleveland, E. G. Connette, president of the International Railway, sent a communication to the Mayor setting forth that the railway wants the city to control its service and is ready to relinquish operation in the city if the city guarantees a return of 8 per cent on the valuation of the property.

DRAFTING TENTATIVE AGREEMENT

After the receipt of this communication from Mr. Connette, the Council directed the Corporation Counsel to confer with the traction officials and draft a tentative agreement so that the Council will have a concrete plan before it upon which to work. The city law department is now preparing this tentative agreement. It is expected that the City Council will demand only a 6 per cent return.

In his communication to the City Council, Mr. Connette called attention to the fact that the owners of the property were desirous of reaching an agreement with the city and pointed out that certain bases set down by the Mayor are acceptable to the company if taken together. Mr. Connette added:

"I am prepared and authorized to agree to any method by which the fair valuation of our Buffalo property can be determined within the rules laid down by the courts to govern a valuation for rate-making purposes. The public service commissioners for this State have quite generally allowed 8 per cent as a fair return on the capital valuation. We regard this as low, but with proper guarantees in the shape of reserves, maintained either by the city or by the right to raise the fare, if necessary, we would accept 8 per cent. I do not think it would be profitable to enter upon any effort to estimate the needed improvements.

COMPANY NEEDS MORE REVENUE

"I think that Buffalo has a very fair equipment. What we need most is money to pay the increased cost of operating the equipment which we have. The public's good-will has been against us for so long that I fear that we do not receive credit even for our good intentions."

The Mayor says it would be desirable in some way to substitute two mortgages for the present liens, one

covering the lines within the city of Buffalo and the second covering all properties outside the city.

The Public Service Commission has denied the petition of the railway for the commission to receive its answer to the rate complaint filed with the commission several years ago when the city thought there was a reasonable prospect of getting the 5-cent fare reduced. The right of the commission to hear the case was questioned by the company and court proceedings were brought to enjoin the commission from hearing the case. The company contended that its franchise from the city protected its right to charge a 5-cent fare. Some time ago the city made application to withdraw its complaint from the commission and the company made an application asking the commission to receive its answer. It is said that the company by a certiorari or mandamus proceeding may try to compel the commission to receive its answer and go on with the rate case. The question of jurisdiction is still to be tested.

Rapid Transit Can Proceed

The Court of Appeals at Cincinnati, Ohio, has affirmed the decision of the Common Pleas Court in refusing an injunction against the Rapid Transit Commission to prevent it from issuing \$80,000 of bonds for the purpose of paying for the preliminary surveys for the proposed rapid transit loop and other necessary work to be done in preparing for its construction.

While the Common Pleas Court held that the commission was not bound by its resolution not to spend any of the money provided in the authorized \$6,000,000 bond issue until the plan of operation is definitely determined and approved, the higher court goes further and says this declaration is analogous to those contained in political platforms and for a similar purpose. Moreover, the court holds that the resolution was not a contract and that the commission is clearly unable to bind its own hands in this matter and thus disable itself from exercising its discretion in proceeding with further preliminary work that might become necessary to the direction of the enterprise. It cannot divest itself of the incidental and necessary right to spend money for such purposes.

Attorney John C. Rogers brought the suit as a taxpayer, alleging that the commission adopted a resolution before the bond issue was voted upon, to spend none of the money until the plans for the loop had all been completed and approved.

Brooklyn Outlook

Receiver Friendly to Press But Not Over-communicative—Wants Facts First

Lindley M. Garrison, receiver of the Brooklyn (N. Y.) Rapid Transit Company, after two hours' interview with Federal Judge Mayer on Jan. 3, when asked as to the future of the road, said:

"Until I have an opportunity to make a survey of the physical and financial properties of the company, I shall be unable to make any statement in regard to definite plans."

PHYSICAL SURVEY LIKELY

In a formal statement issued later, the receiver said in part:

"We desire to operate this property with the greatest attention to the safety of the traveling public that is possible, and I propose to set about at once ascertaining the information that can be obtained on this subject and putting into practice whatever will give the greatest assurance of safety to the traveling public.

"I propose obtaining from the Public Service Commission, a physical survey of the property, if the members have already made one, and if not, propose requesting them to do so, so that I may benefit by any observations or suggestions resulting from the facts developed.

"In respect to damages accruing to the individuals, on the occasion of the recent lamentable accident, I, of course, cannot at present give any assurance, because I do not know the financial resources of the company available for the purpose, but I can say that it is the intention of the court and the receiver to do everything humanly possible to see that funds are available to pay all just claims.

FACTS NECESSARY TO DECISIONS

"With respect to the matter of increased income in order to maintain the roads at a proper standard of efficiency and give the best possible service, I cannot at this time usefully make any statement, as I am not advised of the facts. I propose to set about immediately acquiring all available information under this head, so as to be able to inform the court and carry out whatever policy is adopted by the court.

"In respect to the questions that have been mooted in regard to the subsidiary companies, and what will be done in respect of them, I have no information and shall have to acquire the same before I can have any views or make any recommendations, or aid the court in carrying out any policy."

Chicago Electrification Proposed

Terminal Plan Divided into Stages with Time Limit to Be Fixed Before Ordinance Is Passed

A new ordinance, drafted by the Railway Terminal Commission of Chicago, has been submitted to the City Council as a basis for further dealing with the railroads on the subject of electrification. The ordinance covers the erection by the Illinois Central Railroad of a new passenger terminal at East Twelfth Street, and the railroad is ordered to proceed to rearrange and relocate its tracks, stations and appurtenances on its main line in the city so as to make them suitable for operation by electric power in accordance with time limits to be decided upon before the ordinance is passed.

MICHIGAN CENTRAL INCLUDED

The Michigan Central Railroad, which also uses the East Twelfth Street station, is at the same time ordered to arrange to operate its trains and cars by electric power from Kensington Station north to the Chicago River.

Electrification of the Illinois Central Railroad is to be put into effect in four different stages, but the time limits for each have not yet been decided upon. Stages of development are as follows:

1. The entire suburban passenger service within the city limits.
2. Freight service on all tracks north of East Twelfth Street.
3. Freight service on the main line south of Twelfth Street to the city limits and over the South Chicago Railroad, the Blue Island Railroad and the Kensington & Eastern Railroad.
4. All remaining freight service and through passenger service within the city limits.

Electrification of the Michigan Central Railroad will take place in two stages as follows:

1. Freight service on all tracks north of East Twelfth Street.
2. All remaining freight and passenger service north of Kensington Station.

SUBURBAN SERVICE AFFECTED

Other railroads not operating by electricity will be permitted to enter the city over the Illinois Central tracks for the interchange of freight and the Illinois Central Railroad will be permitted to handle similar exchange business by steam.

The ordinance contains provision for suburban service underneath Grant Park in connection with the development of plans for subways for street and rapid transit railroads. Authorization is also given to change from time to time the type of construction or operation and to extend systems of distribution for power, light and water along the right-of-way of the companies affected.

The attitude of the Railway Ter-

minal Commission has been that a railroad can be electrified when it can be shown that it is financially practical. For this reason it was considered advisable not to institute an ordinance covering the electrification of all steam lines, but to separate them, and provide for the electrification of each as financial conditions warranted. The large suburban service of the Illinois Central Railroad naturally made that line the first to receive attention.

An ordinance was submitted by the Illinois Central Railroad more than a year ago which provided only for the electrification of its suburban service. This was not acceptable to the city, and thus the new ordinance is the next step in the development. Public hearings have been and will continue to be held on this ordinance, and as a result of these the dates for the completion of the various stages of the work will be decided upon. It is believed that these will be periods of approximately five-year intervals.

AGITATION STARTED IN 1915

Numerous items concerning the development of plans for electrification at Chicago have appeared in the ELECTRIC RAILWAY JOURNAL during the last three years, beginning with the smoke abatement report which appeared late in 1915. As the present ordinance is concurred in in practically every detail by the railroads affected, it is believed that it will be passed without difficulty, and that work on the electrification will start without delay.

M. O. Bill Ready in New York

A bill which is favored by the State Conference of Mayors, permitting each city in the State of New York to purchase and operate every public utility within the city limits, has been drafted and perfected and will be introduced in the Legislature soon, according to present plans. Governor Smith also favors such legislation. One provision of the Mayors' conference bill avoids the debt limit prohibition by permitting a city to issue public utility securities which would not be included in computations of a city's debt limit. This is now the rule concerning New York City subway bonds and water and dock bonds. Where a city's debt limit does not interfere, a city may issue the usual obligations of a municipality to purchase public utilities.

Travis H. Whitney, of the Public Service Commission for the First District of New York, was one of the committee which drew the bill favored by the Mayors' conference. The measure provides that a municipality shall not commence the acquisition or establish or begin the operation of a public utility without first securing the consent of the Public Service Commis-

sion, and all municipal public service corporations would be under the jurisdiction of the public service commissions, the same as when they were under private control.

Each city is to create a municipal director of public utilities with power to appoint and remove employees, who would have the power to provide adequate and continuous service at reasonable rates without undue discrimination.

Another provision would permit several municipalities or political divisions of the State to organize into a single utility district and jointly acquire and operate public utilities.

Terminal Approved

Cleveland Votes for Union Station Facing the Public Square—For Steam and Electric Passengers

The franchise giving the Cleveland Union Terminals Company a right to erect a union station facing the Public Square at Cleveland, Ohio, was approved by a vote of the electors on Jan. 6, by a majority of 10,842. The plan includes both steam and interurban passenger station service, to the exclusion of the lake front proposition which was intended to take care of the steam roads only.

O. P. Van Sweringen, president of the company, stated that construction will probably be begun in March. Approval of the Federal Railroad Administration will be sought at once. Funds for the construction are said to be ready. Within a few days a meeting of the heads of the railroads which will use the station will be called to complete details.

Besides occupying all the space facing one-fourth of the Public Square on the south from the new Hotel Cleveland, also a Van Sweringen proposition, to Ontario Street, the west side of the latter street will be improved with new structures. In addition, the same interests are building a freight terminal and a system of warehouses where all freight will be delivered and received at high-level for the roads which enter the basement section of the terminals from the river valley, thus saving cartage up and down the steep hills to the depots where they are now located.

A portion of a rapid transit line reaching Cleveland Heights and Euclid Heights, now becoming an extensive residence district, has been built. This will be completed to the new depot. Rapid transit service will also be furnished to other suburban districts.

MR. ARNOLD REPORTS ON PLAN

Bion J. Arnold, who has been investigating the transportation problem of Cleveland for the Chamber of Commerce, made a report to that body on Dec. 17, in which he stated that the location of a union station on the Public Square would eventually cause such great congestion that another station would have to be built. The growth of the city has been such, he said, that it will double its normal operations in

about eight years. All business statistics prove this.

The proposed trackage for the entrance of steam roads to the Public Square site might be adequate for fifteen years, but should much new commuter service be introduced, another depot might easily have to be built within that time. Electrification would appear essential for a depot in that location. Mr. Arnold advises against the abandonment of the suburban depots, as they accommodate people on the crosstown lines and will aid in the development of steam commuter service.

Location of the station on the Public Square is advantageous because of convenience of access, but there are many objections to it in other ways. Considering the expense of building track entrances of interurbans to the station and the readjustment of operations required in other ways, Mr. Arnold doubts the feasibility of the plan mapped out for them. On the original plan of building a station on the lake front, which is recommended for further consideration, a separate station for the use of interurbans would have to be built, as outlined in the original plan, shown in the Cleveland & Youngstown Railway ordinance.

Omaha Labor Case Settled

Joint Chairmen William H. Taft and Basil M. Manly of the National War Labor Board held a hearing in Omaha, Neb., on Jan. 2 and 3 in connection with grievances charged by the carmen against the Omaha & Council Bluffs Street Railway.

A decision read by Mr. Taft at the close of the hearing directs that the railway shall make some changes in schedules in the interest of fairness and justice to the men. It was held that the company acted within its rights, under the rules of the War Labor Board, when it refused on Dec. 3 to enter into a contract with the union.

Messrs. Taft and Manly held, however, that the pride of union men and the technical sensitiveness of the company led to controversies. Union recognition was not a vital factor of the hearing, although the decision, in effect, read that sometimes too much stress has been placed by the company on the question of whether a committee of its employees represented a union.

In the matter of alleged discrimination against union men by the company, the decision held that the company is endeavoring to comply with the orders of the War Labor Board. The application for a modification of the award in the matters of increased wages and a fundamental change of schedules was overruled, because a hearing may be had before the entire War Labor Board on Feb. 1, when a revision of the award will be considered.

The matters in dispute went before the board for settlement following a short strike.

Kansas City Service Nearly Normal

Company Looks Upon Strike as Ended—Peculiar Angles of a Peculiar Controversy

The Kansas City (Mo.) Railways resumed service on Dec. 13, two days after the strike started. By Jan. 1 half the normal number of cars were in service, and cars were running as late as 9 o'clock at night. On Jan. 4 owl car service was restored on the important lines, marking the turning point in the resumption to normal service.

The court proceedings which have assisted the restoration of service have been diverse, because of the different conditions in Kansas City, Kan., and Kansas City, Mo.

The company had filed in both Judge Van Valkenburgh's court, Missouri side, and in Judge Pollock's court, Kansas side, its suit to get light on the War Labor Board's decision of Oct. 24, and for injunction against hindrance in raising fares. On Dec. 2, the courts en banc, rendered their decision, the company appealing to the Supreme Court of the United States. Meanwhile, the company had instituted its petitions to the State Public Service Commissions, to secure authority to increase fares as the War Labor Board had recommended.

The employees struck on Dec. 11.

On Dec. 17 the company sought leave to file suits for injunction against the strikers and others, in both federal courts. These suits for injunctions were supplemental bills to the suit regarding the War Labor Board's decision. Judge Van Valkenburgh, in the Missouri district, granted a restraining order. Hearing as to an injunction was set for Dec. 27; postponed from time to time. The defendants had emphasized the question of jurisdiction; and had attacked the filing of the petition as a supplemental bill. On Jan. 4 Clyde Taylor, attorney for the company, filed, as attorney for the Continental & Commercial Trust & Savings Bank of Chicago, an Illinois corporation, an original bill, asking injunction; this proceeding seeming to meet all possible objections as to jurisdiction and as to supplemental bills, in the matter. Hearing of this application was set also for Jan. 11.

On the Missouri side of the state line, the city police had promised protection to property, and were trying to give it; the company had also the protection of the Missouri National Guard.

The course of events on the Kansas side was somewhat different. Judge Pollock denied an injunction, but he ordered the railway to restore service; ordered the city officials to provide protection, and retained jurisdiction. On Jan. 2 the Kansas City (Kan.) Chamber of Commerce was allowed to intervene, with a showing that the railway had not complied with the order to restore service, and that the city had not provided guards. The court

thereupon ordered the marshal to enforce its orders that cars should run and protection be provided; and granted, at this time, the restraining order asked on Dec. 17 by the company. The marshal, advised of the prospective order, had many deputies ready; he swore in others, and also gave commissions and stars to motormen and conductors operating cars in Kansas. The marshal reported daily to the court in regard to the enforcement of the court's orders.

Meanwhile, the strikers appeared before the War Labor Board in Omaha, and were instructed to present evidence of their allegation that the company was not in good faith seeking to secure higher fares that higher wages might be paid. The War Board suggested that they would appear to better advantage if they returned to work; the company, however, definitely declined to restore their contract, or take them back except individually as the merits of each of the applications warranted.

Following the refusal of the War Labor Board on Jan. 3 at Omaha, to reopen the Kansas City case, E. M. Harber, city counselor of Kansas City, Mo., sent a telegram on the strike situation to the board. Mr. Harber stated emphatically that charges were unfounded that the company was not doing its best to secure higher fares. Mr. Harber, however, asked the board to restate its findings, to remove all possible misunderstanding.

President Kealy issued a statement on Jan. 5, after hearing of the proposal the strikers were about to make as to returning to work. This statement he concluded as follows:

TOO LATE FOR FOMER CONDITIONS

It is too late for anyone to talk of returning under former conditions and restoring the status quo. This might have been possible during the first few days before hundreds of new men were employed and before the company had given its word to those hired. Some of these and acts of violence have foreclosed the rights of any former employee of this company who has broken a contract and put his community to loss and inconvenience, now to come back and demand to be returned to his former status. This is a physical impossibility. We have more than 1,400 men in train service and are adding to these at the rate of 100 a day. Complete restoration of normal service now only waits upon the instruction of students.

A number of our ex-employees are taking advantage of this and have returned to work to-day. Many more have made their arrangements to do so to-morrow. In view of the fact that we have practically rebuilt our organization, all those wishing to return to the work for which they are trained should do so without any delay. Every day means that more places are filled and if they continue to wait a larger number of them cannot be used.

For the benefit of the business and civic interests of the two Kansas Cities, we are insistent upon a termination of this matter in such a way as to insure an uninterrupted continuation of railway service in the community. The necessity for this has been clearly shown by the fact that there have been three strikes in a period of sixteen months.

For the first time in three years we are now able to rebuild our organization to the size it was before the war.

New York City Conferences

Explanation Made of Negotiations with City Looking Toward Settlement of Transit Matters

Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., appeared before the Public Service Commission for the First District on Jan. 7 and corroborated the testimony given by James L. Quakenbusch, general attorney for the company. Mr. Quakenbusch testified on Jan. 6 before the commission that he and Grenville McFarlane, a Boston lawyer, who is said to have been associated with William Randolph Hearst in the promotion of public ownership legislation, had had several conferences with Mayor Hylan over the matter of increased fares for the Interborough.

RAILWAY OFFICERS CONFER WITH MAYOR

Mr. Shonts said that he personally had called upon the Mayor and suggested that the city be represented on the Interborough board of directors. Mr. Shonts is quoted as follows:

"Mayor Hylan told me that there must be some solution of the fare problem. I suggested that a committee from the roads and the Board of Estimate get together and try in some way to thresh the whole thing out. Mayor Hylan said he did not know but that it would be a good thing."

During the present inquiry there has been much talk about a "protocol" drawn following conferences between the railway and city officials whereby the city would assume control of all the transit lines. In its original form this document provided that, as the city and the Public Service Commission would not consent to an increase in fare unless the companies agreed to convey their railroads and assign the leases of those they did not own, trustees be appointed by the public authorities to manage the lines so as to furnish the best possible service and to protect the investors.

EIGHT-CENT FARE SUGGESTED

It further provided that the fare should be increased to 8 cents, with 3 cents additional for transfers; that all of the profits should be deposited with a trust company, and that the profits, if there be any, should be divided between the city and the companies. It is also provided that the Legislature be petitioned for an amendment to the Constitution, so that the city could make a trust agreement similar to that between the city of Boston and the Boston Elevated Railroad. Other necessary laws, to enable the carrying out of the plan, were also to be sought, so that all the lines could be operated as a unified system after the Chicago plan.

It was also provided that the Interborough and the Brooklyn Rapid Transit Companies receive their preferentials from the city as a guaran-

teed payment. The plan provided that the city should transfer to the trustees any accumulated funds out of its one-half part of the sum in excess of the minimum returns above the cost of service, and that if this sum did not amount to sums set forth in tables to be known as "Guaranty Fund Tables," the trustees must make up the difference out of the funds in their possession after paying the costs. If the fund was not then full the plan provided for payments by the city to complete the amount necessary. The cost of service was to cover these items:

All operating expenses, including damages and maintenance, repairs, and renewals.

Taxes.

Rebates and interest on all funded debt. Such allowance for depreciation of property and for obsolescence and losses in respect to property sold, destroyed, or abandoned property, as the trustees may deem necessary or advisable, or prior to their appointment as may be agreed upon, or fixed by arbitration.

All other expenditures and charges which, under the laws of the State of New York, now or hereafter in effect, may be properly chargeable against income or surplus.

The city and the Public Service Commission were to have the right to appoint two directors.

On Jan. 7 Mr. Shonts referred to the feeling between the Mayor and the commission, and said that he represented a client that was, figuratively speaking, between two fires, and that the conferences were conducted so that an agreement could be reached with the Mayor, and then submitted to the commission on its merits. Mr. Shonts said that Mr. Quakenbusch's explanation was quite correct.

Mr. Cameron Exonerated

Cases against employees of the United Railways, St. Louis, Mo., including Bruce Cameron, superintendent of transportation, hastily indicted in July last for their alleged connection with the disappearance of the referendum petitions calling for a vote on the new franchise for the railway, since refused by the company as too onerous in its terms, have been dismissed in court for lack of evidence. When the case was called recently, attorneys for the railway announced their readiness to proceed, but no one appeared to prosecute for the city.

In proclaiming his innocence at the time the indictments were returned Mr. Cameron said:

"I have been indicted upon the evidence of one Jackson, who confesses he committed the deed himself, and of which I am innocent and had no knowledge or connection. My case will be tried in court, where my innocence will be established."

Carhouse and Cars Destroyed

The carhouse and twelve cars, belonging to the Southwestern Gas & Electric Company, Texarkana, Tex.-Ark., were destroyed by fire on Dec. 27, causing a loss of more than \$100,000. The company operates 14 miles of electric railway.

Council Approves Purchase

Seattle Body Votes to Take Over Local Railway—Friendly Suit to Fix City's Purchase Right

The City Council of Seattle, Wash., on Dec. 31, passed, by a vote of five to two, the ordinance authorizing the city to purchase the railway property of the Puget Sound Traction, Light & Power Company, for \$15,000,000 in utility bonds. The ordinance was passed after negotiation lasting over a period of four months.

DATE OF DELIVERY UNCERTAIN

While the exact date for the delivery of the properties cannot be set, A. W. Leonard, president of the company, states that unless unexpected obstacles arise, the transaction ought to be closed in forty-five to sixty days.

To determine the legality of the transaction, and to interpret the meaning of the utility bonds, the City Council and traction officials agreed to file a "friendly" case in the King County Superior Court. Papers in an injunction suit restraining the city from issuing bonds had been prepared, and the case was filed immediately after the ordinance was passed.

By the terms of the purchase ordinance, the company is required within forty-five days after the termination of any litigation in connection with the transaction to deliver the property to the city free and clear of all incumbrances. All franchises are to be surrendered to the city and the company is to dismiss all legal actions pending against the city. All taxes are to be paid up to the date of the transfer, including the gross earnings tax for 1918. The company is required to pay a forfeit of \$400 a day, for every day after the forty-five days following the termination of the litigation, which transpires before the deed to the property and the bill of sale are delivered.

The ordinance also provides that the company must replace any property destroyed by fire or otherwise pending delivery to the city. When delivery is made, the company will be required to submit a statement showing that from Oct. 1 last up to the time of delivery, there has been spent monthly on maintenance the same average monthly sum that was spent for that purpose during the last five years. If this sum is not spent on maintenance, the company will be required to turn the cash over to the city. Until all of the above conditions are fulfilled, the city will retain the \$15,000,000 in utility bonds.

MORE THAN 200 MILES INVOLVED

The property to be acquired by the city includes 203 miles of track, 540 cars, carhouses and yards, repair shops at Georgetown, cable stations and all equipment and supplies required in the operation of the railway system. The railway is said to comprise only about one-fifth of the Puget Sound Traction, Light & Power Company's

properties in the Seattle district. Company headquarters will be continued in Seattle, with A. W. Leonard president, at the head.

Councilman Oliver T. Erickson, the father of municipal ownership in Seattle, voted against the purchase, on the ground that the price was too high.

It has been reported that a referendum would be invoked on the railway purchase, but city officials do not expect any such development in view of the fact that at the time the advisory ballot was submitted in November the people voted four to one in favor of the purchase.

Omaha Ready to Sell

The appointment of a committee of three to include the Mayor is being urged upon the Council of Omaha, Neb., to confer with the officers of the Omaha & Council Bluffs Street Railway, Omaha, Neb., with respect to the matter of the possible purchase of the property by the city. The company's position on the matter has been stated through G. W. Wattles, its president. He is quoted as follows:

"I will be very glad to talk to the committee appointed by the City Council. I have stated openly to the Council that we are willing to sell the street railway. But there are two sides to that proposition. If the city wants to pay us the money we have put into the development of this property to its high standard of the present day, plus the legal rate of interest on that money, then we won't lose much time in agreeing and I shall advise the stockholders to sell. But if, on the other hand, the city is going to try to take away from the stockholders of this company the property which their money and their efforts and their foresight have developed, if they are going to try to take this property away without a just compensation to those who have put their money into it, then we shall have a great deal to say."

News Notes

Municipal Ownership Bee Buzzing.—The City Council of Columbus, Ohio, on Dec. 30 asked City Attorney Scarlett for an opinion on the legal and financial measures necessary to acquire the railway property of the Columbus Railway, Power & Light Company. This is regarded as a first step toward municipal ownership, but is really incidental to the franchise and fare dispute between the company and the city.

City Wants Leased Lines Abolished.—One of the first measures presented after the new City Council at Providence, R. I., had organized provides that

the Council committee on Rhode Island Company affairs be directed to prepare a plan and present it to the General Assembly abolishing the leased line system, reducing the capital stock and eliminating unprofitable lines. The resolution calling for these changes has been referred to the committee for consideration.

Accepts Wisconsin Indeterminate Permits.—At the instigation of President A. M. Robertson, the Duluth-Superior Street Railway has surrendered its franchise to operate in Superior, Wis. The system operating between the two cities is now on the indeterminate permit basis so far as Wisconsin is concerned. Difference in the terms of the permit and franchise is mainly based on the appearance before the State instead of city officials for any grants to be made in behalf of the company or public.

Hudson Tunnel Bill Rejected.—The Senate interstate commerce committee voted on Dec. 12 its disapproval of the Calder bill, providing for an appropriation by the government of \$6,000,000 to build a vehicular tunnel under the Hudson River at New York. A decision not to report the bill to the Senate was reached after the committee had heard representatives of the Joint Tunnel Commission of New York and New Jersey and other advocates of the tunnel scheme. The project was rejected on the ground that Congress would be setting a precedent for tunnel and bridge enterprises, backed by government capital.

Question of Contract Rights in New Jersey.—The report of the committee of the New Jersey League of Municipalities to decide whether the United States Supreme Court will pass upon the power of the Board of Public Utility Commissioners of New Jersey to abrogate municipal franchise contracts providing for maximum rates for utility service, will be submitted at a meeting to be held in Trenton, N. J., on Jan. 20. The question has been referred to the executive committee of the league. If the matter goes to the United States Supreme Court, it is said that the test will be made in connection with the decision of the State Commission authorizing the Public Service Railway to raise its fares.

Moving Platform Plan Presented.—The Continuous Transit Securities Company, of which M. Everhart Smith is president, has filed with the Public Service Commission for the First District of New York a plan for the establishment of a moving platform in Forty-second Street in place of the present shuttle subway operation between the East and West Side subway lines. It is proposed to utilize two of the four tracks and to construct three moving platforms, the fastest of which will operate at a speed of 9 m.p.h. and its seating capacity 31,600 passengers an hour. The cost is estimated at less than \$1,000,000. The commission has taken the plan under consideration.

Berkeley Preparing for Blanket Franchise.—As the first step toward granting a resettlement franchise to the San Francisco-Oakland Terminal Railways, the City Council of Berkeley, Cal., has requested the State Railroad Commission to place a valuation on all properties owned by the company in Berkeley. A revaluation as requested by the Council will be placed on holdings of the company as they existed on March 2, 1917, which is the date of the first request made by the railway for a blanket franchise. Under the proposed betterment franchise the company will operate under a single permit instead of a multitude of franchises covering various units of the system.

Brooklyn Officials Ask Change of Venue.—The attorneys for President Timothy S. Williams, of the Brooklyn (N. Y.) Rapid Transit Company, and other officers of the company indicted in connection with the accident on Nov. 1, have secured an order directing the District Attorney to show cause why a change of venue to a county outside of New York City should not be granted. The order is returnable before Justice Callaghan in Special Term of the Supreme Court, Part I, on Jan. 16. Justice Kapper was to have tried the first of the cases on Jan. 6, but the order of Justice Jenks acts as a stay, and no trial can be had until Jan. 30, at the earliest. The stay remains in operation until three days after the court makes a decision on the argument for the change of venue.

Programs of Meetings

New England Street Railway Club

The New England Street Railway Club will hold its annual Manufacturers' Night on Jan. 23, at the Hotel Somerset, Boston, Mass. A large committee is making unusual preparations for the dinner, entertainment, music and vaudeville.

Illinois Electric Railway Association

The annual meeting of the Illinois Electric Railway Association will be held at the Hotel La Salle, Chicago, Ill., on Jan. 17. It is expected that P. H. Gadsden, chairman of the committee on readjustment of the American Electric Railway Association, will address the meeting. There will also be an address on safety by H. B. Adams, chairman of the electric railway section of the National Safety Council. John Leisenring of the Illinois Traction System, H. A. Johnson of the Chicago Elevated Railways, B. J. Fallon of the Chicago Elevated Railways and W. P. Potter of the Illinois Traction System, chairmen of the electrical, mechanical, way and traffic committees respectively will each present a paper. The allegory "The Grim Reaper," which was presented before the Central Electric Railway Association at Indianapolis in November, will be presented at Chicago.

Financial and Corporate

More Revenues Needed

New York Railways in Latest Fiscal Year Lacked \$153,000 of Meeting First Mortgage Bond Interest

During the year ended June 30, 1918, the income of the New York (N. Y.) Railways was \$153,634 less than the sum required to pay its operating expenses, rentals and interest on its first mortgage bonds. In other words, it lacked by this amount sufficient to pay the interest on its first real estate and refunding 4 per cent bonds and paid no interest whatever on its \$30,609,487 of 5 per cent adjustment bonds. Naturally the stock, which under the reorganization was reduced from \$52,000,000 to \$17,500,000, received nothing. The company has no surplus to draw upon to make good these losses. In fact, it had an existing deficit at June 30, 1918, of \$1,355,880.

The result, the company's annual report states, is inevitable. Reserves have been depleted, and available funds from all other sources are being used up in an endeavor to maintain the service until an increased fare can be had. Unless this is speedily forthcoming a receivership cannot be avoided, with its attendant losses and probable disruption of service, as under a receivership a large portion of the service now rendered by the company at a loss would be discontinued.

Since strikes on the lines of the system were in effect within the first half of the fiscal year ended June 30, 1917, which created abnormal results both as to revenue and expenses, extended comparison between 1917 and 1918 revenues and expenses would be useless. The following comment, therefore, while setting forth the amount of the increases and decreases as between 1918 and 1917, is confined generally to a comparison between the year ended June 30, 1918, a year free from strikes but within the war period, and the year ended June 30, 1914, a period prior to the war.

The gross passenger revenue for the year ended June 30, 1918, showed an increase over that of the preceding year of \$419,518 or 3.75 per cent. As compared with 1914, the revenue from passengers during 1918 fell off \$1,806,433 or 13.46 per cent. There was also a decrease approximately corresponding thereto in the number of revenue passengers carried, there having been \$4,849,794 less passengers carried in 1918 than in 1914. Other street railway operating revenue increased \$6,406 over 1917, and as compared with 1914 decreased \$104,021.

Railway operating expenses during the last year were \$8,131,471, an increase over 1917 of \$262,661 or 3.34 per cent.

The total charge to the maintenance accounts during 1918 (equal to 20 per

cent of the total operating revenue) was \$2,384,007, an increase of \$85,175 as compared with 1917. The total expenditures for maintenance during the year were \$2,822,916, or \$438,909 in excess of the charge, thus reducing the company's reserve for maintenance and depreciation. During 1914 the actual expenditures for maintenance were \$2,447,395, and there was credited to the depreciation reserve account \$324,773, the total charge for maintenance and depreciation being \$2,772,168.

TRAFFIC STATISTICS OF N. Y. RAILWAYS

	1918	1917
Cash fares.....	223,765,819	215,672,697
Revenue transfers.....	14,377,030	13,866,986
Free transfers.....	83,891,488	85,088,109
Total passengers.....	322,034,337	314,627,792
Ratio of free transfer passengers to revenue passengers, (per cent).....	35.23	37.07
Average fare per passenger.....		
Per passenger, including transfers (cents).....	3.607	3.559
Per revenue passenger (cents).....	4.877	4.877
Operating expenses per passenger.....		
Per passenger including transfers (cents).....	2.525	2.501
Per revenue passenger (cents).....	3.415	3.428
Car-miles.....	26,993,360	28,918,483

During 1918 the amount expended for injuries to persons and property was \$1,157,154, an increase of \$105,754 over 1917. The costs as accrued during the year, however (on the basis of 7.2 per cent of the gross passenger revenue), resulted in a net charge to operating expenses on this account for 1918 of \$835,884, the difference between the amount expended and accrued representing the balance in the accumulated reserve account which was discontinued after June 30, 1918.

Taxes assignable to railway operations showed a rise of \$138,212 or 13.39 per cent as compared with 1917. This increase is accounted for principally by additional federal income and excess profits taxes applying to leased lines, the burden of which will, it is anticipated, be relatively even greater during the coming year.

The gross income for 1918 was an increase of \$4,569 over 1917. As compared with 1914, however, there was a decrease of \$1,208,131. Income deductions during 1918 increased \$10,150 over 1917, due principally to an increase in interest on bills payable, less decreases in charges on account of interest on other unfunded debt, and decreases in sundry rents, etc.

There was a deficit of \$153,634 in net income for 1918, and the deficit at June 30, 1918, was \$1,355,888, an increase as compared with 1917 of \$211,148. A comparison of 1914 with 1918 shows that at June 30, 1914, the amount of surplus available for interest on adjustment mortgage income bonds and other requirements, was \$1,196,164 or \$2,552,044 more than on June 30, 1918.

Miscellaneous operating statistics of the company for the years ended June 30, 1917 and 1918, are shown in the table above.

COMPARATIVE INCOME STATEMENT OF NEW YORK RAILWAYS FOR YEARS ENDED JUNE 30, 1917 AND 1918

	—1918—		—1917—	
	Amount	Per Cent	Amount	Per Cent
Revenue from transportation.....	\$11,615,247	97.45	\$11,195,729	97.40
Other railway operating revenue.....	304,786	2.55	298,380	2.60
Total revenue from railway operations.....	\$11,920,033	100.00	\$11,494,109	100.00
Operating expenses:				
Maintenance of way and structures.....	\$1,368,433	11.48	\$1,249,171	10.87
Maintenance of equipment.....	1,454,483	12.20	910,467	7.92
Horsepower—revenue car service.....	908	0.01	53,151	0.46
Operation of power plant.....	675,366	5.66	608,615	5.36
Operation of cars.....	3,593,811	30.15	3,526,824	30.68
Injuries to persons and property.....	1,157,154	9.71	1,051,400	9.15
General and miscellaneous.....	641,495	5.38	597,699	5.20
Total "actual" expenditures.....	\$8,891,650	74.59	\$7,997,325	69.58
Maintenance of way and structures, reserve.....	333.186	0.28	899,768	0.87
Maintenance of equipment, reserve.....	472,095	*3.96	39,416	0.34
Injuries to persons and property, reserve.....	321,240	*2.69	267,699	*2.33
Total reserves.....	\$760,179	*6.37	\$128,515	1.12
Total operating expenditures and reserve credits.....	\$8,131,471	68.22	\$7,868,810	68.46
Taxes assignable to railway operations.....	1,170,223	9.82	1,032,011	8.98
Total operating expenses and taxes.....	9,301,694	78.04	\$8,900,821	77.44
Income from railway operations.....	\$2,618,339	21.96	\$2,593,288	22.56
Non-operating income.....	627,118	5.27	647,600	5.64
Gross income.....	\$3,245,457	27.23	\$3,240,888	28.20
Deductions from gross income.....	2,676,550	22.45	2,666,052	23.20
Net income available for interest on 4 per cent bonds.....	\$568,907	4.78	\$574,835	5.00
Interest on 4 per cent bonds.....	722,541	6.07	722,887	6.29
Net income before deducting interest on adjustment mortgage income bonds and other requirements.....	*\$153,634	*1.29	*\$148,052	*1.29
Add—surplus account.....	*1,202,246	*10.09	*996,679	*8.67
Surplus.....	*\$1,355,880	*11.38	*\$1,144,731	*9.69

*Decrease or deficit.

Effect of Higher Fares

Revenue Increased and Riding Decreased in Most Cases—Interurban Traffic Suffered Less than Urban

In a recent canvass made by the information bureau of the American Electric Railway Association among electric railways which are collecting increased rates of fare, the replies indicated that the riding habit of the patrons of 53 per cent of the companies was adversely affected by the fare increases. On the other hand, 40 per cent of the companies found no alteration, and 7 per cent experienced an actual increase. This information was obtained from 161 companies with about 16,513 miles of single track. This is 34.12 per cent of the total mileage for the United States.

REVENUE DECREASED IN FEW CASES

In 81 per cent of the cases the operating revenue of the company was increased. In 10 per cent there was no increase, and in 9 per cent there was an actual decrease.

Of the purely urban companies, seventy-one of which reported, 58 per cent showed a decrease in riding, 36 per cent showed no adverse effect, and 6 per cent reported an increase. Seventy-eight per cent reported increased revenue, 10 per cent no change and 12 per cent actual losses.

Of the thirty-four purely interurban companies reporting, 29 per cent showed a loss in riders, 52 per cent no change and 19 per cent a gain. Eighty-six per cent reported increased revenues, 11 per cent no increase and 3 per cent a loss.

Of fifty-six companies doing both urban and interurban business, 61 per cent reported a decrease in riding, 37 per cent no change and 2 per cent an increase. Eighty-two per cent of the companies reported an increase in revenue, 13 per cent no change and 5 per cent a loss.

The accompanying table gives the ratio (expressed in per cent) between the actual percentage gain in revenues and the theoretical increase in revenue or percentage increase in fare. For instance, if a company secured a gain of 20 per cent in actual revenues from a 20 per cent increase in fare, its ratio would appear as 100 per cent. Less than the theoretical gains in revenue, therefore, are reflected by ratios of less than 100 per cent.

EIGHTY-FIVE COMPANIES REPORTED

The table represents the experiences of eighty-five companies reporting definite results of advances in fares. In the determination of the percentages, the cash fare was used as a basis, owing to the lack of definite figures on reduced rate tickets. The table, therefore, should not be used as a criterion for measuring very accurate results.

Fifty-two per cent of the companies, in their fare increase campaigns, used publicity in order to educate the people, either by newspaper advertisements or by company organs and leaflets distributed among the car patrons.

Of 100 companies stating whether or not valuations were required before the increases were permitted, thirty-seven replied were in the affirmative. Some stated that either the commission granting the increase had estimated the value or that questionnaires were submitted by the commission and answered by the companies. There were sixty-three negative replies.

One hundred companies answered as to the duration of the award. Fifty-nine of the companies received emergency awards, ranging from the duration of the war to certain specified periods after the signing of the treaty of peace. The other 41 per cent received permanent awards, several of them, however, being subject to further review by the commissions.

RATIOS BETWEEN PERCENTAGE INCREASES IN REVENUE AND PERCENTAGE INCREASES IN FARES IN 85 CASES OF REVENUE GAINED

1 to 19 Per Cent Increase in Fares		
Urban	Interurban	Urban and Interurban
Per Cent	Per Cent	Per Cent
86.6	19.2	29.4
100.0	29.4	57.5
100.1	42.0	
137.5	100.0	
20 to 49 Per Cent Increase in Fares		
10.6	60.0	17.5
24.3	60.0	21.0
24.5	60.0	33.3
25.0	64.0	40.0
27.0	64.3	40.5
32.0	64.8	60.0
36.0	67.5	60.0
36.5	70.0	67.6
37.3	70.0	83.3
37.5	75.2	112.0
37.5	83.3	120.0
40.0	84.0	135.0
41.0	90.0	147.1
50.0	94.0	100.0
50.0	100.0	100.0
50.0	100.0	107.0
50.0	100.0	110.0
50.7	100.1	150.0
51.0	118.8	
50 to 100 Per Cent Increase in Fares		
		10.6
		40.0
		50.0
		80.0

Mr. Tone Returns as Receiver

S. L. Rue Tone, engineer, former president of the company and former Public Service Commissioner, was named, accepted and sworn in on Dec. 31 as receiver for the Pittsburgh (Pa.) Railways. Mr. Tone was president of the company when it went into the hands of receivers last spring. He was appointed to succeed J. D. Callery, resigned. It is the second time he has succeeded Mr. Callery in the affairs of the road, having been elected to the presidency when Mr. Callery resigned.

Charles A. Fagan and W. D. George, his fellow receivers, issued the following statement when informed of Mr. Tone's appointment:

"We are highly gratified with the appointment of Mr. Tone as one of the receivers. His standing as an engineer and his long experience as vice-president and then as president of the Pittsburgh Railways, coupled with his wide and comprehensive knowledge of public utility matters gained during his service as Public Service Commissioner of the Commonwealth, all render him eminently qualified to discharge his duties to the satisfaction of all."

Columbus Proxy Fight

Local Interests Assume Arbitrary Attitude Toward Management Interests Now in Control

The contest between the stockholders' protective committee and the Clark interests for control of the Columbus Railway, Power & Light Company, Columbus, Ohio, has centered in the selection of the proxy committee and each side has been contending for the balance of power in that respect.

At a meeting of the directors of the company on Dec. 31, measures were taken to support the Clark Management Company and a proxy committee, consisting of F. R. Huntington, William C. Willard and E. R. Sharp was named. At least two of these men are residents of Columbus. They evidently do not see the necessity which is insisted upon by other Columbus interests of localizing the control and responsibility to the public.

This step forestalled the committee in its demand for three out of five members of the proxy committee, to which Clarence M. Clark, representing the management company, refused to yield. The committee, however, has selected three men as its proxy committee and it has been proposed that a joint committee of seven handle the proxies. The fight has thus centered about the selection of the seventh member, and up to Jan. 4 no agreement had been reached. The protective committee insists that it be allowed to name the seventh man and Mr. Clark and his associates were just as determined to name him themselves.

Mr. Clark, it is said does not expect to be a member of the committee, no matter what settlement may be arranged.

Several members of the committee, however, expressed the belief that an agreement would finally be reached and that it would not be necessary to canvass all the stockholders.

On Dec. 31 Mr. Clark issued a statement which in part reads in the following way:

"There is no desire on our part to control the board of directors or the management of the company. The only question at issue between me and the stockholders' protective committee this morning was as to the proxy committee. I have at all times have been willing to agree on five names for such committee, all names to be satisfactory to both sides, or I agreed to have the stockholders' committee choose two, the board of directors two and these four to select the fifth member of the proxy committee."

I also stated to the stockholders' committee that I would agree now on a board of directors, practically all of whom should be local men of standing, and on their selection such board could take such steps as desired in electing and creating the executive management of the company."

The stockholders' committee would agree to nothing but the acceptance of its ultimatum—that on the proxy committee of five the committee must have three—Messrs. Kieseweter, Kurtz and Massie. It was upon this issue alone that we agreed to disagree. There is really no issue between the purposes desired by the stockholders' committee and the interests I represent, in so far as the local management is concerned.

The ultimatum of the stockholders' committee was presented to the directors of the company this afternoon and the directors concurred in my position in not consenting to the appointment of a minority of the proxy committee."

Vote Not Mandatory

Plymouth & Sandwich Company Shares
Action to Compel Town Authorities
to Subscribe for Stock

The full bench of the Supreme Court of Massachusetts has issued a decision in favor of the town of Plymouth in an action brought by the Plymouth & Sandwich Street Railway to compel the Selectmen to subscribe for 500 shares of stock in accordance with Chap. 95 Acts of 1911.

TOWN TO SUBSCRIBE TO STOCK

By this act the town was authorized to subscribe for the above shares at not more than par value (\$50,000), to facilitate the construction of the road, and the town voted soon after the passage of the act that "the Selectmen . . . be and are hereby authorized in the name of and on behalf of the town to subscribe for . . . 500 shares . . . at a price not exceeding the par value thereof. Such subscription or purchase shall not be made by the Selectmen until they are satisfied that the balance of the amount necessary for the construction and equipment of said road is fully provided for."

In February, 1917, the railway made demand on the Selectmen for the purchase of 500 shares of its capital stock and on the refusal of the Selectmen a petition for mandamus was brought.

The court finds that on Jan. 1, 1917, the cost of construction and equipment of the road amounted to about \$387,000, "with some thousands of dollars yet to be expended for necessary construction." Of the \$387,000, \$152,000 had been provided by the issue of capital stock; \$217,000 by borrowing money on notes payable in one year after the money was borrowed (some of these notes were overdue), and for the balance of the \$18,000 the company had run in debt.

The decision holds that by the true construction of the vote of the town the Selectmen were given permission to subscribe to the stock and that this is not an instance in which votes giving authority to do an act are to be construed to be votes directing that act to be done. Beyond this, says the finding, the authority or permission to subscribe was made conditional on the Selectmen being satisfied that the balance of the amount necessary for the construction and equipment of the road has been fully provided for; i. e. on the Selectmen being satisfied that the amount necessary for the construction and equipment of the road in addition to the \$50,000 which would come to the company from the subscription of the town, had been fully provided for.

SELECTMEN NOT SATISFIED

A single justice found that the Selectmen in good faith, and after consideration of the situation, are not so satisfied, and the full bench upholds the previous finding. "In saying this," says the finding, "we have not overlooked the fact that the petitioner (the company) had no mortgage debt, that it

planned to refund the construction notes by an issue of stock or other form of permanent security when the road had been completed and was in a position so to do, and the bankers for the petitioner agreed with the petitioner to effect a renewal of such said notes as were not exchanged at maturity for preferred stock, and at the meeting held on Feb. 1, 1917, between representatives of the petitioner and the Selectmen, the former agreed to accept the bonds of the town issued under the votes passed at the meeting of March 25, 1911, or to find purchasers for the same."

B. R. T. Receiver Will Raise \$8,000,000

Lindley M. Garrison, receiver for the Brooklyn (N. Y.) Rapid Transit Company, on Jan. 7 outlined to an extent his financial plans for the immediate future of the property. In answer to a question as to whether the financial condition of the company at the present time was sound, he said:

"That depends on what you call sound. The company has enough money to pay its current operating expenses, the salaries of the motormen, conductors, etc. It has not enough money to complete its construction and equipment of new lines. About \$8,000,000 is needed. Of this \$3,500,000 will be required to obtain the necessary increase in motive power to operate the new type of cars which will be used when the new lines are in operation. It will be necessary to build additions to the existing power stations. The further sum of \$4,500,000 will be needed to provide equipment such as rolling stock, wiring and finishing up certain construction work.

"I expect to apply to the court to obtain this amount of \$8,000,000 through the necessary issuance of receiver's certificates to that amount. I will not, however, apply to the court until after Jan. 15 when the matter of making the receivership permanent comes before the court."

Interest Safeguarding Indianapolis

At a meeting of the directors of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., held on Dec. 31, it was decided to pass the payment of \$120,000 interest charges on the Indianapolis Street Railway general mortgage 4 per cent bonds, and also the payment of \$60,000 to the sinking fund account, due on Jan. 1, 1919. According to statements of officials of the company, this step was taken to safeguard the interests of all concerned in the financial integrity of the company until a meeting of the security holders could be arranged. The semi-annual rental of \$150,000 on the Indianapolis Street Railway was paid on Jan. 1 when due. These developments should all be viewed in the light of the emergency fare matter reviewed elsewhere in this issue.

New Buffalo Committee

Local Interests Promise Co-operation
on Modification of Previous
Deposit Agreement

While the members of the City Council of Buffalo, N. Y., are touring the country investigating the railway situation in the large cities, the situation in Buffalo as regards the International Railway is becoming more acute. The International Traction Company of New Jersey, which owns the stock of the International Railway, failed to pay, on Jan. 1, the interest on its \$18,000,000 of collateral trust 4 per cent gold bonds. The interest was not paid because the International Railway has not declared a dividend since last March.

PREVIOUS AGREEMENT CRITICISED

A second committee has been organized to protect the holders of these securities. Those on this committee are all Buffalo men. The Manufacturers & Traders' National Bank, Buffalo, has been designated as depository for the committee.

In a public announcement this committee says that the so-called protective committee organized on Dec. 10 fails to place any limit whatever on the expenses to be incurred by the committee for compensation of itself and legal counsel and also prevents a bondholder from withdrawing from the agreement after once having deposited his bonds unless 30 per cent of the holders of the deposited bonds file written objections to the plan adopted by that committee. Even then a bondholder can withdraw only by paying to the committee such amount as it may determine to be his proportionate share of its obligations and expenses incurred up to that time.

The new committee, of which H. T. Ramsdell is chairman, fixes the compensation to be paid to the members of the committee and its counsel at not more than 1 per cent of the face value of the deposited bonds. Any bondholder may withdraw from the agreement upon paying his proportionate share of any liability at that time incurred by the committee, provided that not more than 1 per cent of the face value of his bonds shall be charged for compensation and expenses of the committee. Mr. Ramsdell says that the main purpose of this committee is to co-operate with the so-called protective committee already formed, and to endeavor to obtain a modification of the agreement under which it is acting to conform with the above provisions. If this is accomplished the new committee will immediately deposit all of the bonds in its hands with the committee formed previously.

A 5-cent fare is still being charged in Buffalo. The company must weather the financial storm until after the special referendum election in March and there is every indication that the 6-cent fare proposition will again be defeated by the voters.

Financial News Notes

Goshen Suspension Vetoed.—The petition recently filed by the Chicago, South Bend & Northern Indiana Railway for permission to discontinue city service in Goshen and remove certain tracks has been denied by the Council of that city.

Receivership Hearing Put Off.—The hearing of the petition for receivership of the Montgomery Light & Traction Company, Montgomery, Ala., filed by the Commercial Bank and Savings Company, New Orleans, La., which was set for Dec. 20, was continued by Judge Henry D. Clayton of the United States District Court, with the consent of all parties. No definite date has been fixed for the hearing.

Evansville Foreclosure Sale on Jan. 18.—Judge Robert J. Tracewell, of the Vanderburg County Superior Court, has fixed Jan. 18 as the date of sale for the properties of the Evansville Railways. William A. Carson, who has been acting as receiver for the company, has been appointed master commissioner. The tentative plan for the purchase of the road by the bondholders and for its reorganization by them was reviewed in the ELECTRIC RAILWAY JOURNAL for Jan. 4, page 71.

Interurban to Be Sold.—The Columbus, Magnetic Springs & Northern Railway will be sold by the receiver, Charles J. Finger, at Delaware, Ohio, on Jan. 15. As noted in the ELECTRIC RAILWAY JOURNAL for Jan. 4, page 72, the Columbus, Delaware & Marion Electric Company has made a proposition to the residents of the town through which the line operates to assist in financing the road and keep it in operation if they meet certain conditions which are laid down.

Takes Advantage of Grace Period.—Holders of the 4½ per cent general mortgage bonds of the New Orleans Railway & Light Company, New Orleans, La., were recently notified in respect of the interest due on Jan. 1, on the bonds, that the company found it necessary because of abnormally high operating costs to avail itself of the days of grace as provided by the mortgage securing the bonds. It is confidently believed that interest will be paid within this period of grace.

Colorado Springs Default.—Default having occurred in the payment of the interest due on Jan. 1 on the first mortgage 5 per cent bonds of the Colorado Springs & Cripple Creek District Railway, Colorado Springs, Col., James Timpon, Robert Struthers, Jr., and Emerson W. Judd, owning or representing a substantial amount of the bonds, have consented to act as a committee to protect the interests of the bondholders. A protective agreement is in the course of preparation. Holders of the bonds are requested to notify the secretary of the committee, Mr. Judd, New York, of the amount of the bonds which they hold.

City Will Ask for Co-receiver.—The Board of Estimate of New York City on Jan. 3 decided to protect the city's investment in the dual subways by asking for the appointment of a co-receiver of the Brooklyn Rapid Transit Company, for which Lindley M. Garrison, ex-Secretary of War, was appointed temporary receiver. The motion to make the temporary receivership permanent will be heard by Judge Julius M. Mayer of the Federal District Court on Jan. 15, at which time the city of New York will be represented by the Corporation Counsel. It is probable, however, that a formal application for a co-receiver on behalf of the city will be made before that time.

Fresno Interurban Suspends Passenger Service.—The California Railroad Commission on Dec. 24 gave the owners of the Fresno Interurban Railway permission to discontinue street-car service in the city of Fresno on the ground that the traffic offered did not justify a

continuance of operation. The commission found that every day the line was operated resulted in a heavy loss which the company was not able to stand. At the time suspension of passenger service originally came up, the commission ordered the installation of automobile service, but even this failed to pay. The company will, however, continue its freight service.

Receivership Suit Goes to Trial.—A motion by the United Railways, St. Louis, Mo., for dismissal of receivership proceedings brought against it by stockholders has been dismissed by Federal Judge Dyer in the District Court. This means the case will go to trial, probably at the March term of court. The court gave the railway until Jan. 20 to file an answer to the stockholders' bill of complaint. Suit for a receivership was filed on Jan. 7, 1918, by John W. Seaman, New York, a stockholder. On Jan. 31, 1918, the railway filed a motion for dismissal. This was sustained on Feb. 8, Judge Dyer ruling that the bill of complaint was defective. An amended bill was filed on July 13, and the railway again moved it be dismissed. It is this move for dismissal that has now been denied.

Communities Willing to Come to Terms.—The disposition of Bay State Street Railway representatives and remonstrants against the proposed discontinuance of non-paying lines of the road, to come to terms of agreement whereby the road will be enabled to continue operations through the present crisis in its affairs, has led Judge Morton in the United States District Court to terminate the hearing on the receiver's petition to discontinue the non-paying lines. S. H. Pillsbury, attorney for the receiver, suggested to Judge Morton that the decision on the petition be postponed indefinitely, as the majority of the district representatives had made arrangements with officials of the railway whereby their lines will continue to be operated, and that the other community representatives have indicated their desire to discuss similar terms.

Electric Railway Monthly Earnings

GALVESTON-HOUSTON ELECTRIC COMPANY.

Period	GALVESTON, TEX.		Operating Income	Fixed Charges	Net Income
	Operating Revenue	Operating Expenses			
Im., Oct., '18	\$207,068	\$172,775	\$34,293	\$39,551	\$15,238
Im., Oct., '17	197,919	*216,614	71,305	36,403	32,902
12m., Oct., '18	2,599,424	*1,741,101	858,323	470,016	388,307
12m., Oct., '17	2,028,899	*1,349,087	679,812	447,661	232,151

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

Im., Oct., '18	\$21,060	*\$18,725	\$2,335	\$5,026	\$2,691
Im., Oct., '17	26,023	*17,850	8,173	5,076	3,097
12m., Oct., '18	325,155	*219,455	105,700	60,282	45,418
12m., Oct., '17	341,821	*208,703	133,118	61,651	71,487

INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.

Im., Nov., '18	\$3,435,686	*\$2,345,066	\$1,090,618	\$1,336,874	\$1,239,827
Im., Nov., '17	3,454,687	*\$1,900,069	1,554,618	1,097,265	\$1,685,052
5m., Nov., '18	16,170,935	*11,440,439	4,730,496	7,230,483	\$1,439,963
5m., Nov., '17	15,928,087	*9,018,680	6,909,407	5,380,055	\$1,765,798

JACKSONVILLE (FLA.) TRACTION COMPANY

Im., Oct., '18	\$73,973	*\$72,515	\$1,458	\$16,892	\$15,434
Im., Oct., '17	59,743	*42,606	17,137	18,819	1,318
12m., Oct., '18	887,295	*649,781	237,514	196,759	40,755
12m., Oct., '17	678,268	*455,967	222,301	188,224	34,059

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

Period	Operating			Fixed Charges	Net Income
	Revenue	Expenses	Income		
Im., Oct., '18	\$200,632	*\$147,242	\$53,390	\$28,172	\$134,800
Im., Oct., '17	298,951	*142,029	156,922	29,148	117,357
12m., Oct., '18	3,028,815	*1,855,037	1,173,778	339,746	1,949,031
12m., Oct., '17	2,363,682	*1,346,955	1,016,727	349,534	1,676,956

PENSACOLA (FLA.) ELECTRIC COMPANY

Im., Oct., '18	\$40,173	*\$34,135	\$6,038	\$8,533	\$2,495
Im., Oct., '17	25,807	*15,592	10,215	7,808	2,407
12m., Oct., '18	473,692	*320,377	153,315	97,739	55,576
12m., Oct., '17	331,242	*193,106	138,136	93,405	44,731

SAVANNAH (GA.) ELECTRIC COMPANY

Im., Oct., '18	\$106,443	*\$83,115	\$23,328	\$25,767	\$2,439
Im., Oct., '17	89,589	*59,743	29,846	23,226	3,320
12m., Oct., '18	1,145,310	*788,949	356,361	300,375	55,986
12m., Oct., '17	942,348	*625,264	317,084	288,599	28,125

TAMPA (FLA.) ELECTRIC COMPANY

Im., Oct., '18	\$82,785	*\$48,241	\$34,544	\$5,087	\$29,457
Im., Oct., '17	82,709	*46,814	35,895	5,501	30,394
12m., Oct., '18	1,011,114	*603,753	407,361	61,529	368,832
12m., Oct., '17	1,007,494	*557,897	449,597	54,532	93,067

* Includes taxes. † Deficit. ‡ Includes non-operating income. § Includes accruals under rapid transit contracts with city payable from future earnings.

Traffic and Transportation

Washington Wants More

Indications That Companies There Will Apply for More Than Present Five-Cent Fare

The Washington Railway & Electric Company and the Capital Traction Company, Washington, D. C., will probably ask for an increase in fares in the near future. This was intimated by railway officials at a public hearing conducted by the Public Utilities Commission of the District of Columbia to consider arguments for and against inter-company transfers.

COMPANIES WANT FULL HEARING

The hearing was a result of recommendations made by John A. Beeler, traffic expert in the employ of the commission, advocating inter-company transfers at certain points, affecting all car lines operating in Washington.

While the railway companies are opposed to some of the transfer points recommended, George E. Hamilton, president of the Capital Traction Company, stated that his company would not contest a full hearing. It is presumed that the other companies will assume the same attitude.

Mr. Hamilton stated that it was the belief of the officials of his company that the 5-cent cash fare which has been in effect was insufficient at present to produce the revenue necessary for a reasonable return to stockholders and bondholders. If it became evident that this was true, he said, the companies would expect the commission to increase revenues through whatever method was deemed best.

It was pointed out by John A. Hanna, vice-president of the same company, in charge of operations, that the operating revenues for December, under the straight 5-cent cash fare, had been less than the operating income for any month during the period from March, 1917, to August, 1918, inclusive. He said the general falling off in operating revenues was due in part to the influenza epidemic and in a measure to a decrease in population, following the cessation in war activities.

DISAGREE ON ESTIMATED LOSS

Aside from any monetary loss the companies might incur by reason of the proposed inter-company transfer points, which was estimated at approximately \$30,000 in the Beeler report, but which railway officials state will reach to between \$50,000 and \$60,000 annually, Mr. Hanna pointed out that such a system would cause increased congestion at certain transfer points which are now troublesome problems and would also seriously overcrowd cars now running to capacity.

Railway officials stated that under

the proposed inter-company transfer system the companies would be compelled to carry long-haul passengers at a loss and suggestions were made tending to introduce a new scale of fares which would increase the passenger fare on lines running to suburbs.

Latest Fare Tabulation

American Electric Railway Association Again Reports Fare Increases in Thirty-one Cities

The information bureau of the American Electric Railway Association announces fare increases in thirty-one more cities since its last report. The supplementary list now made public is as follows:

City	Population	Nature of Increase
Chicago, Ill. (el. lines).....	2,547,201	Five to 6 cents.
Boston, Mass.....	767,813	Seven to 8 cents.
Syracuse, N. Y.....	158,559	Five to 6 cents.
Grand Rapids, Mich.....	152,861	Five to 6 cents.
Cambridge, Mass.....	114,293	Seven to 8 cents.
Utica, N. Y.....	89,272	Five to 6 cents.
York, Pa.....	88,618	Seven to 8 cents.
Malden, Mass. (Bos. el.).....	51,770	Five to 7 cents.
Chelsea, Mass. (Bos. el.).....	52,243	Seven to 8 cents.
Newtown, Mass.....	43,403	Seven to 8 cents.
Dacotah, Ill.....	44,445	Reduced rates
	41,483	tickets abolished
Charlotte, N. C.....	40,759	Five to 7 cents.
Everett, Mass.....	40,160	Seven to 8 cents.
Brookline, Mass.....	33,526	Seven to 8 cents.
Medford, Mass.....	26,681	Seven to 8 cents.
Walla Walla, Wash.....	26,067	Five to 6 cents.
Gloversville, N. Y.....	22,314	Five to 6 cents.
Enid, Okla.....	21,356	Five to 6 cents.
Tucson, Ariz.....	17,324	Five to 8 cents.
Glens Falls, N. Y.....	17,160	Five to 6 cents.
Ithaca, N. Y.....	16,017	Six to 7 cents.
Long Branch, N. J.....	15,733	Five to 6 cents.
Watertown, Mass.....	15,188	Seven to 8 cents.
Asbury Park, N. J.....	14,629	Five to 6 cents.
Saratoga, N. Y.....	13,839	Five to 6 cents.
Helena, Mont.....	13,789	Five to 7 cents.
Morristown, N. J.....	13,410	Five to 6 cents.
Arlington, Mass.....	13,073	Seven to 8 cents.
Tiffin, Ohio.....	12,862	Five to 7½ cents.
Fuscelloss, Ala.....	10,824	Five to 6 cents.
Johnstown, N. Y.....	10,678	Five to 6 cents.
Bowling Green, Ky.....	9,900	Five to 10 cents, (two tickets for \$1)
Ballston Spa, N. Y.....	4,138	Five to 6 cents.
Salisbury, N. C.....	7,153	Five to 7 cents, (four tickets for 25 cents.)

A recapitulation of fare information for cities of more than 40,000 population has been made by the association. A summary of this information follows:

Fare Increases Granted	No. Cities
Six-cent unit zones, two zones, or more.....	1
Five-cent unit zones, two zones.....	1
Six-cent central zone, 2-cent suburban zone.....	3
Five-cent central zone, 2 cents outside zone.....	2
Five-cent central zone, 3 cents a mile outside.....	1
Seven-cent fares, plus 1 cent for transfer.....	11
Seven-cent fares.....	5
Six-cent fares, plus 1 cent for transfer.....	4
Reduced rate tickets eliminated.....	13
Fare Increase Applications Pending	
For 10-cent fare.....	10
For 8-cent fare.....	7
For 7-cent fare.....	8
For 6-cent fare, one cent for transfer.....	1
For 6-cent fare.....	2
For 5-cent fare.....	2
For a charge for transfers.....	3
For a zone system.....	3
For general relief to be left to authorities.....	4
Note—This list includes fifteen cities in which no increase has already been granted.	
Cities negotiating for purchase of property.....	2
Cities in which no action has been taken.....	15
Cities in which relief has been refused.....	13

Four Cents a Mile

Road in Thinly Populated Farming Country Allowed Extraordinary Rate for Cash and Ticket Fares

The Public Service Commission for the Second District of New York on Dec. 31 passed an order fixing the maximum fare on the Southern New York Power & Railroad Corporation's lines, outside Oneonta, at 4 cents a mile for cash and ticket fares and 3½ cents per mile for mileage book rate. The commission's order says no changes are to be made in the present schedule of fares in force in Oneonta. The railroad operates from Mohawk to Oneonta, with a branch extending from Iredex to Cooperstown and a local system in Oneonta. The present fare rate is 3 cents a mile. The company alleged that this charge was insufficient to yield reasonable compensation for the services rendered.

It was shown that for the year ended Aug. 31, 1918, there remained of total receipts of the company, after paying operating expenses, taxes, rent of track and equipment, \$66,457 out of which to pay fixed charges, depreciation and contingencies and any return on capital invested. The company has outstanding \$952,000 of bonds and unfunded interest-bearing debt amounting to \$122,725. Annual interest payable on this indebtedness amounts to between \$50,000 and \$55,000. Increases in pay dating from Sept. 1 will increase operating expenses by \$15,000 per annum, not reflected in the above figures. It appeared probable that the company, provided the volume of its business and rates remained the same, would be in receipt of barely sufficient revenue to pay its operating expenses, taxes and fixed charges.

COMMISSION GUIDED BY COURT

Commissioner Cheney, who wrote the opinion in the case, said:

We have hesitated before consenting to an increase of fare to 4 cents per mile, which is a higher rate than is charged for the carriage of passengers by any other road in the State except for the short lines operating under peculiar conditions. The reason of the hesitation is that we doubt the effect of the increase of fare. But the Court of Appeals has held that "the question what general policy should be adopted by the respondent in developing suburban traffic will be decided by it and not by the State. The methods and rates which it should apply to the development of any policy were subject for regulation but the question whether the welfare of the road would be best subserved by one policy or another was a subject to be decided by the officers and stockholders of the corporation."

In view of that decision we are inclined to adopt the only method which appears to be available to enable this road to render service to the communities whose principal transportation facilities are afforded by it, and not assume to decide questions of policy in corporate management.

We therefore find that the rates and charges for passenger service now charged by the Southern New York Power & Railway Corporation are insufficient to yield a reasonable compensation for the service rendered and are unjust and unreasonable and that the just and reasonable fares and charges for such service to be determined and in force by it as a maximum shall be at the rate of 4 cents per mile for tickets and cash fares and 3½ cents per mile for mileage books.

Interurban Advances

Indiana Board Approves Indianapolis & Cincinnati, Union Traction and T. H., I. & E. Petitions

Interurban passenger fares were increased to 2½ cents a mile on the lines of the Indianapolis & Cincinnati Traction Company and the Union Traction Company of Indiana by orders issued on Dec. 31 by the Public Service Commission. The order in the case of the Terre Haute, Indianapolis & Eastern Traction Company, the third line asking for an increase over the present fare of 2½ cents a mile, was not handed down until Jan. 6.

NEW RATE EFFECTIVE JAN. 10

The increased rate was to take effect on Jan. 10 and the order is to remain operative until June 30, 1919. The rate of the Indianapolis & Cincinnati Traction Company was increased from 2 to 2½ cents a mile early last year and the rate of the Union Traction Company was increased from 2 to 2½ cents in June, 1918.

The commission takes the position in the orders that it is not primarily interested in the valuation of the interurban companies, but that its chief concern is to keep the electric system of transportation in operation.

The commission points out that the chief source of revenue for the interurban companies is the passenger fare. The order relates that interurban railways in Ohio and Illinois are now operating under a 3-cent rate, the same as is charged by the steam railroads.

Whether the increased rate from 2½ to 2½ cents will have a tendency to reduce the number of passengers and thereby defeat the purpose of the order, is considered by the commission in the order. It is noted that the various companies showed that there was a decrease in passenger traffic under the operation of the 2½-cent rate and that very little of the theoretical increase was realized.

INTERURBAN OUTLOOK NOT PROMISING

In summarizing the interurban situation in Indiana the order says:

"This railroad system, made up of several railroads, is easily one of the great assets of the State and its future, on an assumed basis of \$30,000 to \$32,000 a mile, is menaced by new conditions of which the most prominent are greatly increased costs of operation due to conditions growing out of the war, and the inroads of the auto passenger and truck cars. The signing of the European war armistice will tend to ease the situation somewhat, but it will probably increase the building of good roads and the number of automobiles—the 'natural enemies' of the interurban railroads of this character."

The order says that the commission did not accept the book value of the Terre Haute, Indianapolis & Eastern property submitted at the hearing of the case in December. This valuation

was \$26,050,558. "The prayer of the petitioner is justified on a basis of approximately half this sum," the order says.

Attention is called to the fact that the only remonstrance to the increase in rates by the Terre Haute, Indianapolis & Eastern Traction Company was made by the citizens of Ben Davis. The evidence showed that 90 per cent of the travel between Indianapolis and Ben Davis was on commutation tickets not affected by the basic mileage rate increase.

In the order of the Union Traction Company it is observed that the net operating revenue of this company under the operation of the 2½-cent fare in July, August and September, 1918, was \$343,982 and in 1917 for the same period was \$342,197. But in 1918 it is shown that the cost of maintenance of way and structures was 12.96 per cent greater than for the same period in 1917.

EMERGENCY RATES ONLY

The 2½-cent rate is designated as an emergency rate in all three orders. It is to be computed upon the penny zone system and the minimum charge is to be 10 cents, except within the limits of incorporated cities and towns.

New York Opposed to Fare Increase

The attitude of the present city administration of New York toward the applications of the Interborough Rapid Transit Company and the New York Railways for increases in fares was announced at City Hall on Jan. 3 at the conclusion of a two-hour executive session of the board. The Interborough has petitioned for the right to charge 8 cents on the subway and "L," and the surface car lines 8 cents, with 3 cent transfers. Announcement of the Board of Estimate policy was made by Comptroller Craig, as spokesman for the Board. After some preliminary remarks the Comptroller said:

"We have determined not to consent to an increased fare to any private operator such as the Interborough. If the dual subway contract is modified at all it must be modified in other particulars so as to make the modification reciprocal and mutual."

"Are you impressed with the need of higher fares?" was asked.

"Temporarily," said Mr. Craig, "there is an occasion for a greater fare than conditions justified at the time the contracts were made."

This, however, applied only to the subways and elevated as operated under the dual subway contract and did not in any wise include reference to the surface situation.

"What if the lines were operated by the city?" was another question.

"Under the rapid transit act," answered the Comptroller, "municipally operated lines must be self-sustaining. Fares would have to be adjusted to meet the situation."

Higher Fare Warranted

Higher Wages and Fair Return for Milwaukee Must Come from Increased Fares

As the return on the investment of the Milwaukee companies is much below what can be regarded as a fair amount, the entire cost of any increase in wages should be met through increased rates. Such is the conclusion reached by Hagenah & Erickson as a result of an examination made for the employees' association of the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company.

VALUATION CONSERVATIVE BASIS FOR RATES

In answer to specific questions asked by the association, the examiners found that the valuation of \$47,564,162, adjusted to June 1, 1918, by the method followed by the Wisconsin Railroad Commission, presents an extremely conservative basis for rate adjustments, and that an annual allowance of 3 per cent of the depreciable property for depreciation is well within the range of what would be considered by any authority a fair amount.

In regard to what constitutes a fair rate of return, the report points out that this is ordinarily not less than 7.5 per cent of the fair value. Courts and commissions have generally held that a return of from 7.5 to 8 per cent is not only reasonable but necessary to attract capital. At present a return of 8 per cent is probably too low. In the past ten years, it is said, the Milwaukee companies' return has not been unreasonable. The estimated return for 1918 is 4.8 per cent. The railway system alone shows 3.84 per cent; the electric and heating system, just over 6 per cent. These returns are said to be too low for the best interests of the service.

WAGE INCREASE MUST BE MET BY FARE ADVANCE

Lastly, the report states that the adoption of the standard of wages recognized by the War Labor Board would mean an increase of \$640,000 a year for railway employees and shop men and \$265,000 a year for electric and heat department employees, a total of \$905,000. On the point of electric railway wages Mr. Erickson says:

The entire cost of any increase in wages in this department must come through increased fares, and we believe that such increase should be sufficient not only to cover the advance in wages to the National War Labor Board standard, if such action is contemplated, but that action should also be taken at such time to further increase the earnings of this department to the end that the net earnings, after such increase in wages, will yield a return more in accord with what public service commissions and courts have regarded as a fair return on a public utility investment.

The auditing committee of the employees' association, in recommending the adoption of the examiners' report, states that it has no suggestions to make regarding the rate of return ex-

cept to point out that savings and loan stock secured and protected by rigid State laws earns in excess of 7 per cent. Continuing the committee says:

Since the report was written, the Wisconsin Railroad Commission has increased electric rates. In addition to providing for increased cost of coal, materials and taxes,

the commission has allowed 1.9 mills for wages in the electric and heating departments. This amounts to \$350,000 per year. This increase in wages was made on the date the commission's order was delivered. The electric order made no provision for increased wages for electric railway employees. The \$40,000 a year needed to bring the wage scales of such employees up to War Labor Board standards can be provided only through increased railway fares.

in Illinois and St. Louis in favor of the Traction System. This is because of the fact that in preparing its interstate tariffs the Traction System has pursued its past policy of straight mileage fares into St. Louis and has made no special or arbitrary charge for transportation across the Mississippi River at St. Louis.

Free handling of baggage on the same basis as that prevailing on the government-operated steam railways is announced by the Illinois Traction System to take effect with the establishment of the new 3 cents a mile interstate passenger rates on Jan. 10.

Features of Indianapolis Decision

Emergency Relief Granted Previously to Company Considered Sufficient in View of Downward Price Tendency

The ruling of the Public Service Commission of Indiana in the case of the Indianapolis Traction & Terminal Company declining to grant a further increase in fares on the Indianapolis city lines beyond the 5-cent fare established last October and abolishing the 1-cent charge for transfer, with rebate, all referred to briefly in this paper for Jan. 4, states that the emergency relief which has been granted the company in the increase to a straight 5-cent fare will continue in effect until 100 days after the final peace terms are signed and ratified by the United States.

SINKING FUND MONEY ALL EXPENDED

The commission finds that an emergency still exists, but believes that owing to a downward tendency in prices, the company will now secure relief from the excessive operating costs which have existed, and with voluntary action on the part of the company in reducing sinking fund and fixed charge accounts, sufficient revenue will be received to discharge all its obligations.

The commission suggests that a special meeting of stockholders and bondholders be arranged with a view to diverting the money collected in sinking funds to the immediate purchase of additional modern equipment. At the time of issuing the order the commission apparently was under the impression that amounts aggregating more than \$2,000,000 which have been paid into sinking fund account were in cash, and the order was intended to provide for the use of these funds for improvements to the property.

This money, however, has been used to purchase bonds for the sinking fund, and these bonds have been canceled and the money is not available for the purchase of equipment, etc.

The commission also ordered the company to reorganize its transportation department as a possible means of bettering service, and suggested changes in the personnel of that department at least during the period of reorganization.

The order discusses at some length the financial structure of the company; its earnings during the sixty-day trial period of the 5-cent fare established in October, the result of which the commission believes was misleading owing to the existence of the "flu" ban during a part of that period; the reports filed by the company and the former

public directors; the discrepancy between the report of the company's checkers and those of the commission as to the percentage of uncollected fares, which varied from 3 to 13 per cent, etc.

MR. MORGAN HOPEFUL

Marshall S. Morgan, Philadelphia, vice-president of the company, who has been in Indianapolis assisting in formulating steps to carry out the order of the commission, stated that the situation was very hopeful in that the commission in its order of Oct. 12 had placed a tentative valuation on the Indianapolis property of between \$14,000,000 and \$16,000,000, which the commission's engineer had stated was a low estimate.

Mr. Morgan stated that if the commission based its rate on this valuation and allowed 7 per cent for a just return on the investment and 3 per cent for depreciation, as had been done in the case of other Indiana utilities, the company would have sufficient funds to meet all fixed charges, obtain new capital and make improvements to the property. It was stated by officials of the company that the points suggested by the commission would be taken up in turn and every effort made to comply with the terms of the order. It was pointed out that very little time had been given the company between the date of the order, Dec. 28, and Jan. 1 when the payment of bond interest and dividends and the installment into sinking fund were due.

PREPAYMENT COLLECTION PROPOSED

The company is arranging for adapting all of its double-truck closed cars for prepayment fare collection.

New I. T. S. Interstate Tariff

New tariffs recently approved by the Interstate Commerce Commission allow the Illinois Traction System, Peoria, Ill., to charge the same rate of fare as that of the steam carriers. Previously the system has maintained 2 cents a mile fares, but a charge of 25 cents has been made for handling each piece of baggage.

Although the new interstate tariffs, which correspond with the intrastate rates now prevailing on the traction lines by order of the Federal Court, will be on the same basis as the steam carriers, it is stated that a differential in rate will still exist between points

Rhode Island Fare Case Jan. 13

The hearing set for Dec. 30 before the Supreme Court of Rhode Island on the appeals taken by several municipalities of the State from the recent ruling of the Public Utilities Commission increasing the fares on the lines of the Rhode Island Company was postponed to Jan. 13 by agreement of counsel.

The hearing was originally set for Dec. 16, but before that date G. Frederick Frost, attorney for the Rhode Island Company, was injured in an automobile accident and at his request the hearing was postponed for two weeks as it was expected by Dec. 30 he would be able to appear in court. His condition, however, did not improve as rapidly as was expected and accordingly another postponement was permitted.

Several months ago the Public Utilities Commission authorized the company to increase fares and approved the establishment of a zone system. This aroused the taxpayers in a number of the towns and East Providence, North Providence, Johnston and Warwick through their attorneys filed an appeal from the ruling of the commission.

Denver Fare Demonstration

Service on the lines of the Denver (Col.) Tramway was completely suspended for six and a half hours on the evening of Jan. 2 because of demonstrations by crowds of men and boys who objected to the collection of a 7-cent fare. Service was resumed early on Jan. 3 on regular schedules.

The trouble began when homeward-bound workmen in the stock yards district refused to pay more than a 5-cent fare, ejected the trainmen and ran the cars into the city. As incoming cars reached the business district, they were abandoned.

The 7-cent fare, which was approved by the State Public Utilities Commission, although opposed by the city officials, was put into effect on Dec. 26. For several weeks previous to Dec. 26 a 6-cent fare had been in effect with the approval of both the State Utilities Commission and the City Council. The conditions of the grant of the 7-cent fare in Denver were reviewed briefly in the ELECTRIC RAILWAY JOURNAL for Dec. 21, page 1119.

Transportation News Notes

Wisconsin Road Wants Increase.—The La Crosse & Onalaska Street Railway, La Crosse, Wis., operating an interurban line, has filed with the Railroad Commission of Wisconsin a petition for an increase in fare.

P-A-Y-E in St. Paul.—The pay-as-you-enter system was adopted for use on the St. Paul lines of the Twin City Rapid Transit Company on Dec. 27. This method of operation has been in use for some time in Minneapolis except on the suburban, intercity and two or three city lines of the company.

Stockton to Charge Six Cents.—The Railroad Commission of California has authorized the Stockton Electric Railroad to charge a 6-cent fare, on the ground that the increase is necessary to meet wage increases and the higher cost of materials and supplies. The company had applied for permission to charge 7 cents.

Columbus Request Denied.—The Public Service Commission of Indiana has denied the petition of the Central Indiana Lighting Company for an increase in fare from 5 to 7 cents at Columbus. As in several other cases decided recently the commission ruled in effect that the war emergency urged by the company in its petition no longer existed.

Kansas City Fare Award Sustained.—The Supreme Court of Missouri on Dec. 31 sustained the Utilities Commission of that State in the 6-cent fare award to Kansas City (Mo.) Railways. All the judges concurred in reversing the Cole County Circuit Court and in ordering the lower court to affirm the action of the commission. This is merely a reflection by the court of the action taken in the St. Louis fare case, referred to previously in this paper and again elsewhere in this issue.

Kokomo Petition Withdrawn.—The Public Service Commission of Indiana on Dec. 26 issued an order permitting the Indiana Railway & Light Company to withdraw the petition it filed with that body some months ago for authority to increase fares in Kokomo. The company filed its motion on Dec. 14, but the commission did not take immediate action on it. The review of the commission indicates that the relief that was asked for by the company would have been denied had the petition been carried to a hearing.

Distinction Between Cash and Ticket Fares.—Because the ticket fare under the new ordinance is 5½ cents on cars of the Cincinnati (Ohio) Traction Company, two persons, a man and woman, attempted to ride on the payment of 11

cents in cash. C. W. Culkins, Street Railroad Director, approved the act of the conductor in ejecting them. The ordinance provides for a cash fare of 6 cents each for passengers and for the sale of tickets at 5½ cents each in strips of six. An increase in fare under the Cincinnati service-at-cost franchise went into effect on Jan. 1.

St. Louis Fare Rehearing Denied.—The State Supreme Court of Missouri has overruled the motion of City Counselor Daves of St. Louis for a rehearing before the court, in connection with its decision reversing the lower court in the 6-cent fare case affecting the United Railways, St. Louis. As explained in the ELECTRIC RAILWAY JOURNAL for Dec. 28, page 1155, the Supreme Court of the State reversed and remanded the decision of Circuit Judge J. G. Slate of the Cole County Circuit Court, who on Sept. 7 held that the Public Service Commission was without jurisdiction to grant an increase in fare.

Plans Appeal to Legislature.—The formal order of notice of a petition to the General Assembly, at its coming session, to amend the charter of the Danbury & Bethel Street Railway, Danbury, Conn., by repealing the portion of section 6 of the charter which provides for the collection of a 5-cent fare within the borough of Danbury and within the borough of Bethel. Since the granting of the charter, in 1885, Danbury has become a city, but the 5-cent fare provisions apply to the limits of the city as now extended. The application is made by Judge J. Moss Ives, as receiver for the company.

St. Louis Company Wants Action.—An early hearing on the proposal for a zone system and on other plans for increasing the revenue of the United Railways, St. Louis, Mo., is requested in a letter written by President McCulloch of the company to the Public Service Commission of Missouri. Mr. McCulloch declares that the 6-cent fare, with the increase in wages which went into effect even before the fare increase did, does not enable the company to meet its expenses and net a 6 cent return on the investment, and that further relief must be had. Mr. McCulloch's request for such relief was first made to the commission on Aug. 31.

Auburn Increase Allowed.—The Public Service Commission for the Second District of New York on Dec. 31 authorized the Auburn & Syracuse Electric Railroad to charge a 6-cent fare in Auburn, including the lines to Owassac Lake and to the Sole Cemetery, effective on five days' notice. The increase is during the war and for a reasonable time after the peace treaty becomes effective. Because of franchise restrictions the company's application for 6-cent fare came within the Court of Appeals decision in the Quinby case. The Auburn authorities, however, on Dec. 10 waived the franchise restrictions and submitted the matter to the commission for determination.

Skip Stops Withdrawn in Springfield.—After receiving an order from the Fuel Administration on Dec. 12 A. D. Mackie, general manager of the Springfield (Ill.) Consolidated Railway, announced that the skip stops would be abolished. The fuel administrator at Chicago for the district in which Springfield is located notified the local administrator in Springfield that the matter of skip stops was purely optional with the Council and citizens of Springfield and that he did not insist upon the order being carried out to continue the stops. Mr. Mackie had previously stated to the Mayor that skip stops would be continued in Springfield until the fuel administration ordered otherwise.

Special Courtesy to the Blind.—A step toward greater courtesy was taken by the Tampa (Fla.) Electric Company on Dec. 9 when cards instructing operators to give special assistance were distributed to the blind people of Tampa. A person holding one of these cards may have a car stopped at any place on the line, whether a corner or within the center of a block, and a like convenience will be accorded them when boarding cars. They will only have to stand near the track and hold the card in the air, where it can be seen by the motorman. The new plan to assist the blind was devised by C. F. W. Wetterer, general manager, following a discussion at a meeting of the Blind Welfare Association.

New Albany I. C. C. Hearing, Jan. 22.—Col. Charles L. Jewett, head of the legal department of New Albany, Ind., has been notified that the Interstate Commerce Commission on Jan. 22 will hold an oral argument on the petition of the Louisville & Southern Indiana Traction Company, and Louisville & Northern Railway & Lighting Company, regarding increases in fares between New Albany, Jeffersonville and Louisville. M. A. Pattison, attorney examiner, conducted a hearing on the petition in Louisville last July, after which a finding was returned in which the petition was denied. When the objections of the company were sustained by the commission, Colonel Jewett was apprised of the hearing that has been scheduled.

Front-End Collectors Now "Ground Conductors."—The Dallas (Tex.) Railway is using "ground conductors" to handle the crowds boarding cars in the downtown sections during the rush hours. Under this plan, men with authority to collect fares have been stationed at the most important boarding points on Main, Commerce and Elm Streets. These men stand at the front end of cars as they stop to take on passengers, and the patrons are thus permitted to board the cars by both front and rear entrances, thus effecting a saving in the time required to load the cars. This system of fare collection at congested points has been used elsewhere with success, but to Dallas evidently belongs the credit for coining the term "ground conductors," as applied to the front end collectors.

Gary Increase Denied.—The Public Service Commission of Indiana has denied the application of the Gary Street Railway for an increase of its city fares to 6 cents. This means that the present 5-cent fare will remain in force. The application of the company was filed with the commission on Aug. 8 but the hearing was not held until Nov. 12. The company also asked for authority to increase its fare on the Gary and Hammond line and on the Gary and Indiana Harbor line from 5 cents to the city limits to a fare of 8 cents. Denial of this application was also included in the decision handed down by the commission. This means that the present 10-cent fare between Gary and Hammond and between Gary and Indiana Harbor will remain in force.

Six-Cent Fare Request Refused.—The State Railway Commission of Nebraska on Dec. 28 refused to grant the Lincoln Traction Company an increase in fares on its city lines, and the present 5-cent fare was ordered to remain in force until June 30, 1919, when the commission promises to reconsider the matter. The company's application, filed on Nov. 10, last, asked for a 6-cent fare with an additional charge of 1 cent for transfer privileges. In August last the commission authorized a 5-cent fare, effective from Sept. 1, with 6 cents between certain suburban points. Appeals are now pending in the courts from previous decisions of the commission on fare. Previous reference to the matter were made in the *ELECTRIC RAILWAY JOURNAL* for Aug. 10, page 262; Sept. 21, page 529; Dec. 7, page 1030.

Tampa Discusses Skip Stops.—The responsibility of eliminating skip stops in Tampa, Fla., will fall on the shoulders of the City Council, if this move is taken in the near future by the Tampa Electric Company. C. F. W. Weterer, manager, has been informed by the Electric Railway Board at Washington that the fuel administration has not authorized the elimination of the skip stop. The company was on the verge of putting cars back on the old schedules, but the order was rescinded and a letter was written the City Council stating the skip stop would not be eliminated without a resolution from that body ordering stops at every corner. Several of the Councilmen have agitated the elimination of the skip stop and during the week ended Dec. 7 a letter from the city clerk, written at the direction of the Council, asked the railway to get back on the old system.

Butte Denied Seven-Cent Fare.—The Public Service Commission of Montana has denied the petition of the Butte Electric Railway for a cash fare of 7 cents. The commission has also restored the 23-cent fare for children and mail carriers on duty, thus doing away with the 3-cent fare provided for in its order giving the company the right to increase its fares from 5 cents to 6 cents. This order was made on Nov. 30, and the company had until Dec. 5

to file its schedule of rates in conformity with the rates of 6 cents for adults and 3 cents for children and mail carriers on duty. Before Dec. 5 arrived the company petitioned the commission to amend its order of Nov. 30, by striking therefrom all reference to the tariff for "children and mail carriers on duty, 3 cents," and "all reference to 23-cent fares and modify the order to provide for a ticket fare of 6 cents for the service as had heretofore been provided for 5 cents and to provide a cash fare of 7 cents."

San Diego Hearing This Month.—A public hearing on the application of the San Diego (Cal.) Electric Railway to the Railroad Commission of California for investigation of rates, and, in fact, all other conditions bearing upon the conduct of the railway will, it is expected, be held in San Diego during the present month. The company, although losing money, is not asking any definite increase in its present fares; it is simply laying its cards face up on the table before the commission and the public with the object of acquainting all concerned with the serious conditions now confronting the owners and management. The company has most carefully prepared its case, giving a detailed history of operation and financial conditions from the horse-car days to the present time. So the public may know, its exhibit may be found at the Chamber of Commerce by all who wish to read it. Copies are also in the hands of city attorneys of San Diego, Coronado, East San Diego and National City.

Municipal Line Increases Fare.—The London & Port Stanley Railway, London, Ont., a municipally-owned radial line, is to have its second war-time rate increase. Rates were fixed following electrification and rehabilitation in 1915. Six months ago passenger and freight tariffs were advanced, but a 30-cent round-trip summer excursion rate was retained for the benefit of residents of London. The commission operating the road reported to the City Council that within the past six months costs increased at the rate of \$50,000 per annum, and the Council determined to support an application to the federal parliament to alter the charter by striking out the provision for the 30-cent fare. A rate of 50 cents for adults and 25 cents for children will be substituted. The provincial government has denied an appeal by the city of St. Thomas and the village of Port Stanley for the right to tax the London & Port Stanley Railway, which is now exempt as a publicly-owned utility.

Utica and Syracuse Service Inquiry.—The Public Service Commission for the Second District of New York arranged to confer with the municipal authorities in Utica and Syracuse on Dec. 10 over local transportation facilities. Representatives of the New York State Railways were also invited to attend. At prior conferences arrangements were made whereby ad-

ditional power service was to be provided the New York State Railways in Utica by the Adirondack Electric Power Corporation, and while there have been delays it is stated they were due to unavoidable happenings. The Adirondack Power Corporation, which is installing a new transmission line from Amsterdam to Utica to enable it to supply more power to the electric railroad, is progressing its contract and the line is expected to be completed by Dec. 15. The commission some time ago investigated transportation conditions in Syracuse with the result that service was improved. The Syracuse conference will be to review the present conditions.

Riders Should Decide Skip-Stop Question.—Thomas E. Mitten, president of the Philadelphia (Pa.) Rapid Transit Company, sent a letter to Councils on Jan. 2 in which he further defended the skip-stop system. He declared the system in full effect increased the company's carrying capacity equal to 200 cars, that it would save \$1,000,000 a year and reduce the riding time of patrons on the lines from five to fifteen minutes a day. The number of automobile buses in Philadelphia increased more than 250 per cent since 1914, and to that, according to Mr. Mitten, could be credited a considerable portion of increased electric railway accidents. Mr. Mitten sent with the letter a copy of the address delivered by him on the skip-stop system before the committee of thirteen at a meeting in City Hall on Dec. 27. In connection with this address he again informed Councils that, as publicly stated, the plan of the management of the company provides that the car rider finally shall say whether the skip-stop system shall go or stay.

Charleston Suburban Fare Increase.—It was announced on Dec. 28 that the State Railroad Commission of South Carolina at its next meeting would issue an order allowing an increase in the passenger fares of the suburban lines of the Charleston Consolidated Railway & Lighting Company, effective on Jan. 1. There will be a straight fare of 5 cents from the incorporated limits of the city of Charleston to the Navy Yard, and a straight fare of 3 cents from the Navy Yard to North Charleston, round-trip tickets between the two latter points, however, being 5 cents each. The order of the commission is for ninety days and, at the expiration of that time, should there be no complaint to the commission the revised rate will be permanent. Should there be a complaint, a new hearing will be granted. The increased rates are the result of a hearing held by the commission on Dec. 12. At the time of the award of the War Labor Board in the Charleston wage case that body directed the attention of the commission to the need of more revenue by the company. This phase of the matter was referred to in the *ELECTRIC RAILWAY JOURNAL* of Dec. 14, page 1068.

Personal Mention

Henry S. Lyons retired on Dec. 31 as secretary of the Boston (Mass.) Elevated Railway.

C. E. Cole has been appointed roadmaster of the York (Pa.) Railways to succeed R. E. L. Kelb.

J. H. Richards has been appointed secretary of the Boise (Idaho) Railway to succeed T. R. Hamer.

H. A. Smeck has been appointed claim agent of the Binghamton (N. Y.) Railway to succeed A. K. Martin.

David Wilson has been appointed secretary of the Railroad Corporation of Arkansas to succeed J. B. Dunlap.

W. D. Humphrey has been appointed chairman of the Oklahoma Corporation Commission to succeed J. E. Love.

T. J. O'Connor has been appointed roadmaster of the Texas Electric Railway at Dallas, to succeed J. L. Adams.

Robert MacKenzie has been elected president of the Sarnia (Ont.) Street Railway, Ltd., to succeed James Flintheft.

Charles England has been appointed auditor of the Fort William (Ont.) Electric Railway to succeed J. C. Crawford.

D. L. Waters has been appointed auditor of the United Traction Company, Albany, N. Y., to succeed W. H. Elder.

W. T. Lee has been appointed chairman of the Corporation Commission of North Carolina to succeed Edward L. Travis.

L. Demery has been appointed master mechanic of the Hornell (N. Y.) Traction Company, to succeed M. J. Gordon.

William F. Breidenbach has been appointed secretary of the Sheridan (Wyo.) Railway to succeed William R. Sullivan.

J. Milton has been appointed master mechanic of the Chicago, Aurora & DeKalb Railroad, Aurora, Ill., to succeed William Harmes.

E. H. Mason has been elected second vice-president of the City & Suburban Railway, Brunswick, Ga., to succeed A. deSola Mendes.

S. L. Lupton has been appointed a member of the State Corporation Commission of Virginia to succeed Alexander Forward.

L. LeMay has been elected secretary and treasurer of the Memphis (Tenn.) Street Railway to succeed the late W. H. Burroughs.

Harry K. Tompkins has been appointed secretary of the Fishkill Electric Railway, Beacon, N. Y., to succeed W. H. Southard.

A. Shiel has been appointed auditor of the Northwestern Pennsylvania

Railway, Meadville, Pa., to succeed C. H. Allen.

Orin Stiffler has been appointed superintendent of the Indiana County Street Railway, Indiana, Pa., to succeed Irwin Barry.

William J. Bradley has been appointed auditor of the Second Avenue Railway, New York, N. Y., to succeed N. M. Hudson.

C. J. Callahan has been appointed secretary of the Public Utilities Commission of the State of Idaho to succeed E. G. Gallet.

C. D. Donovan has been appointed master mechanic of the City Electric Company, Albuquerque, N. M., to succeed Antonio Vargas.

E. A. Hoffman has been appointed superintendent of transportation of the Wilkes-Barre (Pa.) Railway to succeed C. F. Crane.

George Schneider has been appointed claim agent of the Westchester Electric Railroad, Mount Vernon, N. Y., to succeed A. P. Guion.

J. A. Mower has been appointed claim agent of the Eastern Pennsylvania Railways, Pottsville, Pa., to succeed James E. Burr.

S. R. Inch has been elected vice-president of the Utah Light & Traction Company, Salt Lake City, Utah, to succeed O. J. Salisbury.

E. S. Chesebro has been appointed treasurer of the Yarmouth Light & Power Company, Yarmouth, N. S., to succeed Carl T. Keller.

Frank Gardner has been appointed engineer maintenance of way of the Houston (Tex.) Electric Company to succeed C. R. Brewster.

J. A. Srite has been elected president of the Chambersburg & Shippensburg Railway, Chambersburg, Pa., to succeed W. H. Fisher.

F. A. Zimmerman has been appointed secretary of the Chambersburg & Shippensburg Railway, Chambersburg, Pa., to succeed J. G. Schaff.

A. E. Lane has been elected president of the Ephrata & Lebanon Traction Company, Ephrata, Pa., to succeed Charles O. Collett.

E. C. Given has been appointed treasurer and auditor of the Boise Valley Traction Company, Boise, Idaho, to succeed E. A. Wetmore.

S. W. Hardwich has been appointed master mechanic of the Northern Texas Traction Company, Fort Worth, Tex., to succeed Theodore Taylor.

Herbert W. Trafton has been appointed a member of the Public Utilities Commission of the State of Maine to succeed John E. Bunker, who died some time ago.

Miss Julia A. Prasch has been appointed treasurer of the Yakima Valley Transportation Company, North Yakima, Wash., to succeed C. A. Becker.

C. F. Dupuis has been appointed a member of the Board of Railroad Commissioners of North Dakota, effective Jan. 1, 1919, to succeed C. W. Bleick.

S. Larue Tone, president of the Pittsburgh (Pa.) Railways when it was placed in receivers' hands last April, was on Dec. 31 appointed the third receiver.

J. P. Keeney has been appointed chief engineer of power plants and substations of the Virginia Railway & Power Company, Norfolk, Va., to succeed W. C. Bell.

H. L. Harris, auditor of the Twin State Gas & Electric Company, Brattleboro, Vt., has also been appointed secretary of the company to succeed H. H. Bechtel.

E. H. Kifer has been appointed general manager of the San Antonio (Tex.) Public Service Company to succeed W. B. Tuttle, who still retains his position as vice-president of the company.

William E. McGovern has been appointed auditor of the Eastern Wisconsin Electric Company, Sheboygan, Wis., to succeed Simon Kurtz, who has been appointed assistant auditor of the company.

J. P. Costello has been appointed superintendent of railroads of the Reading Transit & Light Company, Reading, Pa., to succeed S. E. Smith, who is now general superintendent of the company.

E. F. Goetz, master mechanic of the Chambersburg & Shippensburg Railway, Chambersburg, Pa., has also been appointed general manager and purchasing agent of the company to succeed S. M. Coover.

J. S. Goldsmith has been appointed assistant general counsel of the Public Service Commission of Maryland, Baltimore, Md., to succeed Osborne I. Yellott. James C. Legg has also been appointed as a commissioner.

P. E. McChesney has been appointed purchasing agent of the Eastern Texas Electric Company at Beaumont to succeed E. J. Davis, who now has general supervision over the city and interurban lines of the company.

E. P. Summerson has been appointed secretary of the Lehigh Power Securities Company, New York, N. Y., which controls the Lehigh Valley Transit Company, Allentown, Pa., to succeed A. E. Smith, who still retains his position as treasurer.

L. E. Martin has been appointed to the newly created position of general superintendent of interurban lines of the Illinois Traction System, with headquarters in Springfield. Mr. Martin has been superintendent of maintenance of way of the company for several years past. His successor as superintendent of maintenance of way has not been named.

Thomas B. Pratt, formerly with the publicity department of the New York, New Haven & Hartford Railroad, has succeeded Peter D. Vroom as publicity manager of Henry L. Doberty & Company, New York, N. Y. Mr. Vroom is to take up active newspaper work in another city.

F. D. Howells, former chief engineer of public utilities for the city of Los Angeles, has become general manager of the California Highway Transportation Association. This organization, made up of freight and passenger automobile companies, is endeavoring to aid in the development of workable state laws governing automobile transportation utilities.

F. W. Bedard has been appointed general superintendent of the Urbana & Champaign Railway, Gas & Light Company, Champaign, Ill., and E. A. Roehry has been made general superintendent of the Cairo Railway & Light Company, Cairo, Ill., according to announcement from the office of H. E. Chubbuck, vice-president, executive of the Illinois Traction System.

Frank Ring has been appointed traffic manager of the Walla Walla (Wash.) Valley Railway. Mr. Ring formerly was employed by the Pacific Power & Light Company and later was promoted to the management of the Kennewick office, which place he resigned to take a position in the Baker-Boyer Bank in Walla Walla. He succeeds E. G. Miller as traffic manager of the railway.

Joseph H. Lyons, widely known among labor union men of the Coast, has been appointed superintendent of transportation on the Tacoma (Wash.) Municipal Railway. Mr. Lyons assumed his new duties on Jan. 1, when the city took over the city-owned lines from the Tacoma Railway & Power Company, which has been operating them ever since they were opened.

A. A. Blackburn, who for fourteen years has been chief engineer and assistant to the general manager of the Belfast (Ireland) City Tramways, has been appointed engineer and manager of the Huddersfield Corporation Tramways to succeed R. H. Wilkinson, whose appointment as manager of the Bradford City Tramways was noted in the *ELECTRIC RAILWAY JOURNAL* for Dec. 7, page 1017.

Herman M. Aldrich for the last four years superintendent of the Northampton (Mass.) Street Railway, and for ten years superintendent of the Amherst & Sunderland Railway, has resigned to become superintendent of the Claremont Railway & Lighting Company, Claremont, N. H., the property of which was sold recently to local manufacturers of Claremont after abandonment had been threatened by the original owners.

Godfrey Goldmark has been appointed counsel to the Public Service Commission for the First District of New York to succeed Judge William L. Ransom, whose resignation took effect at

midnight on Dec. 21. Mr. Goldmark formerly was a partner of ex-Judge Hiram R. Steele. He entered the commission as secretary to Chairman Straus. A year later he became assistant counsel and recently has specialized in regulation.

J. M. Barry has been appointed local manager of the Alabama Power Company at Anniston, Ala., to succeed Laurence W. Jackson resigned. For some time Mr. Barry was in charge of the distribution of electricity for the Great Western Power Company, at San Francisco, and prior to that was chief of the San Francisco department of electricity, to which position he came from Portland, Oregon, where he was electrical engineer for the Northwestern Electrical Company.

H. Ware Barnum, Ware, Mass., has been appointed general counsel for the Boston (Mass.) Elevated Railway, according to announcement made by the trustees of the company. Mr. Barnum has been Assistant Attorney-General of Massachusetts since January, 1915. He is about forty years old and for a number of years was a member of the firm of Elder, Whitman & Barnum. He has had a large experience in legislative work. He is a graduate of St. Lawrence School, New York; Harvard, A. B., 1900, and the Harvard law school, 1903. Mr. Barnum succeeds Russell A. Sears.

S. T. Phillips, heretofore general electrical equipment foreman, New York State Railways, Rochester Lines, has resigned to become master mechanic of the Gary (Ind.) Street Railway. Previous to going to Rochester Mr. Phillips was associated with J. F. Uffert, now superintendent of equipment New York State Railways, when Mr. Uffert was master mechanic of the Hudson Valley Railway and the United Traction Company, at Glens Falls and Albany, N. Y., respectively. He was for a number of years connected with the New York Edison Company and the Hudson River Electric Power Company, Glens Falls, N. Y.

Lindley Miller Garrison, receiver for the Brooklyn (N. Y.) Rapid Transit Company, was born in Camden, N. J., in 1864. He was educated in the public schools, at Philip Exeter Academy, at Harvard, New York University, Rutgers and Brown and was awarded the L.L.D. degree at New York University. He studied law in the offices of Redding, Jones & Carson in Philadelphia and was admitted to the Pennsylvania bar in 1886. He practiced with Redding, Jones & Carson and their successors, Jones & Carson, from 1883 to 1888. In the latter year he was admitted to the bar of New Jersey and practiced at Camden, N. J., until 1898. From 1899 to 1904 he was a member of the firm of Garrison, MacManus & Enright, Jersey City. He was vice-chancellor of New Jersey from June, 1904, to March 5, 1913, and was Secretary of War in the cabinet of President Wilson from March 5, 1913, until Feb. 10, 1916, when he

resigned. He was lately been a member of the law firm of Hornblower, Miller, Garrison & Potter, New York.

Obituary

Mr. Turner Dead

Walter V. Turner, manager of engineering for the Westinghouse Air Brake Company, died at Columbia Hospital, Wilkingsburg, Pa., on Jan. 9. He had been seriously ill since the middle of November. In his death the air-brake industry has lost its greatest expert.

Mr. Turner was born in England in 1866, and before he came to America in 1888 he was in the wool business. After a short time spent on a ranch in New Mexico, he entered the employ of the Atchison, Topeka & Santa Fe Railroad and soon became chief inspector. Becoming interested in air brakes, he soon gained a reputation for proficiency in them and was placed in charge of the air-brake instruction car on that road. From general air-brake instructor he was promoted to mechanical instructor for the entire system. During this time he took out twenty-two air-brake patents, which were sold to the Westinghouse Air Brake Company.

He became connected with the Westinghouse Company in 1903; in 1907 he was made mechanical engineer; in 1910, chief engineer; in 1915, assistant manager and in 1916, manager of engineering. His first task with that company was to develop the K triple valve, of which there are now over 2,000,000 in use. By his untiring energy and ingenuity the art of braking trains has developed by leaps and bounds. He has taken out more than 400 patents and a hundred or more are still pending. Among his latest inventions are those which have contributed extensively to the success of electric train operation, the electro-pneumatic brake and the system of empty and load brake control stand out pre-eminently. By making use of these features the capacity of the New York subways has been increased tremendously. Mr. Turner was also an author, among the more important of his books being "Train Control—Its Development and Effect on Transportation Capacity," which was published in two volumes. He was awarded the Longstreth medal in 1911, and the Elliott-Cresson medal in 1912. He was a fellow of the Royal Society of Arts, England, and a member of the American Society of Mechanical Engineers, the American Electric Railway Association, Franklin Institute (Philadelphia), and the Pennsylvania State Chamber of Commerce. The degree of "Doctor of Engineering" was conferred on him by the University of Pittsburgh in 1918.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,

SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

Soft Coal Output Increased Six Per Cent in 1918

Production for the Last Year Estimated by the Geological Survey at 447,748,000 Net Tons

The lowest weekly production of bituminous coal reported in the last three years was brought about by the time lost on account of the Christmas holidays during the week ended Dec. 28, according to the Geological Survey. Estimates for this week place production at 6,385,000 net tons, 3,746,000 net tons or 37 per cent behind production of the week ended Dec. 21, and 3,352,000 net tons or 34 per cent behind production of Christmas week of last year. The average daily production for the current week (five days) is estimated at 1,277,000 net tons as compared with 1,913,000 net tons for this coal year to date and 1,763,000 net tons for the same period of 1917.

BITUMINOUS PRODUCTION INCREASED 35,187,000 TONS IN NINE MONTHS

Total production of bituminous coal for the period April 1 to Dec. 28 is estimated at 447,748,000 net tons as against 412,561,000 net tons during the period April 1 to Dec. 28, 1917, or an increase of 35,187,000 net tons.

The production of bituminous coal and lignite in the calendar year 1918 is estimated at 585,883,000 net tons, an increase compared with 1917 of 34,092,000 net tons or 6.2 per cent. Four

the Christmas holidays caused anthracite production during the week of Dec. 28 to decrease more than 500,000 net tons, compared with the production of the week preceding and was approximately 200,000 net tons lower than the production during the corresponding week of 1917. For the period April 1 to Dec. 28 the production of anthracite is estimated at 73,830,000 net tons which is 1,606,000 net tons or slightly more than 2 per cent below the production of a similar period of last year.

Copper Wire Goes Lower

Rubber Covered on Top to 28-Cent Base, Represents a Drop of Seven Points

As a result of the drop in copper price wire has fallen many points. Of ten prominent manufacturers three were quoting on Monday 27 cent base on rubber-covered, two 28 cents, four 30 cents, and one 32 cents. Considering discounts, however, rubber-covered base is probably between 27 and 28 cents, a drop of around seven points. Quite recently one or two manufacturers have stopped selling on base, and they are now selling on cost.

On Saturday bare wire was quoted in Chicago at from 25 to 26 cents, while weatherproof ranged from 28 to 29 cents a pound.

Since Monday copper has made further reductions and if the wire quota-

Iron and Steel Scrap Prices Drop

Mills Making Almost No Bids, But Dealers Holding Off Until More Definite Prices Develop

Iron and steel scrap values are still dropping and no sales of any consequence are being made. The drop here is greater than in the new product.

Almost no bids are being made by consumers, and dealers still hesitate to buy while values are so uncertain.

A further disturbing factor is the heavy offering of scrap arising from the termination of war contracts. The Canadian government is offering around 15,000 tons of scrap and the U. S. Government is known to hold a large tonnage. This, however, is expected to come on the market only slowly so that values will not be unduly sacrificed.

Dealers seem to feel that it will be several weeks before any definite and safe market for scrap develops.

It is hard to secure any real quotations but resales were made this week on the following basis in Chicago:

Remolting and short old steel rails, \$24.00-\$25.00 per gross ton; frogs, switches and guards, \$19.00-\$20.00 per gross ton, car wheels \$24.00-\$25.00 per gross ton, old iron rails, \$26.00-\$28.00 per gross ton; old iron and steel axles, \$28.00-\$30.00 per net ton.

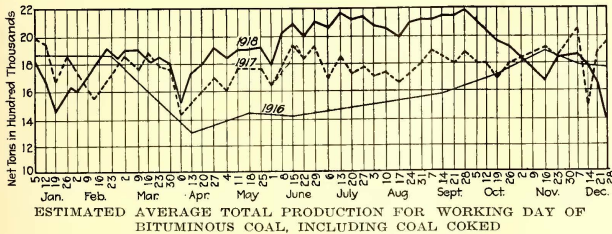
With the exception of old steel rails which are quoted in New York as \$17.00-\$18.00 per gross ton, the Chicago prices above quoted are lower than the quotations received for the Pittsburgh, Cincinnati, New York and Philadelphia districts. In these cases, however, prices are f.o.b. buyer's mill, whereas the Chicago quotations were based on exchanges between dealers and brokers.

G. E. Employees Back

Men Return as Work Is Provided—Company Does Not Admit Jurisdiction of War Labor Board

A hearing was held in New York on Wednesday of this week by the War Labor Board in the General Electric Company sympathetic strike case. At its conclusion the board announced that it would take under consideration and state later whether or not it would assume jurisdiction in a case where one of the parties was unwilling to be bound by the decision.

Manager H. Griswold, Jr., of the Erie Works expressing his unwillingness to submit the controversy to the board or to be bound by any finding



states reported decreases, Georgia, Iowa, Missouri and Texas. The most important increases were in Pennsylvania, 11,264,000 tons, Ohio, 5,715,000 tons, Illinois, 5,064,000 tons and West Virginia, 4,908,000 tons. The estimates indicate that West Virginia still retains second place as a coal producer but the lead is so small that final returns may place Illinois in this place, which was assumed by the State of West Virginia in 1908.

The loss of time brought about by

tions continue to follow the downward trend of copper still lower prices should prevail next week.

A prominent wire producer said a couple of weeks ago that the wire people could expect to do business on 19-cent copper. Deliveries in the second quarter of the year are already selling at this figure it is understood. Spot electrolytic copper on Tuesday was quoted at 20.62½ cents and there were some recessions from that price later in the week.

it might make, expressed willingness to refer any differences to the system of representatives at Erie which is similar to that set up by the War Labor Board at Pittsfield and Lynn. E. W. Rice, president of the company, said that the only controversy between the management and the workers existed at Erie, where 20 per cent of the employees went out because of alleged unfair discharge of ten men. The Schenectady and Pittsfield plants were working under an award of the War Labor Board, and in violation all Schenectady employees and 50 per cent of the Pittsfield employees went out in sympathy. The Fort Wayne works were operating under an agreement between the management and workers made through a Department of Labor representative, and in violation of it 75 per cent went out in sympathy.

So far as work was available, the men at the various plants have gone back. At Schenectady, where about 15,600 went out, all but about 1000 have been taken back, and there was

no work for these at the time. The situation is similar at the other works. None were out at Lynn. The men were taken in a preferential order, the general result being that first preference is given to those who had been in war service, then those having dependents, etc.

The Department of Labor does not look forward to any unemployment crisis, according to a statement on the general labor situation by Assistant Secretary of Labor, Louis F. Post: "There is no reason," he says, "why either business men or wage-earners should be apprehensive with regard to commercial stagnation. The war has on the whole increased the purchasing power of the masses and has created new markets. America must assist in the rebuilding of Europe, and avenues for foreign trade hitherto closed to us are now open. Raw materials which were denied to private and non-essential industry during the war are now accessible to the manufacturers of America through their release by the

War Industries Board. Credits which were similarly denied to private concerns because they were needed for Government use have also been released by the Capital Issues Committee. There is no reason for anyone to be alarmed over the future."

Street Cars Still Subject to Mexican Tariff

By the decree of Aug. 27, 1918, machinery of all kinds unless otherwise specified, as well as separate parts, was to be admitted free of charge into Mexico. Subsequently, however, by the circular of Oct. 21, 1918, the Director General of Customs of Mexico directed that exceptions be made in the case of certain articles which will continue to stay at the old rate of 45 cents per 100 lb. gross weight. Included in the articles still subject for duty, as transmitted by Vice-Consul Joseph W. Rowe of Mexico City, are motor cars for railway use, and electric batteries.

Track and Roadway

Waterbury & Middale Tramway, Waterbury, Conn.—It is reported that the Waterbury & Middale Tramway contemplates the construction of an extension from South Street, Bristol, over Wolcott Street and through Wolcott, connecting with the car line from Waterbury to Hotchkiss Lake. J. H. Cassidy, secretary.

Detroit (Mich.) United Railway.—Two new extensions have recently been placed in operation by the Detroit United Railway. One of these lines is the Northwestern Belt Line, a single-track extension of the Hamilton line operating to Woodward Avenue through the company's carhouse and shop property in Highland Park and connecting with Grand River Avenue near the westerly city limits. This line will later be double-tracked. The other line placed in operation is the Ferndale line from Springwells Avenue, around the edge of Woodmere Cemetery to Dearborn Avenue and connecting with Fort Street. A branch line is being built northward paralleling with Solway Avenue.

Cincinnati (Ohio) Traction Company.—Walter A. Draper, vice-president of the Cincinnati (Ohio) Traction Company, recently notified city officials that the company is prepared to build new rails on Eastern, Freeman and Central Avenues whenever the city is ready to undertake improvements in those streets.

Peterboro (Ont.) Street Railway.—The Hydro-Electric Power Commission of Ontario, which operates the Peterboro Street Railway, reports that it proposes to erect 20 single-track miles of overhead construction.

Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa.—This company reports that by 1919 it will reconstruct 3 or 4 miles of track if labor can be procured.

Dallas (Tex.) Railway.—Plans of the Dallas Railway for 1919 call for the completion of its building program which is now under way. The program involved the expenditure of \$1,000,000, but a part of that sum has now been spent. The remainder is to be spent this year. This is in improvements and extensions. The maintenance charges and general repairs for 1919, it is expected, will be higher than usual because it has been difficult to keep up with the demands of the year. The plans for extensions call for the building of the Oak Lawn line out to the cemetery. The Second Avenue extension is just being completed. There will be some work in Oak Cliff, the Colonial Avenue line is to be double-tracked and the Lake Avenue line is to be extended to the hospital. It is probable that additional plans for extensions will be made during 1919 and some of the additional work will doubtless be under way before the close of the year.

Power Houses, Shops and Buildings

Southwestern Gas & Electric Company, Texarkana, Ark.—Fire recently destroyed the carhouse of the Southwestern Gas & Electric Company, together with twelve cars, causing a loss of about \$100,000.

Pacific Electric Railway, Los Angeles, Cal.—A new passenger station has recently been completed by the Pacific Electric Railway at Fullerton.

Washington Railway & Electric Company, Washington, D. C.—A contract has been awarded by the Washington Railway & Electric Company to Lake Stone, Washington, for the construction of a new one-story concrete substation at Fourteenth and East Capitol Streets, at \$3,000.

Hammond, Whiting & East Chicago Railway, Chicago, Ill.—This company advises that during 1919 it expects to construct a new 400-kw substation and an addition 50 x 50 ft. to its carhouse.

Danville Street Railway & Light Company, Danville, Ill.—The carhouse of the Danville Street Railway & Light Company, containing nine city cars, was recently destroyed by fire, causing a loss of about \$75,000.

Chicago & Joliet Electric Railway, Joliet, Ill.—In a report to the Chicago Electric Railway states that during 1919 it proposes to install one 1500-kw substation at Joliet, one 300-kw automatic substation at Woodlawn Park and 6000 ft. of 250,000 C.M. 12,000-volt underground cable connecting the Joliet substation with the substation of the Public Service Company at Jackson and Ottawa Streets. All equipment has been purchased, except cable and small material, such as bus bar supports, disconnect switches, insulator racks, etc.

Rolling Stock

St. Cloud (Minn.) Public Service Company expects to purchase two motor cars this week.

Municipal Railway of San Francisco expects to purchase this year five automobile buses and twenty 32-ft. steel city passenger cars.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind. intends to purchase some time during the year one single-truck work car, 30 ft. over all.

Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va. expects to purchase ten steel ash cars this year.

Winnipeg (Canada) Electric Railway is reconstructing its present rolling stock at the rate of ten cars per month, forty cars having already passed through its hands. It is understood that the ten new cars that were ordered from the Ottawa Car Company, as reported in the July 31 issue of the *ELECTRIC RAILWAY JOURNAL* are at present in the last stages of construction.

Trade Notes

C. E. A. Carr Company, Montreal and Toronto, has added H. F. Powell to its selling force.

Olmer Fare Register Company states in a recent issue of its organ, the *Olmer Fare Register*, that there is a demand for the company's product greater than it can supply and that when peace comes a bigger business than ever in registers is expected.

Walter N. Polakow, consulting engineer, announces the founding of Walter N. Polakow & Company, Inc., consultants in power production methods, industrial investigations, labor problems, scientific record systems and production accounting, with offices at 31 New York City. In view of the close of hostilities a number of capable engineers formerly associated with him have joined the staff of the corporation.

National Car Coupler Company, Attica, Ind. has issued a statement in which it is affirmed that 93 per cent of its employees have petitioned the company to continue operation under the old system, and have voluntarily waived any rights they might have under the recent award of the National War Labor Board granting a basic eight-hour day, collective bargaining and reinstatement of certain discharged employees. The statement says that in view of this petition and of its harmonious relations with its employees during twenty years of its existence, the company "has specifically but decidedly declines to abide by the award."

New Advertising Literature

Eugene F. Phillips Electrical Works, Ltd., of Montreal, Canada: A 270-page handbook entitled "Phillips' Wires and Cables," the book, which is pocket-sized and handsomely bound in leather, is printed on coated paper, is illustrated and comprises five sections. The subjects of these are electrical conductors, bare and weather-proof wires and cables, magnet wires and cotton-covered wires, rubber-insulated wires and cables and flexible paper-insulated power cables and telephone cables and varnished-cambic insulated cables, and general information. Aside from the complete information furnished about the company's many different varieties of wires and cables, tables of wire weights and diameters and other very useful information to the wire user are given.