

# Electric Railway Journal

Consolidation of STREET RAILWAY JOURNAL and ELECTRIC RAILWAY REVIEW

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## Straight Talk from a

### Representative Union to Its Members

**S**TATING that "the car employee who believes that the union was organized for the purpose of retaining men in their positions who refuse to do right is fooling no one but himself," the official organ of the trainmen's union in Chicago declares in a recent issue that these men will not be supported in wrong doing. This editorial pronouncement was evidently prompted by the question of a traction official as to why the organization should insist on restoring to their positions men who have been discharged for serious offenses; referring especially to failing to register fares and permitting liquor to interfere with performance of their duties.

On this point the editorial says: "Men who persist in these practices should be game enough to take their medicine when they are caught with the goods, and not try to unload their troubles on the union. Men who willfully do these things are no good to the union or themselves, and there is no reason why the great body of good men in the business should suffer because of their indiscretions. The union cannot support cases of this kind."

Leaders of this union are to be commended for taking this positive stand. Stories about dishonesty of conductors have too long been taken as a matter of course, and it is to the credit of the great body of honest employees that they wish no longer to be associated with such co-workers. Organized labor is coming to take a greater interest in the employer's welfare, and the latter will not be the only beneficiary if union appeals for higher fares and for getting rid of those who tamper with the company's revenues have a successful outcome. If these utilities are once more restored to a position where they are earning a reasonable return we do not believe the employees will have occasion to regret their part in helping to bring about this happy result. Cooperation is a tendency of the times. It augurs well for the future.

## It Isn't Economical to

### Build Cars to Last Forever

**I**N VISITING different railway properties in this country one cannot fail to be impressed by the large number of old cars and antiquated types of motors and equipment still in service. With some types of electrical apparatus, as for instance incandescent units, engineers have long since worked out curves which show that it is cheaper to replace them with new lamps after they have had a certain life, rather than continue them longer in service. Manufacturing engineers, from time to time, have tried to impress upon electric railway operating officials the desirability of similar treatment for their entire equipment. It is very difficult, however, to con-

vince a general manager that any equipment which will still operate should be scrapped in order to give way for a more modern type.

At a recent meeting of a committee of the American Electric Railway Engineering Association there was considerable discussion regarding the light construction which is being employed in certain recent types of cars. This suggests that perhaps it would be much better for the electric railway industry if the equipment, instead of being built to last twenty or twenty-five years, was built to last only half as long. The first cost would then be considerably less and there would not be the temptation to continue the equipment in service after its period of usefulness had ended. The automobile business has progressed as rapidly as it has, partly at least because the cars wear out quickly and can be readily scrapped and new apparatus installed.

In this connection an editorial in the July 7, 1917, issue of this paper entitled "Are City Cars Made for Collisions or Passengers?" is *à propos*. As was pointed out in this editorial, when railways learn to look upon their cars as production units then they will put less money into dead metal and more money into equipment which will produce high acceleration, rapid braking and economical operation. Operating officials should learn to look upon their car equipment as a means for delivering a passenger-mile. Any method of delivering this in the most economical and attractive manner is the best for their railway property.

## The Relation of Rail Steel to Rail Joints on Electric Railways

**T**HERE is an increasing tendency toward the selection of some form of welded joint in track construction in streets. The old cast-weld method has been revived with marked success, while electric arc welds, electric bar welds and thermit welds have also held their own in favor as subdivisions of the general class known as welded joints. The basis of the popularity of all of these is the desire of the track engineer for a continuous rail which is considered the ideal, particularly as the costly item of copper bonding is usually eliminated. The continuous rail, as such, is a success in paved streets because the pavement prevents or retards the injurious action of that old bugaboo "expansion and contraction."

Having long ago banished this deterrent, street railway engineers have since been troubled mainly with the problem of securing the most successful form of weld required to give the continuous rail. With all of the forms of welds previously referred to there has been a certain percentage of failures, not primarily in the welds themselves but in the rails at or not far away from them. A comparison of chemical compositions of rails which have failed in this way, and general observation as well, have

shown a tendency to confine the larger proportion of the breakages to rails coming from one mill. Special track-work manufacturers find that similar trouble in breakage of iron arms in castings can be traced usually to rail of a particular manufacture.

It would appear from this that there is a big field of investigation open to the new welding society on the subject of the relation of chemical analysis and details of manufacture of rails to the suitability of the steel for adaptation to the several forms of joint welding now current. Robert B. Holt, of Leeds, England, pointed this out in his book on tramway track construction, but we believe that his suggestion has received little attention in this country. Here we have another subject upon which the American Electric Railway Engineering Association could well afford to co-operate in an investigation which should be of great value to the industry. Metallurgical experts should be engaged to assist in the work as no committee member should be expected to devote to it the great amount of time that is necessary for effectiveness in such joint efforts.

### Make Up for Lost Maintenance Time

**A**N ENORMOUS amount of maintenance work has piled up during war days and while labor and materials are not much less in price, they are at least easier to get. We realize that most companies have little money to spend on maintenance but some of it must be done and the men who are returning from the front will be glad to help in this work. We can thus "kill two birds with one stone," by utilizing their detachment from pre-war jobs to secure their assistance and at the same time bring about a prompt readjustment of labor conditions throughout the country.

There seems to be little reason now to defer work in the hope that prices are speedily coming down, for the chances are strongly that they are not going to do so. Indeed, many competent analysts of the labor field anticipate further increases in prices for the following among other reasons:

The country confronts a labor shortage in the near future. There has not been the customary immigration into the United States which in the past has kept up the supply. At the same time many men have been away from their usual employment for a year or two, and the work which they would have done has not been done, or, at best, has been incompletely performed. During the war an enormous deferment of maintenance, repair and construction work has occurred, and this is due to be made up at once with ultimate overdrift on labor. To be sure, there are local surpluses of men due to cessation of war work and some congestion due to demobilization of troops. Reports of unemployment at many points are disconcerting. This is due, however, to failure of the labor distributing forces of the country to function properly and promptly, and the condition is temporary.

Granted that there will be an actual labor shortage, say in six months or a year, depending upon the speed with which the country gets upon a real peace footing, the conclusion is inevitable that work on track, line, power plant and equipment should speed up at once. We must be near the point at which the effects of deferred maintenance are near the limit. Further postponement will make the work still more difficult and expensive.

### The Diesel Engine in a Railway Power Plant

**I**T IS a coincidence that in this issue of the *ELECTRIC RAILWAY JOURNAL* space is devoted to two of the most highly efficient but radically different power generating units, the ultra-large steam turbine and the Diesel oil engine. The turbine has largely displaced earlier types of steam engines, but the Diesel has made slow progress in the stationary power plant field in this country in spite of its many inherent virtues. In view of the comparative meagerness of data as to operating costs of Diesels in the electric railway power plant field, the figures given in this issue for results obtained at Lincoln, Neb., possess particular interest. Every engineer responsible for economical power plant operation needs all of such information that he can get. While he may never expect to use oil engines, he needs an intelligent concept of what engines of this type are and can do.

The Lincoln Traction Company has been using Diesel engines in its plant in combination with steam equipment for nearly three years, with entire satisfaction. The reasons for the adoption of this type of plant are explained in the article. From the data given it is obvious that the Lincoln situation is favorable to the Diesel, due to the high cost of generating energy by steam. The company estimates that during 1918 a saving of more than 0.9c. per kilowatt-hour was realized on all energy generated by these engines over what would have been the cost with steam. This estimate is somewhat vague due to the uncertain element of maintenance, for while it is possible to determine just what has been spent in this direction, it is never quite possible to determine the exact condition of the equipment at the end of a year as compared with that at the beginning.

It is, of course, the high maintenance cost or the fear of incurring such that has made power-plant engineers hesitate to adopt the oil engine. The increasing cost of coal, however, renders maintenance cost relatively less important, and high-efficiency energy transformers such as the internal combustion engine must have more thorough consideration than ever before. In this connection it is well to remember why the engine has an inherently high efficiency and why it is necessarily somewhat complicated and heavy in construction; not forgetting, however, that it requires no boilers or elaborate fuel and ashes handling apparatus, a fact which partly compensates for its limitations.

Internal combustion engines of all kinds transform a reasonable proportion of the energy of fuel into mechanical energy because the fuel is burned in the cylinder where it imparts its expansive power direct to the piston. The temperatures and pressures are high and the radiation losses are not excessive, facts which conduce to high thermodynamic efficiency. The Diesel engine burns heavy oil under favorable heat and energy conditions (high temperature and pressure) with self-ignition. This is accomplished by spraying it in atomized form into the cylinder clearance space behind the piston when that space is filled with air at very high pressure and temperature. The oil is automatically vaporized and ignited, burning so as to provide fairly uniform pressure during combustion.

The mechanical construction needed to permit this simple and effective process to go on is, of course, necessarily rugged and somewhat complicated. This, in ad-

dition to the fact that very high-class fitting is needed on account of the high temperatures and pressures, renders the engine expensive to build and entails skilled operation to produce the best results. When, however, one considers the inherently superior qualities of the engine it is no wonder that much study and capital have been invested in its development. And especially in view of the fact, as stated by Dr. Diesel in the writer's hearing: "My engine will burn anything in the way of liquid fuel."

It was in marine work that the Diesel engine first found a large field where the absence of boiler and coal bunker space requirements was naturally quickly appreciated. The stationary plant field is open, however, for fair competition.

### 60,000 Kw. in One Turbo-Generator Unit

**I**N AN EDITORIAL printed on Oct. 23, 1915, this paper estimated that at the then rate of increase in size of steam turbines the 50,000-kw. unit should materialize in three years. At this writing a 60,000-kw. machine is in operation in one of the great power plants of the Interborough Rapid Transit Company in New York City, somewhat ahead of schedule at the above rate of increase. This is in one sense three turbines in one, as there are three mechanically independent rotors. It is properly rated as one machine, however, because all parts are essential to each other to produce the result desired, and it therefore holds the world's record for single-unit capacity.

As far as heat transformations are concerned this machine cannot be expected greatly to better the record of the 30,000-kw. units in the same station, installed about four years ago. The heat and mechanical conditions in these units were discussed editorially on page 285 of the issue of the JOURNAL for April 24, 1915. It was shown that the total of losses, not inherent in transformation from heat to mechanical work in the range of temperature and pressure used, had been reduced to less than 25 per cent. This is truly remarkable when the possible losses through friction and radiation are considered. The advance marked by the 60,000-kw. machine is rather in the subdivision to permit of more economical use of materials and to provide for partial operation in case a section becomes disabled. In compactness, also, the new machine is a wonder, as it can be circumscribed by a rectangle roughly 50 ft. on a side. In a picture reproduced in this issue there can be seen the new unit and three (all) of the 30,000-kw. machines, a total of 150,000 kw., continuous rating, in only part of the area which but a few years ago sufficed for eight Corliss engines of a combined capacity but slightly greater than that of the latest new unit. This illustrates once more the radical change which has occurred in the practical transformation of energy from latent to kinetic form. It would seem as if the limit of space efficiency had now been reached.

The imagination can only with the greatest difficulty grasp what 60,000 kw., the capacity of the super-turbine, means. To use a device common with orators, we may say that it would propel 2000 city cars of 20 tons weight, operating simultaneously; it would light a string of 20-cp. lamps, placed a foot apart, stretching from New York to Columbus, from San Francisco to San Diego, or from Chicago to Buffalo; it would lift 250 tons vertically at a mile a minute, etc.

### The Basis for the Chicago Rehearing Seems Reasonable

**I**N FILING its petition for a rehearing of its 7-cent fare case, suggesting a complete revaluation as the basis for a reasonable return upon the fair present value of the properties devoted to the public use, the Chicago Surface Lines has paved the way for developments which may lead to a more happy outcome.

The Illinois commission recently refused the companies' application for an increase in the rate of fare on the ground that the war-time emergency no longer exists and that a change in the rates could not be made without a showing that the present fare does not produce a reasonable return on the value of the properties. Without having heard evidence as to the present valuation of the lines, the commission thereupon arbitrarily eliminated items amounting to some \$44,000,000 from the capital account of the companies and decided that the present rate would afford security to the investment.

The Surface Lines management is satisfied that the fair value of the property is in excess of the present amount of the purchase price or the capital account and is willing to stand on the results of an investigation covering this subject. Arguments on this petition are likely to lead to some fine distinctions between valuations for capitalization, taxation, purchase or rate making.

Without going into the merits of this debatable subject, which has so long furnished a complex problem for experts, we cannot forebear expressing the belief that, as a matter of equity, the investor should have opportunity to earn a fair return on what he has devoted to the public service whether in dollars and cents, time, energy, ingenuity or effort. But, if the cost of reproduction should be preferred as a basis for rates, there is probably not the same difference in values of many electric railway properties between the two plans as would formerly have been the case.

Thus, in the Chicago surface case, some of the capitalization represents money spent for equipment which has once depreciated in value or has been scrapped, like the old cable apparatus, while part of it represents money spent for property which has appreciated in value. Just how far these fluctuations in value will counterbalance each other is impossible now to say, but one cannot be considered without the other. In other words, if there is an allowance for depreciation there should be one also for appreciation under the cost of reproduction theory. Any other proposal would be based on the principle of "heads I win, tails you lose."

Several other items rejected by the commission in the Chicago valuation for rate making purposes might also in all fairness be restored. One of these, for instance, is the allowance for brokerage in raising money. If we remember correctly, this allowance was to have been taken care of part of the cost service in the Chicago ordinance which failed of passage last November. If the alderman and their special counsel saw fit to offer a return on such expenditures the Illinois commissioners might well give further consideration to the suggestion that it is a proper capital charge. There is strong need for standardization in valuation methods, and we hope for a fair solution of the Chicago troubles after the discussion of this case before the Illinois Public Commission.

# Diesel Engines Prove Economical at Lincoln

Three 350-Kw. Diesel Units Have Been in Service in This Plant for More Than Two Years in Combination with Steam Equipment — Although Maintenance Cost Is High a Considerable Saving Has Been Realized During the War Period

By O. J. SHAW

Secretary Lincoln (Neb.) Traction Company

THE Lincoln (Neb.) Traction Company operates some 70 miles of electric railway lines together with an extensive lighting, power and steam heating business. It serves a city of more than 60,000 population, with various suburbs in addition. Lincoln is the State capital and the home of the State university, two other universities and several State institutions, but there are few large industries except of an agricultural nature.

The railway system comprises about sixty miles of city track and seventy-five cars. The schedules call for from forty to fifty cars between 6 a. m. and 12 p. m., with one car operating owl service thereafter. The rush hours fall between 7.30 and 8.30 a. m., and 5.30 and 7 p. m. The company also sells power, metered on the switchboard, to the Omaha, Lincoln & Beatrice Railway, a 6½-mile interurban line giving thirty-minute service between Lincoln and its suburbs, and doing a lighting and power business also.

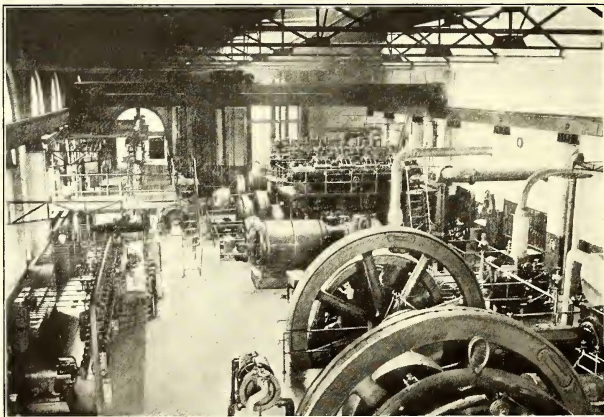
In addition to the lighting business in Lincoln the traction company supplies lighting service to from 10,000 to 12,000 suburbanites, the farthest point reached being about 6 miles from the power plant. In every suburban community the energy is sold to the municipality, which resells it to the consumer. The lighting and power peak falls between 7.30 and 9 p. m. in the summer, and 6 and 8 p. m. in the winter.

The company operates about two miles of steam heating mains, a 16-in. main from the station reaching practically all of the downtown retail district and serving theaters, churches, department stores, etc. Practically all of the steam is the low pressure exhaust from Corliss engines and steam from a bleeder-type turbine in the plant. Live steam is seldom needed.

Typical load curves for the years 1917, 1918 and 1919 are reproduced on page 904. In 1915 the company generated 10,776,910 kw.-hr. of electrical energy and sold 68,588,000 lb. of steam. The operating power station equipment at that time included one 750-kw. Curtis

turbine, one 500-kw. Allis-Chalmers-Corliss engine, one 325-kw. Murray-Corliss engine, one 1500-kw. Curtis turbine and one 500-kw. Allis-Chalmers turbine. There was also one 200-kw. high-speed Harrisburg engine not in use. The boiler-room equipment included six B. & W. 250-hp. boilers equipped with Jones underfeed stokers, two Stirling 450-hp. boilers with Jones underfeed stokers, one Stirling 150-hp. boiler equipped with blowers and two Edgemoor 500-hp. boilers equipped with Green chain grates.

In 1916 the lighting demand increased considerably and the demand for steam heat increased more than 20 per cent. The boiler room had reached the limit of its output and it became essential either to increase its capacity or to obtain energy from some other source. A study of the Diesel engine led to the conclusion that the necessary increase in plant capacity could be obtained without increasing the boiler-room capacity by adding engines of this type, with an in-



PART OF LINCOLN TRACTION COMPANY ENGINE ROOM, SHOWING DIESEL ENGINES AT FAR END

crease in efficiency of the plant as a whole. Two Busch-Sulzer four-cylinder, vertical, type-B, 500-hp., 200-r.p.m. Diesel engines were, therefore, installed in August, 1916. One is direct-connected to a 350-kw., 2300-volt, 60-cycle, three-phase, alternating-current generator and the other to a 350-kw. 550/575-volt, direct-current generator. The guarantees for these engines provide that with a net load of from 500 b.h.p. to 250 b.h.p. the fuel-oil consumption will not exceed 6 gal. per 100 b.h.p.-hr. to 7.4 gal. per 100 b.h.p.-hr. for the two loads mentioned, respectively, the fuel oil to have a heat value of not less than 18,500 B.t.u. per pound, specific gravity at 60 deg. Fahr. not higher than 20 deg. Baumé and not lower than 40 deg., with residue not more than 10 per cent. The speed variation from no load to full rated capacity is not to exceed 2½ per cent from mean.

When the Diesel engines were installed the 1500-kw. mixed-pressure turbine, using low-pressure steam from the Corliss engines and high-pressure live steam when

necessary, was sold because uneconomical, and a 1500-kw., 3600-r.p.m., 2300-volt, General Electric bleeder-type turbine was installed on the same foundation.

In November, 1917, one McIntosh & Seymour, four-cylinder, vertical-type, 500-hp., 164-r.p.m. Diesel engine was installed. This is direct-connected to a 350-kw., 550/575-volt, direct-current generator. The maker guarantees that this engine, when carrying between full and one-quarter net load will consume fuel oil of a heating value of not less than 18,500 effective B.t.u. per pound, not to exceed a range between 0.408 lb. and 0.628 lb. per brake-horsepower per hour. The speed variation is guaranteed not to exceed 3 per cent from mean for normal variations in load and the consumption of lubricating oil is not to exceed 2½ gal. per day.

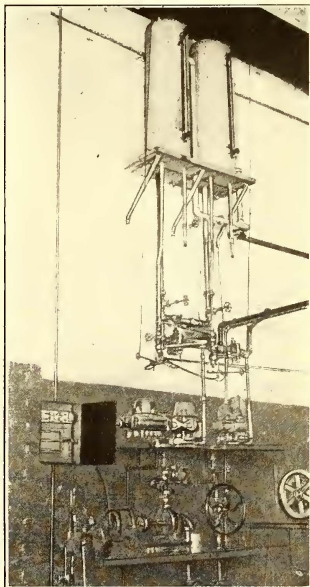
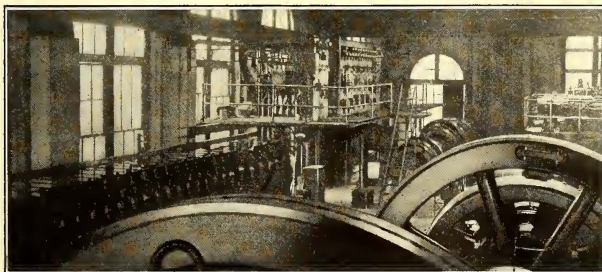
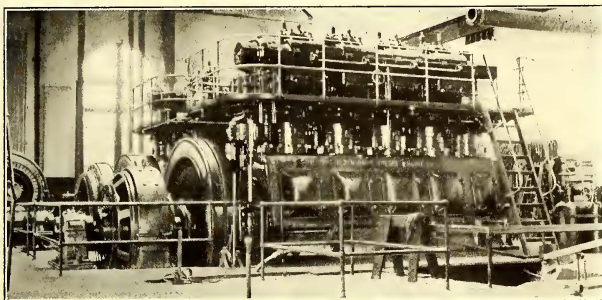
With the installation of the McIntosh & Seymour engine the Harrisburg engine was removed, unit No. 2,

installed as an alternating-current unit so that it could carry the lighting load after midnight.

The two Busch-Sulzer engines occupy a foundation approximately 31 ft. (in line with engine axis) by 26 ft. Each engine is, roughly, 10 ft. wide, 22 ft. long (over flywheel) and 11½ ft. high. The McIntosh & Seymour engine is approximately 11 ft. wide, 24 ft. long (over flywheel) and 14 ft. high. If a second unit is added the total floor space occupied will be about the same as that required for the other pair of "Diesels."

#### ROUTES OF FUEL OIL AND COOLING WATER THROUGH THE PLANT

The fuel oil is delivered in tank cars on a spur track and unloaded by gravity to two underground steel drum storage tanks with a capacity of 12,000 gal. each. From the tanks it is pumped by small motor-driven



AT TOP, LEFT, TWO DIESEL UNITS IMMEDIATELY AFTER INSTALLATION; AT BOTTOM, LEFT, SWITCHBOARD LAYOUT OF LINCOLN PLANT ALTERNATING-CURRENT BOARD ON BALCONY AND DIRECT-CURRENT BOARD ON FLOOR; AT RIGHT, OIL PUMPS, METERS AND AUXILIARY SUPPLY TANKS FOR DIESEL ENGINE FUEL OIL

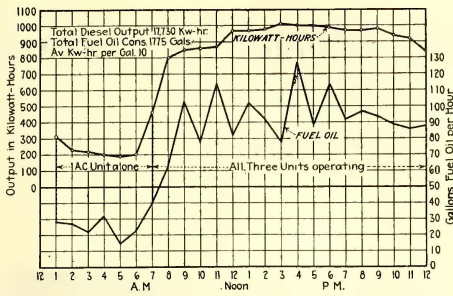
a 500-kw. motor-generator set, was moved into line with unit No. 1 and a new 500-kw. motor-generator set was installed in line with these two. A 50-kw. motor-driven G.E. exciter set was also installed. This has sufficient capacity to serve the entire plant.

The alternating-current Diesel-engine unit operates in parallel with the 1500-kw. turbine and after midnight during the summer season when there is no heating it carries the load. The switchboard panel for this unit is on the alternating-current switchboard located on the balcony. The direct-current "Diesels" operate in parallel with the direct-current steam engines and motor-generator sets. Their panels are on the direct-current switchboard on the main floor. The alternating-current "Diesel" frequently carries a railway load by conversion through a motor-generator set, but it was

pumps, supplemented with an auxiliary hand pump for emergency use, through Worthington piston-type oil meters to auxiliary supply tanks of 30 gal. capacity and located on the wall, about 6 ft. above the fuel oil pumps. Fuel pumps on the engines draw the oil from the auxiliary tanks and feed it, according to the position of the governor, through discharge lines to the needle valves. Air at 1000 lb. pressure is used to force the fuel oil through an atomizer and against a diffusing plate under 500 lb. compression. This operation produces about 1000 deg. Fahr. temperature in the cylinder. It there ignites, burns and expands, giving the necessary pressure for the power stroke.

Another important feature is the cooling water for the engine. This is pumped from wells just outside the plant to a 16-ft. x 16-ft. tank located on the roof of the





LOAD CURVE AND FUEL CONSUMPTION CHART FOR THREE DIESEL UNITS COMBINED

estimated saving of more than 0.9 cent per kilowatt-hour on all energy generated by the Diesel units. As this amounted to 4,616,086 kw-hr. the saving effected by this unit was more than \$41,000 in one year on switchboard cost.

VIRTUES AND LIMITATIONS OF THE DIESEL-TYPE ENGINE

The Diesel engine is economical because it will burn a low grade of fuel and upon combustion of the oil, as in the gasoline engine, practically all of the mechanical energy is imparted directly to the piston. The maintenance cost, however, is high. This is still an unknown quantity in the Lincoln plant since records are not kept which permit separating the labor and overhead costs from those of the steam equipment. Since the Busch-Sulzer engine is designed for piston cooling, the local condition of the water in Lincoln has made the lubrication cost of this engine higher than on the other type. Recently the Busch-Sulzer Company has perfected the design of the piston-cooling equipment so that it does not interfere with the lubrication of the engines

and the lubrication has been reduced to as little as two gallons of oil per day per engine.

The ideal operating condition for the Diesel engine is a constant load. This is true not only because the engine operates at highest efficiency under a constant full load but because the capital tied up in this equipment is so large that no units can afford to stand idle many hours of the day. As a Diesel engine cannot be heavily overloaded to carry a peak and, as it is not economical to allow an engine to lie idle or operate on extremely light load many hours of the day the advisable plan for a plant with a load having one or more extreme peaks is either to operate with all steam equipment or enough Diesel equipment to handle the average load and a turbine to take the peak and overload. There is perhaps some objection to a mixed installation of this sort due to the fact that an engineer who can operate steam equipment satisfactorily cannot always operate a Diesel engine equally well. To obtain the most efficient operation of these units and avoid trouble with the equipment a specially trained man is advisable.

A complete Diesel installation is not working at its highest efficiency on a purely railway load due to the liability of heavy load swings. A plant with a constant load twenty-four hours a day offers an ideal opportunity. Such a man should be paid more than a steam engineer. for a Diesel engine installation, while any condition under which the engines can operate for even eighteen hours a day with a fairly constant load will give excellent results.

War-Time Changes in Living Costs

BETWEEN July, 1914, and November, 1918, the cost of living for wage earners in representative American communities advanced to the extent of from 65 to 70 per cent. The most marked advances were in the cases of clothing and food. This conclusion is presented in *Research Report Number 14* of the National Industrial Conference Board.

During the period in question the average advances in the cost of the separate items entering into the family budget were: Food, 83 per cent; shelter, 20 per cent; clothing, 93 per cent; fuel, heat and light, 55 per cent, and sundries, 55 per cent.

To estimate the total increase in the cost of living the increases found in the separate items must be related to the importance of these in the complete budget. The annual expenditures of the average workman's family, according to careful investigations by governmental and other agencies, are said to be distributed approximately as follows: Food, 43 per cent; shelter, 18 per cent; clothing, 13 per cent; fuel, heat and light, 6 per cent, and sundries, 20 per cent. A few points' deviation from these averages may occur, but the normal variation is very small.

If the percentages of increase in the cost of the separate items as found in the board's investigation are weighed according to this distribution, the average advance in the cost of living as a whole up to November, 1918, was 65.9 per cent. It is said that no reasonable rearrangement of the budget items to suit individual requirements would greatly affect the average increase in the cost of living as a whole. Other possible combinations, however, would produce increases ranging from 64 to 69 per cent, and to cover this small variation the total increase in the cost of living has been placed at from 65 to 70 per cent.

OUTPUT AND COSTS OF OPERATION OF POWER PLANT, LINCOLN (NEB) TRACTION COMPANY.

	1915	1916	1917	1918
Kilowatt-hours generated	10,776,910	11,531,890	12,613,994	12,907,625
Kilowatt-hours used by railway	6,161,741	6,194,657	6,180,776	6,076,431
Kilowatt-hours used for light and power	4,615,169	5,337,233	6,433,218	6,831,194
Pounds of steam sold	68,588,000	83,499,000	92,728,000	75,643,000
Kilowatt-hours generated by steam	10,776,910	10,062,180	8,309,057	8,291,539
Tons of coal used	38,411.51	42,652.19	35,736.17	31,110.43
Average cost per ton	\$2.87	\$3.50	\$4.59	\$4.96
Pounds of coal per kilowatt-hour	7.13	8.48	8.60	7.50
Cost of coal per kilowatt-hour, cents	1.02	1.48	1.97	1.86
Total cost of coal	\$110,339.57	\$149,271.05	\$163,938.99	\$154,329.60
Kilowatt-hours generated by Diesel engines	none	1,469,710	4,242,377	4,616,086
Gallons fuel oil used	none	136,664	395,568	427,967
Average cost per gallon of oil, cents	none	3.14	3.70	5.66
Kilowatt-hours generated per gallon of oil	none	10.70	10.70	10.70
Cost of oil per kilowatt-hour, cents	none	0.292	0.345	0.566
Total cost of fuel oil	none	\$4,294.12	\$14,646.77	\$24,238.99
Total fuel cost (oil and coal)	\$110,339.57	\$153,565.17	\$178,585.76	\$178,568.59
Average cost of fuel per kilowatt-hour, cents	1.02	1.33	1.41	1.38
Wages of power station employees	\$20,967.92	\$24,797.08	\$27,029.13	\$39,320.33
Cost of water	7,839.49	9,699.51	7,424.19	8,711.05
Cost of lubrication	1,127.08	2,404.24	3,851.77	4,991.90
Cost of power purchased	317.26	386.32	1,898.75	1,898.75
Miscellaneous expense	1,902.42	2,134.75	2,761.34	3,548.71
Power plant maintenance cost	13,136.66	11,891.43	20,179.56	25,376.53
Total cost of power station operation	155,630.40	204,878.50	241,730.50	260,517.11
Switchboard cost per kilowatt-hr., cents	1.44	1.78	1.91	2.02

# Interborough Commissions 60,000-Kw. Turbo-Generator Unit

Attention Is Directed in This Article Particularly to the Automatic Control Features of the Installation

By W. S. FINLAY, JR.

Superintendent of Motive Power, Interborough Rapid Transit Company, New York City

**T**HE Interborough Rapid Transit Company, in its Seventy-fourth Street power plant in New York City, has the largest prime mover now in service in the world. The machine is the first of the three-cylinder type of turbine to be put into operation, one of the elements being the high-pressure section and the other two the low-pressure sections. The combined unit has a maximum continuous capacity of 60,000 kw., or 70,000 kw. for two hours. It occupies a floor space of 52 ft. x 50 ft. and at maximum load requires 826,000 lb. of steam per hour.

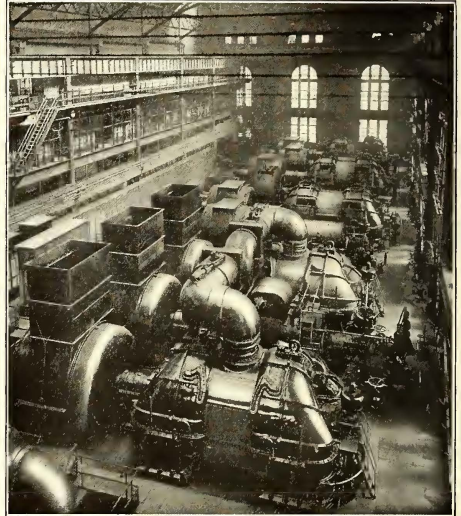
The unit is designed on what is known as the cross-compound principle. Each element is coupled direct to its electrical generator, and all three elements when in normal operation are tied together electrically. The steam path is such that all of the steam passes through the high-pressure element, then divides equally and flows through the two low-pressure elements. This principle of design, by dividing the work done into separate cylinders, allows the use of smaller individual elements which are inherently stronger than large cylinders; it makes possible an outfit considerably more flexible than a single large unit and more reliable because the turbines are smaller and there is less temperature difference in any one cylinder; and it permits the use of commercially common materials with moderate blade speeds and stresses.

## NORMAL LOAD ON EACH ELEMENT IS 20,000 Kw.

The high and low-pressure turbines are proportioned so that with a total load of 60,000 kw. the load will be equally divided among the three elements. In case of failure of one of the low-pressure elements, it would be called upon to carry an abnormal load since all of the steam from the high-pressure element must pass through one low-pressure turbine. To provide against injury to the generator from this cause there is provided a back pressure valve on the exhaust of the high-pressure element which, when the pressure has reached a given amount, will permit steam to exhaust direct to atmosphere. The pressure selected is that which corresponds to a load of 30,000 kw. on the low-pressure turbine, which it is well able to sustain for a half hour. One half-hour is regarded as sufficient time in which to get other units onto the system, when the load on the high-pressure and one low-pressure element of the triple unit may be reduced to the limits of the continuous capacity of the low-pressure generator.

## 40,000 Kw. IS THE MAXIMUM-ECONOMY LOAD

The high-pressure element contains fifty rows of blades, the height of the first row being 4 in. and that of the last row 9 in. The journals are 10 in. in diameter, and the rotor is equipped with a Kingsbury



TURBINES HAVING A NORMAL CAPACITY OF 150,000 KW. IN INTERBOROUGH POWER PLANT

New 60,000-kw. unit in foreground—three 30,000-kw. units in background

thrust bearing the function of which is to prevent any axial movement of the rotor. Each low-pressure element contains forty-four rows of blades, the height of the first row being 6 in. and that of the last row 15 in. In this element the turbine rotor journal is 12 in. in diameter. The rotor is, like the high-pressure element, equipped with a Kingsbury bearing.

In connection with the turbine there are four surface condensers installed, two being connected to each one of the low-pressure elements. The total area of cooling surface is 100,000 sq.ft.

The turbine is designed to operate with steam at 220 lb. per square inch, absolute pressure superheated 150 deg. Fahr. and to exhaust into a 29-in. vacuum. At a load of 40,000 kw., which is the point of best economy of the unit, the high-pressure element will exhaust into the low-pressure element at 29.7 lb. per square inch, absolute pressure, at a temperature of 250 deg. Fahr. This turbine unit is estimated to operate at any load between 30,000 kw. and 60,000 kw. at a water rate which is not more than 5 per cent greater than the minimum.

Each turbine runs at 1500 r.p.m. and its generator



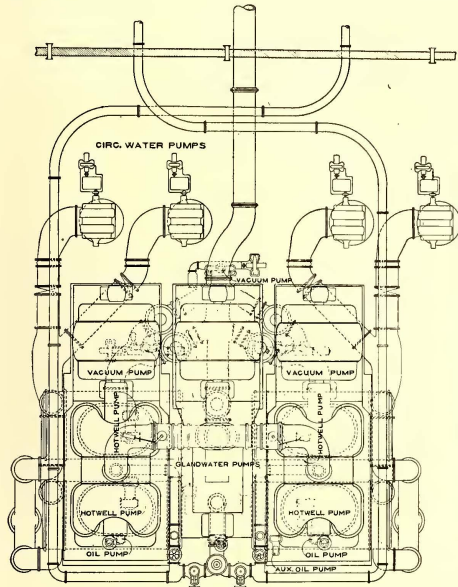
delivers three-phase power at 11,000 volts, 25 cycles. Each element has its individual busbars with separate feeders. Installed in the connections between the busbars are reactance coils to limit the flow of current between generators.

Although the unit consists of three separate elements the method of starting the elements from rest preparatory to synchronizing is essentially the same as for single-shaft units. First the field current of all three

has been given to the development of automatic features by means of which in the event of trouble with any of the elements it will be automatically cut out of service, the remaining two elements continuing to carry the load.

By the use of an ingenious governing arrangement means have been provided that will permit uninterrupted operation of each individual element, should one or the other two be taken out of service by tripping the automatic stop from any cause not affecting all three elements.

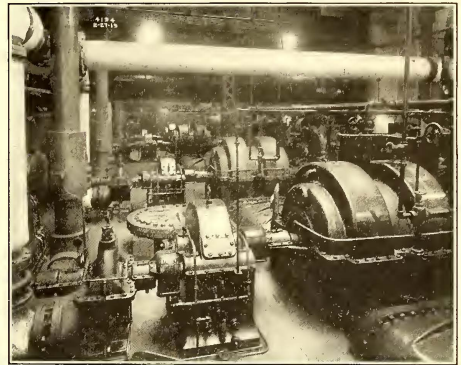
For example, if the high-pressure element is shut down, each low-pressure element will automatically receive high-pressure steam direct from the boilers through its own individual high-pressure steam system, whereas in normal operation the low-pressure elements do not receive any high-pressure steam direct. *Vice*



PLAN AND ELEVATION OF 60,000-KW. TURBO-GENERATOR UNIT

generators is applied; then the throttle valve on the high-pressure element is partially opened. As soon as the high-pressure rotor starts to revolve it will, through the applied field current, set the rotors of the two low-pressure elements revolving. This causes all three elements to come up to speed together and in correct phase with each other, so that when synchronized with the system they can be connected to the main busbars by closing a single circuit breaker.

The new Interborough turbine unit is of interest not only on account of its size but because unusual attention



CIRCULATING WATER PUMP IN INTERBOROUGH POWER PLANT

*versa*, if the two low-pressure elements be shut down, from any cause not affecting the high-pressure element, the high-pressure element will continue operating and automatically exhaust its steam into the atmosphere. Should only one low-pressure element be removed from service, the high-pressure element will exhaust into the remaining low-pressure element. All this governing arrangement is entirely automatic.

THE GOVERNORS SEEM ALMOST TO HAVE INTELLIGENCE

Since the governing mechanism must control three units, not only when operating together but also when operating separately, several features novel in steam turbine practice are involved. Each unit is provided with an over-speed stop governor which will immediately shut off the steam from that unit if the speed rises above a predetermined amount. Each unit is also equipped with a speed regulating governor of which that on the high-pressure unit is of the customary form. The speed-regulating governors on the low-pressure units are somewhat more complicated.

A butterfly valve, capable of automatic operation, is provided at each connection between the high and low-pressure units which will be automatically closed should the low-pressure turbine speed exceed a predetermined limit. This is tripped shut first by the speed regulating governor should it go to the outer position, and in

the event of its failing then by the automatic stop governor. The high-pressure turbine is provided with another exhaust, having a back-pressure valve, so that when necessary the exhaust from the high-pressure turbine may pass to atmosphere and the high-pressure turbine continue to carry its load.

Similarly, if the high-pressure turbine loses its load its governor will cut off steam to the whole system. If the governor does not control the turbine and the speed reaches the predetermined limit, then the stop governor on the high-pressure will close the automatic throttle, similarly cutting off steam from the whole system. The whole system will then slow down until it reaches a predetermined speed lower than normal, when the governors on the low-pressure turbine will cause live steam to be admitted directly to them.

#### A DIFFERENTIALLY-OPERATED VALVE CONTROLS THE LOW-PRESSURE LINE

There is a butterfly valve in the low-pressure line which is controlled from the governor of the corresponding low-pressure turbine. Each valve is operated by a differential piston to both sides of which steam pressure is admitted. One end of this cylinder is connected to a valve trip mechanism located at the low-pressure governor and so arranged that when the governor reaches a prescribed position a valve will be tripped open, thus releasing steam from that side of the differential position. Steam pressure on the other side will then quickly force the butterfly valve closed. If the turbine is to be shut down the gate valve is then closed by hand. The butterfly valve may be opened or closed also by a hand-controlled valve.

The valve controlling live steam direct to the low-pressure turbine will begin to open when the low-pressure governor reaches a prescribed position. This valve mechanism does not differ in principle from the main high-pressure valve controlling steam in the system, and is in conformity with ordinary practice for such purposes.

The overspeed stop governor on the high-pressure turbine will close the main throttle valve and the main regulating valve, while that on the low-pressure turbine will bring about the closing of the butterfly valve and the governor and throttle valve, admitting high-pressure steam to the low-pressure turbines.

As part of the throttle valve there is a switch which, when closed, will open the main circuit breaker. Should some accident happen to one of the turbine elements, it may be instantly cut out by operating the emergency stop, which will cause the immediate closing of the automatic throttle. This in turn causes the closing of the switch, which opens the circuit breaker.

The new unit was built by the Westinghouse Electric & Manufacturing Company, but unlike most Westinghouse turbines of moderate capacity it is built entirely on the reaction principle, whereas the custom of this company has been to build its turbines with an impulse high-pressure section. This change is due to the enormous volumes of steam which are to be handled and it permits the use of relatively long blades in the first rows of the high-pressure element.

The Northern Ohio Traction & Light Company, Akron, Ohio, and the Joliet & Eastern Traction Company, Joliet, Ill., have become members of the electric railway section of the National Safety Council.

## Employees Furnish Tips on Administration

### Connecticut Company's Suggestion Campaign Proves Fruitful—Although Obvious Defects Are Pointed Out, Many Practical Improvements Are Proposed

RECENTLY President L. S. Storrs of the Connecticut Company sent circular letters to all of the company's employees, calling attention to the supreme importance of courtesy and efficiency on the part of all, and also asking the employees to send him suggestions for the improvement of service that had occurred to them. As a result he received several hundred replies, and the suggestions of the men were found for the most part to be of great practical value. There were many that dealt with obvious matters, but among them were hints for improvement of service and conservation of income that showed careful consideration of the company's problems.

The field covered by the suggestion sheets included every department of the company. A painter wrote that he could make certain kinds of paint in the shop where he is employed for much less than the company was paying, and thus reduce the cost of painting cars. His ideas are being tried out. Another employee called attention to lack of signs on certain cars to inform the public that the car passed a certain railroad station, and the deficiency was immediately corrected. Another showed how the company might get more income and save passengers' time by having conductors announce that the cars made a connection with one of the company's own lines to a certain city, instead of dropping passengers at a point where a competing company's lines connected. All of the suggestions were constructive, and there were only three or four that were unsigned.

Examination of suggestions relative to transportation showed that most of the conductors and motormen believe that the skip-stop system discourages trolley riding and drives business to the jitneys on streets where there is jitney competition. There were many suggestions relative to rerouting, and criticisms made by the public were reflected in the suggestions sent in by the men. Many employees urged a return to a 5-cent fare basis, with additional copper-zone fares on long runs. There were literally hundreds of suggestions relative to minor details of operation, and condition of line, equipment and track.

It is significant that the men themselves protested against dishonesty on the part of fellow employees, and did not hesitate to sign their names to such protests. None of them accused any individual of improper handling of funds, but they did make suggestions that certain conditions be looked into, with the result that remedial action could be taken. Among the suggestions was one that the company establish an annual safety prize, with payments to be paid to car operators who go through the year without accidents. Various suggestions for improvement in accounting methods, for better accommodations at amusement parks and kindred matters were made.

Every person who sent in a suggestion received a letter of appreciation from Mr. Storrs, and The Connecticut Company believes that when it makes its next request for constructive suggestions from employees it will receive a great many more than came in response to its first request.

# The Zone Fare in Practice

By WALTER JACKSON

## BELFAST—PART I



BELFAST CASTLE ON ANTRIM ROAD

**Ireland's Great Industrial City, with 400,000 People, Has Practically No Tenements in the American Sense—Twelve Passengers per Car-Mile Is Average for System Despite Most Unfavorable Routing Conditions for Short Riding and No Tributary Population on the Outskirts**

**T**HOSE who see an inevitable connection between the stage fare and the multi-family or tenement house would have their views greatly modified by a visit to Belfast. Here is a city of 14,937 acres and 400,000 people, of whom the poorest classes, and the most numerous, live in tiny brick one-family houses, in striking contrast to the tenements of Edinburgh and Glasgow only a few hundred miles away. To see block after block of these almost microscopic dwellings with their four or five rooms apiece is to realize that national characteristics and topographical conditions are perhaps the most potent factors in the character of housing found at any particular place.

Belfast is free to grow in almost every direction. Its tramway routes, unlike those of many British cities, do not terminate in small, populous communities but end in the open country after a rapid thinning out of traffic in the suburban areas. In this respect the tramways suffer, as there is much less of the pick-up and neighborhood riding that is so prominent in Glasgow's suburbs and its neighboring communities.

A second cause that gives Belfast a lower density per car-mile than other foreign cities is that its chief industries are so located in or near the town that the ma-

jority of the workers are within easy walking distance. This fact is apparent from the map on page 910, but the following figures may prove more convincing:

Of the 20,000 to 30,000 workers at the Queen's Island shipyards, about 8000 ride regularly.  
Of 15,000 employees of the linen manufacturers, less than 10,000 ride.  
Of 3000 at the rope works, 1000 ride.  
Of 7000 flax spinners, 2000 ride.  
Of 3000 tobacco workers, 1000 ride.  
Of 2000 flax spinners (second group), 1000 ride.  
Of 3000 flax spinners (third group), 500 to 600 ride.  
Of 2000 at the Ligoniel Mills, 300 ride.

From the foregoing summary it is plain that although Belfast is a great industrial city, it is by no means an ideal tramway town.

A third factor which discourages heavy riding is the long-standing system of alternative routing for the Belfast City Tramways. Instead of radiating to a given terminus as a single line, a number of routes are double-armed and sometimes even triple-armed. The result naturally is that each branch gets only one-half the service that a single straight through route would give in shorter time and with less mileage. Through this scheme some passengers get a shorter walk, but short riding is discouraged since a man who wants to travel a mile or so will not wait for a car on a ten-minute headway. As

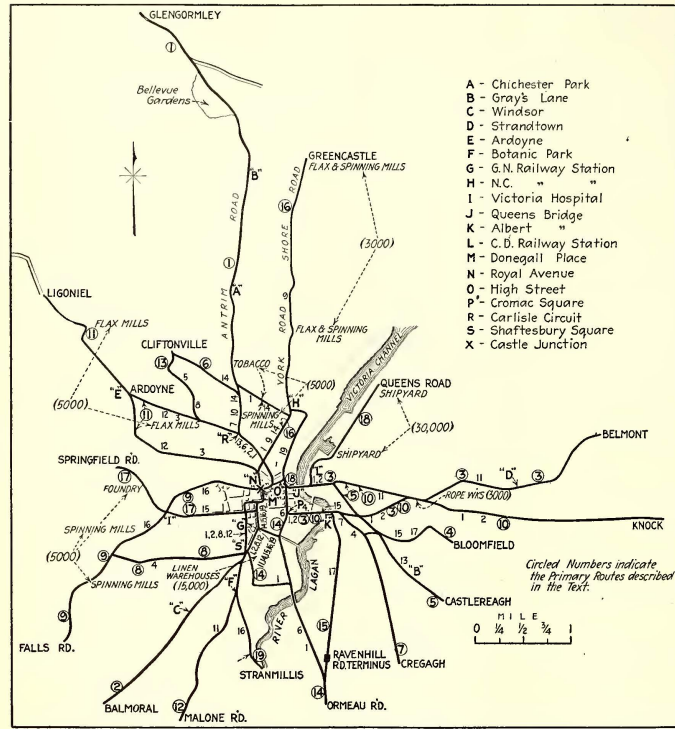
short headways are quite as important as low fares in attracting the short-haul rider, J. S. D. Moffet, general manager, is giving serious thought to the possibility of one-man car service on some of the less important routes.

To summarize the situation: In a city of 400,000 with 100 miles of single track, with industries close to the homes of the workers, no suburban feeders and no high density of population, the returns for the fiscal year ended March 31, 1918, show earnings of 13.39d. (26.78 cents) per car-mile from traffic receipts, a den-

scribed to industrial conditions, because Belfast was a busy city throughout the whole war, and there was no special change during 1917-1918. There were many prognosticators of dire results, but they proved bad prophets! Fig. 1 contains graphs of car-miles and passengers, gross receipts and operating expenses, and cost and revenue per passenger from 1906 to 1918.

**BELFAST ROUTINGS ARE PECULIAR**

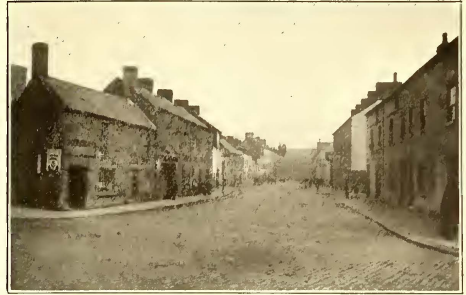
In view of the peculiarities of the Belfast routing and the comparative sparseness of population along various lines, the following detailed statement of services with route mileages, might well be compared with American practices:



sity of twelve passengers per car-mile and a total travel of 75,416,816 passengers. These figures and others of interest to the operator are set forth in the table on page 913, covering operations for the fiscal years 1912 to date. It is worth pointing out that the tramways, despite the increase in fare, enjoyed the greatest traffic gain in their history during the fiscal year ended March 31, 1918. Not only was the £6,893 deficit of the preceding year absorbed, but a surplus of £11,545 was left as well.

Although the fare revisions began on May 21, 1917, the passengers per car-mile increased from 11.1 in the 1917 fiscal year to 12.0 in the 1918 fiscal year. Such figures indicate that the rates of fare must have been increased with a scientific understanding of what the traffic would bear. The improvement can hardly be

1. *Antrim Road and Glengormley section (route),* 6 miles long, gives three- to six-minute service to Chichester Park, 2 1/2 miles out; ten-minute service between Chichester Park and Gray's Lane, 4 miles from city, and twenty-minute service between Gray's Lane and end of line at Glengormley. The greater part of this route is an avenue of fine residences, but beyond Gray's Lane there is nothing until the tiny village of Glengormley is reached. The village is a popular summer resort with a number of tearooms. Formerly the city had a band there, such service being charged against the tramway department. But this is not the worst. About 4 miles out is a rock-walled hill called Bellevue Gardens, on which thousands of pounds have been spent for park development, all charged against the tramways because of the old park fallacy that pleasure travel would pay for it. Although this, the longest line on the system, has been in existence for twenty years and has a well-to-do class of patrons, buildings become scarce almost as soon as the city line is reached. At present, slightly more people are being carried to Glengormley at 4d. than before at 3d., proving that the 1d. increase in the total fare has not stopped whatever development there was.
2. *Balmoral section* is residential. It is 3 miles long. The all-day service to the terminus is ten minutes, but the 2-mile division to Windsor has a five-minute headway during the morning, midday and evening rush hours.
3. *Belmont section* includes both residential and mill territory. It is 3 1/2 miles long with a twenty-minute service on each arm but ten minutes for Strandtown 2 1/2 miles out. On this route the overlapping of lines gives the short rider a car every four minutes during the day and every two minutes during the rush hours for a distance of 1 1/2 miles.
4. *Bloomfield section* is residential. It is a 2 1/2-mile cross-town line feeding midway between Castlereagh and Knock Road. It has a twenty-minute headway as a war measure.
5. *Castlereagh section* runs through a thinly populated district. It is 2 1/2 miles long and has a headway of twenty minutes as a war measure with some extra cars turned back 3/4 mile from the terminus.
6. *Cliftonville section* is residential and well populated. It is 2 miles long. The normal all-day headway is ten minutes with two or three cars added during the rush hours.
7. *Cregagh section* is a 3-mile residential line which runs to open country. It has a ten-minute headway all day.



WIDE STREETS AND TINY HOUSES IN ONE OF OLDEST PARTS OF BELFAST

8. *Donegall Road section* is 2½ miles long, running in conjunction with but not using the same track as the Falls Road section. It passes through thinly-populated territory and terminates at the city cemetery. A twenty-minute headway prevails.

9. *Falls Road section* is 3 miles long to Andersonstown terminus. It has a ten-minute headway over the entire line and five-minute service to the city cemetery. Traffic on this line ordinarily is moderate but is heavy on football Saturdays.

10. *Knock Road section* serves both a factory and a better-class residential district. A ten-minute service (an absurd alternative twenty-minute service via Queens Bridge and the same via Albert Bridge) is given over the complete length of the road, 4 miles to Knock, and a five-minute regular and three-minute rush service to Knock Road, 3 miles out. This is one of the busiest routes in the city.

11. *Ligoniel section* runs to Ligoniel, 3½ miles out. This is a working-class line with a ten-minute service to the terminus. It has two arms which join at Ardoyne, 2 miles from the center of Belfast. The Shankill Road arm has a base headway of ten minutes with changes to five and three-minute intervals according to needs. The Crumlin Road arm has a normal headway of ten minutes with a few extras during the rush hours. All turnbacks are made at Ardoyne, leaving a ten-minute headway between Ardoyne and Ligoniel. This line is a type of the two-arm routing where a single intermediate line would give a straight instead of a roundabout route and permit so short a headway that walking along the route would be almost eliminated. It is true that the walk to and from the car would be increased, but the public would be benefited as it would always find a car in sight.

12. *Malone Road section* is a high-class residential line with a ten-minute service to the terminus. At a point (Botanic Park) 1½ miles from the center of the city it has a branch to a terminus ¾ mile beyond the park and known as Stranmillis. As this branch also has a ten-minute service, it is possible to give a five-minute service on the joint track.

13. *Old Park section* runs over the Crumlin arm of the

Ligoniel route for a distance of 1 mile to Agnes Street and terminates at Cliftonville, making a total length of 2½ miles through a partly working-class and partly high-grade residential section. The Old Park service proper is ten minutes, but on the 1 mile of joint operation the combined headway is five minutes. This route serves one side of the Old Park territory, while the Cliftonville section serves the other side of the recreation grounds and residences in this part of the city.

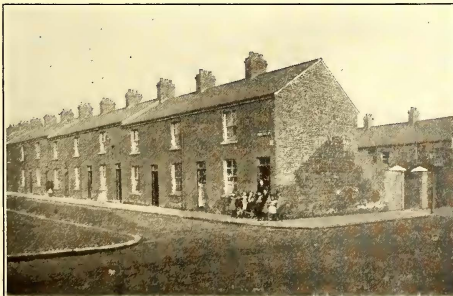
14. *Ormeau Road section*, 2½ miles long, serves a residential district. It has two arms which join at University Street, 1½ miles from the center of town. Both the Botanic Avenue and Cromac Street arms have individual services of ten minutes, giving a joint service of five minutes in the less populated sections! This is the curious result of starting the alternative routes in the center of the city instead of some point nearer the suburbs.

15. *Ravenhill Road section*, 2½ miles long, has an individual all-day headway of twenty minutes as a war measure. It is in residential territory running along the Public Park, which is flanked by Ormeau Road on the opposite side, forming a "V" therewith.

16. *Greencastle or Shore Road section*, 3½ miles long, has a ten-minute headway to the terminus with five-minute service over the first mile. This route serves a working-class district. It passes the station of the Northern Counties Midland Railway, into which a car is run on a stub track every twenty minutes—more often than train connections warrant. This is a possibility for one-man car service.

17. *Springfield Road section* is 2 miles long with a straight ten-minute headway. It serves the Victoria Hospital and the same general territory as the Falls Road section and the Shankill Road route of the Ligoniel section.

18. *Queen's Road section* has extraordinary traffic morning and evening, because it serves the two great shipyards on Queen's Island. These establishments deliver about one-half the morning and evening rush traffic, about eighty cars being used in the morning and a few less at night. Whereas the individual Queen's Road service is simply a ten-minute headway over the 1½-mile run up to 7 p.m., with no reason



LATEST TYPE OF WORKMEN'S DWELLINGS IN BELFAST WITH PLAYGROUND FOR "CHILDHER" IN REAR

for service after that hour, the same tracks during the rush hours are used for through cars to or from every part of Belfast. This through routing involves no extra costs for special work, and it has the advantage of distributing the load to a certain degree. Plenty of the impatient patrons, however, take the first car that leads to Castle Junction—the great gathering point—where they either pay

in the case of the Greencastle section, a few cars of the Queen's Road section are run into the County Down Railway station for the convenience of steam railroad patrons.

In general, all the services as far as possible are routed over at least two sections (routes). The exception is the Glengormley section, which can be looped in

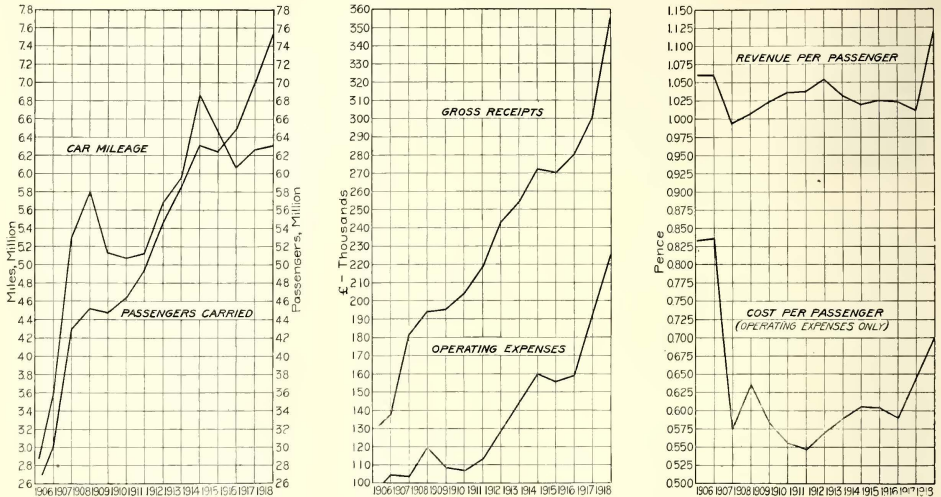


FIG. 1—COMPARATIVE TRAFFIC AND OPERATING STATISTICS OF BELFAST CITY TRAMWAYS FOR 1906-1918

a second fare on a second car or walk the remainder of the way. Of the 20,000 to 30,000 workmen in the shipyards, about 8000 use the cars, and these are disposed of in ten minutes despite unfavorable car-storage and fare-collection conditions. The tracks extend down a narrow street between the yards with few crossovers and no continuous third track that could be used for storage. Passengers pile on pell-mell, since no space is available for the desired prepayment area, but somehow or other the conductors manage to get the fares of everybody except the boys who hang on the outside and drop off before the cars reach the Queen's Bridge into the city. The inbound or morning service is easier, of course, as the fares are collected individually rather than in mass. Eventually, train service may be introduced for the evening operation. As

and out of Castle Junction without switching. The bad feature of the present arrangement is that some routes have odd cars (put on to please individuals who were able to influence the Council in their own as against the public interest) routed over several other sections. For instance on the Antrim Road section,

services are run from Chichester Park to Ormeau Road, Knock, Cregagh and Balmoral (Windsor), but of the two last one has only a twenty-minute headway and the other consists of only odd cars operated during the middle of the day. The natural result of this multiplication of the "chances of disturbance" is that instead of an even headway

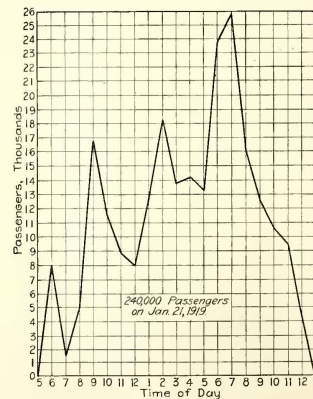


FIG. 2—MARKED MIDDAY TRAFFIC IN BELFAST



J. S. D. MOFFET, general manager Belfast City Tramways since October, 1916, came to Belfast from the West Ham Corporation Tramways, of which he was general manager and engineer from 1913 to 1916. From 1904 to his change to West Ham, Mr. Moffet had been general manager of the Rochdale Corporation Tramways. Mr. Moffet has been conspicuously successful in securing increased travel at Belfast despite increases in fare. Educated

as an engineer, he believes in applying engineering principles to the sometimes elusive problems of the traffic department, and this belief is illustrated by the various graphic records and principles of analysis used by him in Belfast. Mr. Moffet, as general manager at Rochdale, was a pioneer in the installation of car-checking devices, and at West Ham he secured the adoption of a central telephone control system that was the first and only one of its kind in British or European tramway practice. Mr. Moffet is a native of Sunderland, Durham, England. He has traveled over a good part of the world but never visited America. He is familiar, however, with the latest American practices and before long hopes to introduce some highly advanced traffic devices still unknown to European tramway service.

at the busy periods, the cars not only arrive at the converging point in groups but travel the remainder of the journey in bunches of twos and threes. In consequence, the service is bad and the road inadequately covered.

More normal examples of routing a car over two sections are: Falls Road and Greencastle (Shore Road) sections; Donegall Road and Bloomfield sections; Springfield Road and Ravenhill Road sections; Malone and Ligoniel sections; Old Park and Castlereagh sections; Cliftonville and Ormeau Road sections, and Stranmillis and Northern Counties railway station.

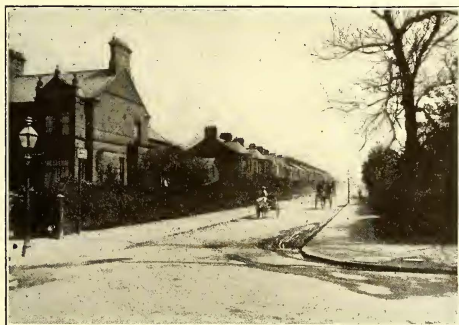
Like other cities of the United Kingdom, Belfast has a pronounced mid-day travel in addition to the usual a.m. and p.m. peaks. This characteristic is clearly brought out in the graph on page 912 of the traffic handled on Jan. 21, 1919. This shows that 17,000 passengers were on the cars at 9 a.m., about 18,300 at 2 p.m. and 26,000 at 7 p.m. The total travel between 5 a.m. and midnight was 240,000. It will be understood, of course, that the actual periods of maximum boarding were say thirty

using the hours saved by starting a little later than at present but quitting earlier. In other words, serious discomfort to the public would be avoided by splitting the saving instead of applying all of it to the postponement of the opening hour. Every cloud is reputed to have a silver lining. In this case, if the workmen do prefer to start after 8 a.m. they lose the low-rate fare. Hence the tramways can offer a choice between the

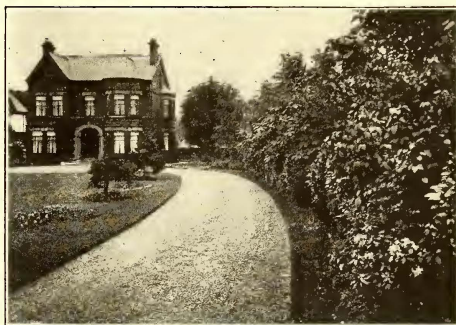
staggered hour with the low-rate fare retained, or an accentuated peak with the low-rate fare eliminated.

This aspect of the daily traffic curve is by no means unique to Belfast. The agitation for shorter workdays is universal throughout the United Kingdom, and their installation will have effects similar to that indicated at Belfast. It is not likely, however, that noon-day riding from mills and sales-shop will be much affected. The habit of

Malone Road



Cypress Gardens



Dunbarton

HOMES IN OUTER PARTS OF BELFAST WHICH INDICATE THAT THE ZONE FARE HAS NO TERRORS FOR THE MIDDLE CLASS

minutes ahead of the time shown on the graph. Aside from the three highest peaks, there will be noted one reaching the total of 8000 passengers at 6 a.m. This, of course, is the early workmen's traffic. How long this will continue is problematical. The present agitation for shorter workdays would, if successful, throw the morning load on top of the 8 to 9 o'clock peak unless the riders concerned could see the advantage of

going home to luncheon has been so strongly cultivated that many shops are completely closed for one to one-and-half hours at midday.

Service to the extent of handling nearly 250,000 passengers a day is being given now with 291 cars, of which 250 to 260 are in daily use. The schedule speed is exceedingly good, 8.5 to 9 m.p.h., owing in large measure to double-track operation, wide streets and good traffic

RESULTS OF OPERATION OF THE BELFAST CITY TRAMWAYS FROM 1912 TO 1918

Year Ended	Traffic Revenue		Total Revenue		Working Expenses			Total Expenditure	Surplus	Car Mileage	Passengers Carried	Average Return per Passenger	Total Working Expenses per Passenger	Passengers per Car-Mile
	£	d.	£	d.	£	d.	£							
1912	239,263	10 12	243,068	10 29	129,343	5 47	219,197	23,871	5,671,776	54,546,856	1,052	0 904	9 6	
1913	250,589	10 12	254,377	10 27	143,885	5 81	238,576	15,801	5,946,659	58,437,942	1,029	0 979	9 8	
1914	268,230	9 38	272,062	9 51	160,278	5 60	269,157	2,905	6,865,591	63,131,820	1,019	1 023	9 2	
1915	266,249	9 03	270,237	10 08	156,913	5 85	267,014	3,223	6,432,600	62,340,269	1,025	1 028	9 7	
1916	275,668	10 88	280,653	11 08	159,310	6 29	272,792	7,861	6,077,658	64,697,292	1,022	1 012	10 6	
1917	296,910	11 41	301,545	11 58	189,066	7 29	308,238	6,893	6,245,012	69,582,066	1,024	1 063	11 1	
1918	350,385	13 39	355,056	13 57	221,967	8 48	343,511	11,545	6,279,072	75,416,816	1,150	1 093	12 0	

\* Deficit.

NOTE—First fare revision May 21, 1917; second fare revision July 1, 1918.

regulation. Cars attain a maximum free running speed of 16 m.p.h. The same running time is maintained throughout the day. Belfast has no buses, and in view of the good car speeds and the low density of population it is not likely to have any in the near future.

Stops are spaced five poles or 600 ft., and practically all of them are nearside. Safety stops, as is the case with operating speeds through different parts of the city, are specified only by the Board of Trade regulations. They are indicated by red signs, while blue signs identify the regular "by request" stops. At an early date, the railway will make the stopping places still clearer by striping the poles.

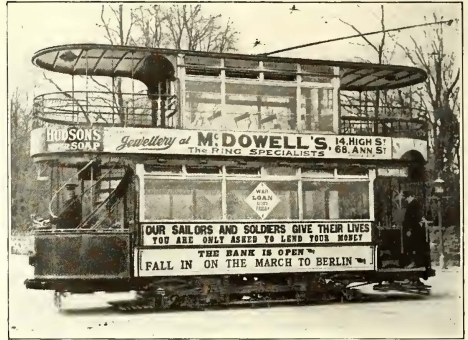
At Castle Junction, the gathering point of all the cars on the system, three traffic regulators are stationed to accelerate traffic movement. These men are on duty from 8 to 10 a.m. and 12 to 7.30 p.m. They assume the responsibility of starting off each car so that the conductor can begin earlier to collect fares. As two passengers can readily board the car at one time, no attempt is made to load people in queues. Only the rear platform is used for entrance and exit.

#### ROLLING STOCK IN BELFAST

The standard car of Belfast is double-deck with open vestibules and open ends on the upper deck. It is 27 ft. 10 in. over all, with 5-ft. 6-in. platforms, seats twenty-two passengers below and thirty eight above, and weighs 24,640 lb. The cars are mounted on Brush single trucks with two 35-hp. Westinghouse No. 200 motors. The controllers are Westinghouse No. 90 M with electric braking features. Magnetic sanders are also used in operating the slipper brake as an addition to ordinary hand brakes. Illumination is afforded by 16-cp. lamps enclosed in molded glass. The conductor's pull cord

the lower deck of the car. Route information boards are placed over the central window of all cars as in common British practice.

An unusual—and appreciated—feature of Belfast car equipment is the installation of Neill clocks. These are electrically operated by means of two Western Electric 2-volt dry cells, "Bluebell" type. The accuracy of these



BELFAST DOUBLE-DECK CAR USED DURING A WAR-LOAN RALLY

clocks has helped many a passenger make his train.

From the foregoing account, it is apparent that Belfast rolling stock does not differ materially from the usual British double-deck car. In a later issue data will be published concerning the maintenance of this equipment, more particularly the wheels and axles. The second part of this present Belfast article, to be published in the May 24 issue, will show how fare increases have been successfully worked out and how the fares are collected and accounted for.

#### Making Change on Safety Cars

**I**N CONNECTION with the establishment of safety-car service in Hartford, Conn., Manager W. P. Bristol of the Hartford division of The Connecticut Company made a graphic demonstration of the time that it lost in making change on trolley cars.

Mr. Bristol had as his guests, on a trial trip of a safety car, a number of newspaper men and other citizens of Hartford. He supplied each man with a half dollar and also with 6 cents in change. There were eleven passengers on the trip and Mr. Bristol asked each one to present the half dollar to the operator when he boarded the car. A stop watch was held by one of the men and, although the operator worked very rapidly, it took one minute and thirteen seconds for him to collect the fares, make change, register the fares and get under way. At another stop Mr. Bristol asked the passengers to present the six cents in change to the operator. This they did and the fares were collected and the car under way in twenty-one and two-fifths seconds.

The demonstration might be called part of a campaign being conducted by The Connecticut Company to educate the public to have the exact fare ready. It gave all those who were on the trial trip a vivid conception of the time that may be saved if passengers will have their fares ready instead of presenting coins or bills that take the operator's time in making change.



CASTLE JUNCTION, THE GATHERING POINT FOR ALL CARS AT BELFAST

(Note booth where traffic regulators make out reports)

is still the only signal device, but push-button signals available for both the passenger and the conductor are under consideration.

Although illuminated roller destination signs are carried over both dash and step, the management is considering the installation of a big route number sign which would be carried from the upper deck so that a prospective passenger would be sure to see it even if a large motor truck or wagon happened to be obscuring



# Why More Income Must Be Secured

Hearing Before Committee on Public Utilities of National Chamber of Commerce in St. Louis Brings Out Needs of Electric Railways for Adequate Revenues and Needs of Communities for Adequate Railways

THE meeting of the United States Chamber of Commerce on April 30, as briefly noted in the ELECTRIC RAILWAY JOURNAL of May 3 in connection with the general account of last week's convention in St. Louis, took the form of "hearing" by the committee on public utilities. Lewis E. Pierson, Irving National Bank, New York, chairman of the committee, presided during the first part of the meeting and Paul M. Myers, president St. Paul Association of Commerce, during the latter part. Evidence in regard to the utility situation was presented, usually in the form of answers to questions put by or through the chairman.

J. B. Chilberg, president Scandinavian-American Bank of Seattle and a member of the Seattle Chamber of Commerce, was the first speaker. Mr. Chilberg said that the franchise in Seattle prescribed a franchise tax of 2 per cent of the gross earnings in addition to the regular taxes; a fare of 5 cents, including transfers, and the sale of twenty-five tickets without transfer privilege for \$1. With the outbreak of the war there was a tremendous expansion in the shipbuilding business at Seattle, and large numbers of workmen had to be carried twice a day to and from the shipyards. In the meantime the operating expense of the company increased greatly. With the war the 4-cent fare was abolished, but under a State law the company was not allowed to charge more than 5 cents although the city was willing to grant a 6-cent fare.

As it would have required several years to repeal this law, Mr. Chilberg stated, municipal purchase seemed to be the only alternative. This was carried out, most business men supporting the purchase plan although none was in favor of municipal ownership except as the last resort. For the purchase price of \$15,000,000 the city issued bonds which were a first lien on the gross receipts of the combined old and new city lines.

In reviewing the steps taken by the city since the purchase of the property, Mr. Chilberg said that the Council had passed an ordinance stopping jitney competition and was planning to put in skip stops. It had also cut off free transportation for policemen and firemen. Of course, under municipal ownership the 2 per cent franchise payment and the taxes would be lost to the city. The traction company had formerly paved about one-third of the surface of the streets through which its tracks ran, but Mr. Chilberg did not know whether the cost of this paving would be assessed in the future against the tramway department or not. With these changes T. F. Murphine, superintendent of public utilities, hoped to be able to carry passengers for 5 cents. The old municipal railway in Seattle, Mr. Chilberg said, had not been a financial success. So far as he knew, no plan has been made for keeping the accounts of the whole system so as to show the comparative expense of operation under city management and private management, or the taxes and other city payments which would now be forfeited. Such a plan would

have to be initiated by the city, if undertaken, because the Public Utility Commission in Washington does not have jurisdiction over municipal properties.

The testimony of Harlow C. Clark, of the American Electric Railway Association staff, the next speaker, is published on the next three pages of this issue.

W. O. Clure of Minneapolis who described himself as a writer of newspaper articles, said that he had been interested for many years in studying the local electric railway situation. He referred particularly to the activity of the Citizens' Council, which was doing its best to reach a common basis of understanding between the company and the city. He thought that the social aspect of the problem was more important than its economic aspect. He believed in private ownership and was in favor of a cost-of-service franchise with the abolition of all charges not directly connected with the rendering of the service.

The next speaker was Ralph S. Bauer, Lynn, Mass., who spoke in favor of low fares, the deficit to be made up by general taxation. In his opinion, high fares discourage travel, whether they are on the straight-fare or zone basis. The experience with high fares in Boston indicates that there will be a passenger loss of about 72,000,000 during the year. Low fares from the outlying districts are a boon to the merchants of any city, and they can well afford to pay the additional amount required in taxes to subsidize such a service. When asked whether employees in manufacturing plants would not require employers to raise their wages in the case of higher fares and so distribute the burden, Mr. Bauer did not think that this would occur. He considered the jitney an economic waste. He believed that a service-at-cost plan will not permit a company to give the maximum service which is desirable from a car-riding standpoint, and thus would hamper community development. High fares, he said, would force many workers to live in the industrial district and thus produce undesirable living conditions.

R. A. Leussler, assistant general manager Omaha & Council Bluffs Street Railway, said that this property before the war was prosperous, but expenses have increased so greatly that the company cannot earn interest on its bonds. The War Labor Board granted a yearly increase of \$760,000 or 40 per cent in the company's payroll, but the municipal authorities have resisted an increase in fare. The fuel administrator has raised the price of coal and the railroad administrator has raised the charges on freight, but neither the state commissioners nor the municipal authorities have taken these prices into consideration.

Walter A. Draper, vice-president Cincinnati Traction Company, then described the cost-of-service franchise in force in Cincinnati. The Manufacturers' Association of that city was of assistance in securing the franchise, and the company now has a fare of 6 cents. In answer to the inquiry asked of a previous witness as to whether employees would not ask their employers to

stand the additional transportation charges, he said that one manufacturer had told him that his employees had asked for a 10-cent increase a day in wages to pay the 2-cent increase in car fare.

A. L. Faber, Westinghouse Electric & Manufacturing Company, testified to the merits of the one-man car in increasing the service and reducing expenses.

Horace Lowry, president Twin City Rapid Transit Company, Minneapolis, spoke against an extra charge for a transfer on the ground that it created a discrimination between the man who lived on a main line and one who lived on a branch line.

At the close of the session Mr. Pierson explained that it was the hope of the committee to conduct or initiate somewhat similar hearings in other cities to find some solution of the traction problem and invited suggestions in the way of those whose testimony would be helpful and of questions to be asked. The meeting then adjourned.

## The Railway Situation

### Survey of National Situation Indicates Imperative Need of Aid for Electric Railways

AT THE HEARING on April 30 before the committee on public utilities of the United States Chamber of Commerce, a general survey of the electric railway situation was given by Harlow C. Clark, of the American Electric Railway Association Staff. This survey follows in part, in the form of Mr. Clark's answers to queries:

*Is the electric street railway industry as a whole at the present time in a prosperous or unprosperous condition?*

In an unprosperous condition. A statement prepared by the statistical bureau of the American Electric Railway Association shows that of the 44,800 miles of single track of electric railways in the United States there were in the hands of receivers on April 29 5897 miles, or more than 13 per cent. It is also a matter of common knowledge that a large mileage which is not actually in the hands of receivers is practically in an insolvent condition. Since Jan. 1, 1915, service has been abandoned upon 240 miles of track and 528.87 miles have been dismantled and sold as junk. Thus 769.12 miles are no longer in service.

In the case of seventy-six companies whose common stock is listed, the value of this based on present capitalization and the market price of January, 1914, was at that time \$496,238,398. The value on the same capitalization and the prices of January, 1919, was \$245,741,642, a shrinkage of \$250,496,756 or more than one-half. The shrinkage in the value of the securities of the largest New York City electric railway as between January, 1917, and February, 1919, was \$126,811,100, in a total of \$423,505,000.

The preliminary report of the United States Census Bureau covering statistics of electric railways for 1907, 1912 and 1917 shows that between 1917 and 1907 the income from all sources increased 69.9 per cent and the operating expenses increased 80.1 per cent, while between 1917 and 1912 the income from all sources rose 24.6 per cent and the operating expenses 36.87 per cent. Hence, in the last five years covered by the report, operating expenses increased at a greater rate than did income from all sources. This should be contrasted with the figures for the previous five years—1907 to 1912—when income from all sources increased 36.3 per cent and operating expenses 32.5 per cent, as well as the figures between 1902 and 1907, which show an increase of 71 per cent in income and 76 per cent in operating expenses.

The net income from 1907 to 1917 increased 39.9 per cent, but between 1912 and 1917 there was an actual decrease of 17.2 per cent, as compared to an increase of 68.9 per cent for the five years 1907 to 1912. This decrease in net income is perhaps more fully illustrated by a comparison based on the net income per passenger carried. This was in 1907 0.0249 cent; in 1912, 0.00354 cent, and in 1917, 0.00263 cent.

The income statement of 283 companies for 1917 and

1918, compiled by the American Electric Railway Association, shows a net income of \$10,561,902 for 1916 as compared with \$39,490,008 in 1917, or a decrease of 73.25 per cent. Unfortunately, it is impossible to reduce this to the revenue passenger basis, but on the basis of total passengers carried, it shows 0.0034 cent for 1917 and 0.0008 cent for 1918. It is also, unfortunately, impossible from the figures available to show all the amounts per revenue car-mile expended for maintenance. It may safely be stated, however, that since the present era of high prices the maintenance of electric railways in the United States has been cut down below what would in normal times be considered a proper standard, and that if these charges had been included, there would have been an even greater decrease in net.

Few, if any, of the companies operating in this country are charging to operating expense sufficient allowance for depreciation. In general, therefore, the census figures, as well as any income statement that may be obtained, may be said to be a distortion of the actual situation, in that a more favorable aspect is presented than is in reality warranted.

In regard to the traction situation in the 273 cities of the United States having a population of 25,000 or more, in all but twenty-nine applications for an increase in fares necessitated by the financial condition of the companies have been made. In the twenty-nine cases where no applications have been made, local and particular reasons have been the causes.

*What, in your opinion, are the principal causes of the present unprosperous condition?*

The fundamental cause is the decrease in the purchasing power of the dollar. Accepting the statement of Prof. Irving Fisher of Yale University that the purchasing power of the dollar declined 50 per cent between 1896 and 1918, and the further statement of William H. Taft and Frank P. Walsh, joint-chairmen of the National War Labor Board, which they based upon information furnished by government departments, that as between 1915 and 1918 the purchasing power of the nickel had declined so that a seven-cent fare now purchases no more than did a five-cent fare in 1915, it is easy enough to account for the condition of the industry. If the unit of fare was to-day 10 cents instead of 5 cents, the traction system would be able to meet the greatly increased costs of material, wages, taxes and money.

The cost of operation has undoubtedly advanced to a very notable degree. Between 1914 and 1918 the principal materials used by electric railways advanced from 60 to 200 per cent. A statement recently presented in the zone-system report of the Public Service Railway to the Board of Public Utility Commissioners of New Jersey shows on a weighted average an estimated increase of 82.30 per cent in the cost of materials between 1917 and 1918, while the decrease between 1918 and 1919 amounts to 2.25 per cent.

It is more difficult to give an average for the increase in wages. It may safely be said, however, that since the National War Labor Board became active the increase in wages has amounted to about 50 per cent.

In addition to these causes there is a very important reason contained in the demands of the communities for increased and improved facilities and in the constantly mounting requirements for taxes and other imposts. The amount paid by 130 companies for direct taxes increased from \$7,706,343 in 1912 to \$9,721,694 in 1916, or 26 per cent. Other requirements of government total \$4,093,636 in 1912 and \$4,626,568 in 1916, or 1.2 per cent increase. In other words, the amount paid for taxes and other requirements was in 1912 2.36 cents per car-mile; in 1913, 2.53 cents; in 1914, 2.66 cents; in 1915, 2.53 cents, and in 1916, 2.48 cents.

The gradual extension of the transfer privilege has also had considerable effect upon the industry. Census figures show that while the revenue passengers increased 18.4 per cent between 1912 and 1917, the transfer passengers increased 24.6 per cent, whereas as between 1912 and 1907 the revenue passengers increased 28.23 per cent and the transfer passengers 21.25 per cent.

The great increase in the use of automobiles has also had a very marked effect. In the city of Schenectady, which has about 100,000 population, J. P. Barnes, general manager Schenectady Railway, recently made a study of the effect of automobile traffic upon street-car riding. This covers the years 1912 to 1918 inclusive and shows that in 1912 the ratio of pleasure-car riders to trolley-car riders was 1 to 20, while in 1918 it was 1 to 5.08. No doubt these figures would, in general, apply to the cities of the entire

country. Aside from the use of pleasure automobiles, the use of the unregulated jitney is another principal reason for the condition of many electric railways.

*Has the rapid development of the art of electric traction made necessary frequent and large replacements and betterments in response to public demand and the orders of regulatory bodies?*

Undoubtedly. The cars, track, overhead equipment, power houses and practically everything used in connection with electric railways have very materially improved and have become materially more expensive. A very large part of this improvement has brought absolutely no increase in the way of revenue to the companies. The paving required—both as to character and to material—is an example of the kind of expenditure which has been forced upon the companies by municipal requirements but which has brought no corresponding increase in revenue. Moreover, improvements in ventilation, lighting and heating of cars have been made in response to public demand without commensurate increase in revenue. Many extensions to outlying districts have been of material benefit to property and the city as a whole, but have not been paying propositions.

*Can you state the comparative operating ratios for a series of years?*

For 1902, 57.5 per cent; for 1907, 60.1 per cent; for 1912, 58.7 per cent; for 1917, 63.76 per cent (census figures); for 1916, 62.51 per cent; for 1917, 66.65 per cent; for 1918, 72.65 per cent (American Electric Railway Association figures).

*Should traction companies be required to pay part of the cost of bridges over which their lines pass?*

This is a fundamental question and one not to be finally answered until a lasting basis for the relations between the companies and the communities is fixed. My personal opinion is that the furnishing of public service, such as electric railway service, should be done upon a cost basis and that it should be done by private capital and private enterprise because of increased efficiency thus secured, and that private enterprise should be allowed a fair and reasonable return, including a reward for economy and efficiency. This return, which is a necessary part of the cost of service. This return, which is a necessary part of the cost of service. Having arrived at this conclusion, we must not have every charge against electric railway operation as a charge against the car rider and not as a deduction from the profits of the corporation controlling the company. I do not believe that a public utility should be used as a means of profit-making for a community or for the reduction of taxes or of the cost of city government.

The problem is one of the proper division of city expense as between users of car service and the tax payers. If we accept the theory of service at cost, then we must agree that every charge placed upon the service is paid from the fare received from the passenger. Under existing theories and methods the car service is being taxed to provide thoroughfares for practically every form of transportation except car service. Not only is this true as regards paving, but also as regards street cleaning, street sprinkling and snow removal. For a person who uses an automobile, a wagon, a truck, bicycle, jitney, omnibus or a taxi, the community furnishes a thoroughfare provided at public expense. For the citizen who uses the street car it not only compels him to pay for his own thoroughfare, but taxes him for the benefit of the users of other transportation.

In general, as regards bridge, paving construction and similar highway charges, those made necessary by the special nature of the transportation, namely, rails, ties and other things involved in providing the track and strengthening and improving bridges for use by cars are a proper charge against the carrier. On the other hand, there is no reason why he should be taxed for any part of the thoroughfare which is furnished to other means by transportation without charge.

The committee may be interested to note the theory of the State-appointed trustees of the Boston Elevated Railway in connection with the use of subways by the Boston electric railway system. In their annual report the trustees say: "The trustees believe that subways are nothing more than highways under the surface, and that the public should own all its highways whether on the surface or below the surface. . . . The trustees believe that the public owes the same duty to furnish highways for electric railway travel that it does for pedestrian or other travelers. . . . The trustees have also asked that the company be reimbursed from the public treasury for the subway rentals which it has been called upon to pay."

*Is it for the public interest that traction companies which perform an indispensable public function be protected against the destructive effect of unregulated jitney competition? If so, to what extent and in what manner should regulation of jitneys be applied?*

Jitneys should be declared common carriers and treated as such. The same methods and practices of regulation should be applied to them as to the transportation systems—a certificate of convenience and necessity should be required for the operation of a jitney bus; where special licenses, imposts and taxes are levied upon an electric railway they should be similarly levied upon jitney bus lines; where rates, schedules and service of an electric railway are specified and controlled, they should be similarly specified for jitneys, and requirements as to safe and efficient operation for electric railways should be extended to jitneys.

*Assuming that the continuance of existing conditions will make most traction companies insolvent and prevent or curtail their operation, what remedy or remedies would you suggest?*

(a) Exemption from special taxes, reduction of property taxes and abolition of franchise charges?

(b) Exemption from special charges for bridge construction?

(c) Exemption from paving charges except those arising directly from the existence of operation of the tracks?

It seems to me that communities and the companies must get together on a basis which recognizes that the return to capital should be limited to such a rate as will attract new capital into the business, but which will assure this return on the basis of a flexible fare automatically regulated to provide the cost of the service. I believe that the communities should be permitted to prescribe the service that they require. I believe that there should be special inducement to the private operators of these companies for the exercise of economy and initiative. I believe that co-operative action as between companies and communities will alone bring about such service as will meet the requirements of the city under a reasonable rate of fare. My answers to the detailed queries are these:

(a) Yes.

(b) Exemption from special charges for bridge construction except such as arise from the necessity of increasing bridge strength.

(c) Exemption from paving charges except those arising directly from the existence or operation of the tracks. I would favor exemption from all paving charges excepting those which might arise from the tearing up or reconstruction of track necessitated by electric railway work.

*Would you favor an increase in fare and, if so, would you favor an increase for a flat rate irrespective of distance traveled or would you favor the substitution of the zone system?*

I would favor such an increase in fares as would cover the cost of providing the service. As between a flat rate system and a zone system, it seems logical that a system of charges based on a stand-by charge or readiness-to-serve charge plus a charge for distance is more equitable between individuals than a flat-rate system. However, the experience with zone or distance tariffs in this country has as yet been insufficient to demonstrate whether such a distance charge would be better for the social welfare of the community as a whole than the present flat-rate system. I think, moreover, that conditions which prevail in various communities must be taken into consideration in the determination of this question. It is apparent that in the smaller cities the zone system is unnecessary and impracticable.

*Would an increase in the flat rate tend so materially to lessen short-haul traffic as to decrease instead of increase net revenues?*

The answer to this question depends largely upon the amount of such fare increase and the particular conditions concerning the property to which it is applied. In general, I think the car fare should be considered as it affects the riding habit in terms of the average income rather than in its relation to past fares. Car fare is usually a comparatively small part of the budget of the average family. The increase in the cost of living has been met, and is being met by an increase in wages and salaries. I think it would be found true in a very great majority of cases that the proportion of the family budget spent for car fare under any rate of fare now prevailing in the United States is considerably less than it was under a 5-cent fare at the time when most of the fare stipulations were written into

the present franchises. For instance, in the period before 1900, \$2 was a fair average for the laboring man's wage—the 5-cent fare was then one-fortieth of his wage. To-day \$4 is rather below the average wage, but on this basis it would require a 10-cent fare to absorb the same proportion of the income that a 5-cent fare did in those days. It is, therefore, apparent that any rate of fare now likely to be charged imposes no more hardship than did the nickel fare, and that if the riding habit falls off under these conditions we must seek other reasons.

I think that it may safely be said that the experience of most companies charging an increased rate of fare was that there was a temporary falling off of greater or less degree in the traffic, but that the traffic is gradually returning. There is in all cities, except those whose growth is stationary, a normal increase in riding from year to year, so that any decrease in traffic occasioned by an increase in fares would gradually be taken care of by this normal increase. If a service-at-cost system is established and the public is persuaded that it is paying the actual cost of the service and no more, many of the psychological reasons which arise to antagonize the public when a fare increase is made will be eliminated.

*Would the zone system tend materially to reduce traffic in outlying districts?*

See the above.

*Should the transfer privilege be greatly restricted or abolished as a means for increasing revenues? If so, why?*

If the cost-of-service plan be in effect, the question of the method of charging becomes largely a social question to be determined by the community.

*The general effect of traction service has been to develop suburban and interurban districts by providing means of access thereto. Real estate values have been greatly increased and large investments in homes and factory buildings have been made because of the facilities afforded by such traction service. Would not such property suffer heavy depreciation if traction service were withdrawn because of the insolvency of the companies?*

Undoubtedly.

*Can you inform us of the extent of suburban and outlying trackage, the operation of which has already been abandoned by reason of the financial difficulties of traction companies?*

See statement of abandoned lines already made. The majority of these were, of course, in suburban and outlying districts.

*Do you know of any outlying factories, the labor supply of which has been interfered with by cessation of traction facilities?*

None in particular.

*In general terms, what are your views as to the effect upon communities everywhere of such a material reduction of traction service as would necessarily result from the general insolvency of traction companies?*

It would prove disastrous to such communities. From my experience in the position of secretary of a Chamber of Commerce in a city of 150,000 people, I know how important to the commercial and industrial as well as social development of the communities is good electric railway service. The industrial development of the town—that is development of its factories—is very largely dependent upon electric railway service. Communities without such service are at a disadvantage in their competition with other communities.

*In your opinion, is such a condition of general insolvency probable unless means for the relief of the companies are provided?*

(a) *By remission of charges now imposed by public authorities?*

(b) *By increasing the earnings by higher rates of fare?*

Yes.

The electric railway section of the National Safety Council, H. B. Adams, chairman, Aurora, Elgin & Chicago Railroad Company, Aurora, Ill., desires bulletins which can be distributed to members of the section. Electric railways which have had unusual success with bulletins can assist in the general safety movement by co-operating with the railway section in this way.

## How One Company Makes Sure Its Men Do Not Miss Useful Technical Articles

ONCE a year a list of fifty or seventy-five technical publications is sent around to officers and heads of departments in the Portland Railway Light & Power Company, and each man writes his name opposite those periodicals he desires to see regularly. The ruling is that any periodical called for by company officers is provided without question, while the name of more than one head of department is required to warrant the addition of a new paper to the list.

The papers come addressed to the library where an assistant librarian scans each article to see what should be referred specifically to individuals. For the guidance of this library reader there has been prepared a list of topics on which the several officials should see articles, for example:

President—fare increases, one-man cars, public relations, legal questions.

Vice-president—franchises, operating problems, improvement of equipment.

City superintendent—labor management, organization, training platform men, accounting, bonuses.

Electrical engineer—plant construction management and operation.

A paster is attached to each paper on which the name of the officials scheduled to receive that number are listed and on which the dates on which they receive the paper are listed.

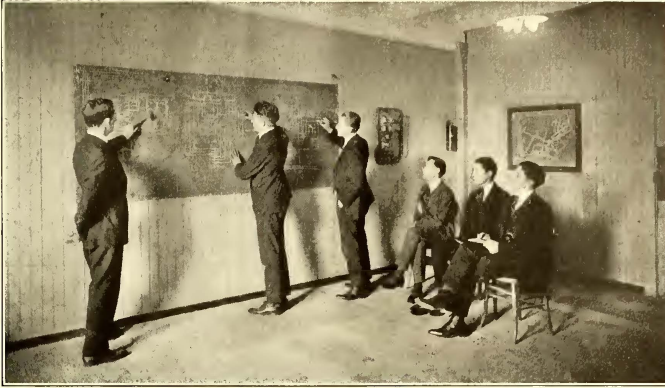
## Standard Rule for Grade Crossings Objectionable

A SUGGESTION was made recently by a manufacturer's representative in regard to grade crossings with steam railroads. It was to the effect that no blanket rule covering operation of street cars over such crossings can be made by either city or state authorities.

If the same rule is applied to the two extreme conditions of a switch track in a sparsely settled district where steam operation is infrequent and where the view in either direction is unobstructed and to a double-track main-line crossing where fast trains are frequently passing and the view is obstructed, the danger connected with each will assume somewhat of equal magnitude in the mind of the conductor who goes through the same operations at each crossing. There is a tendency for him to become careless at the switch track because of the realization that the rule is not warranted.

This carelessness is quite likely to spread until it eventually manifests itself at the main-line crossing. Of course the suggestion made applies to both two-man cars and safety cars.

In one city in the Middle West, on a 5-mile line which has been completely equipped with safety cars, there are six double-track grade crossings. During the rush hours of the steam railroad the electric railway company uses men from other departments to act as flagmen at these crossings. At other times the operator flags himself across, just as a careful automobile driver would, namely, by bringing his car to a standstill and observing the crossing in each direction, and after being satisfied that there is no danger from oncoming trains, proceeding.



DRAWING DIAGRAM ON BLACKBOARD FOR THE CRITICISM OF INSTRUCTOR

## Substation Operators Trained in Fifteen Days

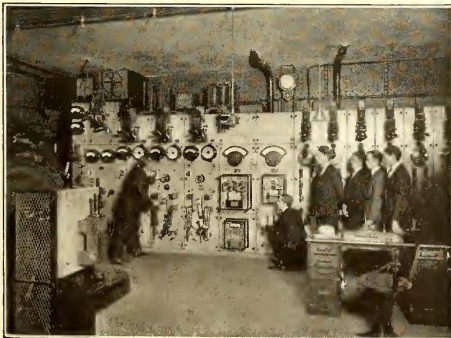
**Intensive Instruction Courses Originally Conceived as a War Measure Are Now Being Continued by the Brooklyn Rapid Transit System and Prove a Great Success Under Normal Conditions**

**A**SCHOOL for substation operators was started in the spring of 1918 by R. B. Arthur, assistant to H. A. Robbins, Superintendent of Power for the Brooklyn Rapid Transit Company. This school was first started to train operators for filling vacancies created by the demands of the war. It has met with such success, however, that it is now being continued as a permanent adjunct of the electrical department.

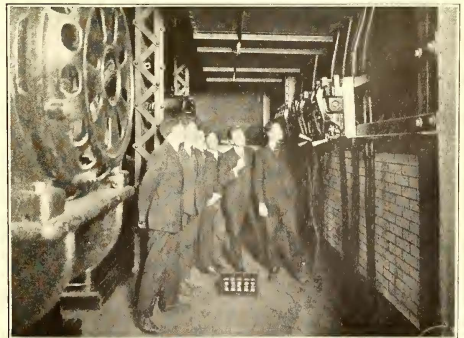
Before a man may become an operator he must be employed in a substation of the company as a rotary man, for in that position he becomes familiar with the general plan and operation of the substation, learns how the current comes from the central station to the substation, and how it is distributed over the wires and cables to the elevated, surface and subway lines. Previous to the establishment of the school the training of operators was left to the various substation foremen.

In some cases this plan gave good results, yet while a foreman may have been an excellent operator it did not always follow that he had the ability to instruct green men in the operation of substations. Before a man was certified as an operator he would be placed under several foremen so as to get as much information as possible. If reports on the progress of the man were satisfactory, and if he was found to be competent, he was made an operator.

Naturally this method of instruction was slow, and when men began to leave the substations in rather large numbers to enter military service and war industries, it was found necessary to change the method of instruction. As a result a class of six rotary men was started, and they received instruction in a course lasting six days. At the end of this time three men were qualified as operators and two others were qualified a week



TIMING ROTARY CONVERTERS FOR "CUTTING IN" ON THE LINE



STUDENTS TESTING HIGH TENSION FEEDERS UNDER SUPERVISION OF THE INSTRUCTOR

later. The first few classes demonstrated the value of such a course of training, and this substation school for operators has now been made permanent.

The course as at present arranged for green men lasts about fifteen days. After the operators have been qualified, in order to maintain a high standard of efficiency they are occasionally recalled to the school for further instruction. The courses for operators recalled to the school are naturally much shorter and deal with specific phases for operating. The hours for the school are from 8 o'clock in the morning until 4 o'clock in the afternoon, for five days a week. The men are chosen for the school according to their seniority, provided they have served at least two months as rotary men and have had previous experience in the electrical line.

#### THERE ARE THREE PHASES OF THE INSTRUCTION PERIOD

The instruction course for green men is divided into three periods. The first of these provides instruction in the general plan and operation of all substations on the system. They are taught how electric power is generated, how the generating station furnishes the alternating current to the high-tension bus and how the power is handled at the substation. The path that the current takes after leaving the high-tension bus is explained, and the operation of each piece of apparatus is amplified by diagrams put on a blackboard, and showing the exact connections of the apparatus. The students take notes and copy all diagrams. Each piece of apparatus is explained in detail.

During the second period of instruction the student is required to explain just what to do if some piece of station equipment becomes defective and how to remedy the trouble and get the machine in operation. All the station circuits, both alternating current and direct current, are gone over very carefully, and each one in turn is explained. The class is then taken to a substation and taught how to synchronize or bring the rotary into "step" with the generator at the generating station. In order to guard against closing of the switch at the wrong time when the rotary is out of phase or "step" with the generator the instructor controls the main switch. If he thinks the period is a good one, he closes the main switch at the same time that the student closes his own. This prevents damage to the apparatus. Each student performs this operation until he can do it to the entire satisfaction of the instructor. He is then permitted to "cut in" the rotary on the line. By using this method it is found that the men become more confident, and only twice since the school was started have machines been "cut in" by the students while out of phase.

After the entire class is able to "cut in" and "cut out" a rotary the apparatus is tied up in every possible way. Fuses are removed in the control circuit, burnt lamps are inserted in the synchronizing circuit, the field wires are disconnected from the rotary, the oil switches are blocked out and the jaws of the starting switch on the induction motor opened to avoid contact. In addition to these, after the rotary has become synchronized and is ready to "cut in" on the direct-current bus, the student may find that the auxiliary apparatus has been put out of service or that the circuit breaker will not remain in. In either case it is his place to discover the reason for this and also find the remedy. Instruction is also given in how to correct local troubles that may arise, such as the handling of alternating-current

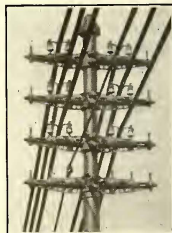
and direct-current feeders and overloads and short-circuits.

By the end of the second period all the students are able to make a diagram of any piece of apparatus found in the various substations. They are then ready for the third period, which is spent in visiting different substations where the operating conditions of each station are fully explained. When students are working on any piece of apparatus it is blocked and locked out, and the key is kept by the individual working on the apparatus in question. This is done for the protection of himself and others so that the apparatus cannot possibly be made alive, which might result in injury and perhaps death to those working on it.

The last two days of the course are spent by the student in his classroom where a general review of the instruction given in three previous weeks is made, and anything that is not clear is explained. The course is brought to a close by a written examination consisting in answering some 367 questions, and preparing diagrams for the exact connections of the more important circuits.

### Double Feeder Insulators Give Strong Construction

THE six heavy wires on the upper arms of the feeder line shown in the accompanying illustration are not supported directly by the insulators, but instead are lying in saddles bridging the gaps between two adjacent insulators and are supported by them. The reason for this unusual construction is that the wires are of 2,000,000 circ.mil section and the engineer who built the line feared that the ordinary tie-top pin insulators



ABOVE, SADDLE USED FOR CABLE SUPPORT. AT RIGHT, FEEDER LINE WITH CABLE SUPPORTED IN SADDLES

would not be strong enough safely to carry their weight on a 90-ft. or 100-ft. span if a single insulator were used. He therefore had saddles for the feeders made of steel in the form shown in the "close up" view, and placed these between the prongs of the insulators with the U-shaped portion, in which the cable rests, located midway between the pins.

This form of construction makes an extra strong line at little additional cost; the only increase in price being for the extra arms, insulators and saddles required, and the labor for installing them. On other portions of the same system where the spans are not as long 2,000,000-circ.mil wires have been carried on single insulators for a number of years without the slightest trouble. While the additional precautions taken in this case may not have been needed yet the double construction is undoubtedly stronger than one with only half as many insulators and therefore worth the additional expense for material and labor necessary for installation on this important line.

## Sidelights on the Zone Fare—The Problem of Currency

Intermediate Coins Should Be Added to American Currency to Attain Flexibility as Good as England's Without Excessive Use of Tokens

BY WALTER JACKSON

“AMERICANS won't bother about splitting a nickel” is an opinion frequently expressed by street railway men. Be that as it may, it is obvious from the records of many companies which have gone to 6, 7 and 8-cent fares that quite a number of Americans surely have an aversion to splitting a dime. Yet this phenomenon in turn has led to the rise of a comparatively small school which avers that American riders would rather pay a dime than be bothered with the making of change! If any noteworthy number of these higher-fare travelers are murmuring to the conductor: “Keep the change,” this theory stands vindicated.

Most of us are agreed that the convenience of having a single-coin passport outweighed much of the inequity of the old 5-cent universal fare as long as the purchasing power of the nickel was unimpaired. But that advantage has gone, whether we are dealing with increased universal, central district 5-cent fares, more-than-5-cent zone fares or less-than-5-cent zone fares. Therefore, we must not blame the zone fare because the amount of change-making and number of car-hours for a given traffic may have to be increased. Every operator will have to face the problem of securing the kind of currency most convenient for his patrons. If he cannot get it from Uncle Sam he will have to make it.

Fortunately, the situation is not so bad as it might have been had the electric railways been the first to go to odd prices. The department store with its 99-cent and \$1.98 bargains went only a comparatively small way in popularizing the cent. In fact, up to the great increases following the outbreak of war in 1914, the nickel still was the pre-eminent coin, not merely for the street car ride but also for the loaf of bread, the packet of chewing gum, many articles in the “5 and 10-cent” store, etc. It is true that some merchants have met the rise in costs by giving a smaller package or quantity for the old unit price, but in a great number of cases the selling price has been raised to some figure like 6, 7 and 8 cents. This has resulted in ceaseless calls upon the government for more copper and still more copper. With the arrival of fare increases, it is necessary to secure 1-cent pieces by the ton and to supply each conductor with special means to hold them! Alas! for the good old days when Pacific Coast conductors had so noble a scorn for copper that they would rather permit Easterners to ride free than soil their hands with man's primal metal.

A news item just to hand also states that since the new consumption taxes went into effect this month, the Philadelphia and Denver mints are making 2,000,000 cent-pieces a day. From the foregoing sketchy but truthful résumé of changes in the proportion of 5-cent and 1-cent pieces, it is apparent that since copper is more plentiful it is easier to split the nickel now than it was three or four years ago. For the street railway man, also, there has arisen this most distressing situation—the average man feels that his income has not increased so rapidly as the purchasing power of money has decreased, and he is therefore watching his pennies as he never did before.

Let us get next to Mr. Common Citizen to realize how

careful he has become about the purchase of a thing that he can dispense with in whole or in part—and that thing is the ride on the street car. Where he once used the car as a convenience, he must now be convinced that he ought to use it for economy in shoe leather and time. How are we going to convince him to return with still greater patronage unless we do what is always done in every other line of selling—give the customer as small a package as he wants or can afford to buy!

Just for a parallel: How many of us are aware that more people in this world buy their fowl by the quarter than by the entire bird? A trip to the East Side of New York or to the East End of London will reward anyone who wants to see the principle of meeting the customer's wishes carried to the limit.

Why is it that the better-paid American workingman or clerk will not ride for such distances as the Britisher unless it be that we have not been applying to him this first principle of salesmanship?

To be sure, there are many American towns and cities where the density of population is so low and the degree of individual prosperity so high that a fare below 5 cents would not increase the traffic sufficiently to make up for the loss of 5-cent short riders. In such places, frequent service with light one-man cars will probably scoop up almost everything worth while. If, after the installation of these cars, the proportion of riders within the 1 or 1½-mile radius is still low, it will prove worth while to do some figuring. There's Aberdeen, for example, with 25 per cent of the passengers riding less than 0.6 mile. Can any of our steepest or warmest cities match this record of a city where climate and national characteristics favor walking?

What has this to do with the splitting of the nickel for short rides? Just this: That such splitting, and consequently short-ride cultivation, has already been made easier by the large increase in 1-cent pieces. The public, however, would be still more willing to take advantage of short-ride fares, and the conductors would be more willing to handle such fares, if our coinage system were improved by adding some intermediate coin like a 2½-cent piece to get a better coin grading like 2½, 5, 7½, 10, etc. A good share of the success of the British system is due to the greater supply of copper half-pence and pence, the abundance of which cancels much of the awkwardness of British coinage considered as a whole. The difference in steps is much less than in United States money, as will be apparent from the following tables of coins and ratios up to 50 cents (United States) and 2 sh. (48 cents) United Kingdom. In each case the lowest coin is the basis of both ratios:

United States:							
Coins	1 Cent	5 Cents	10 Cents	25 Cents	50 Cents		
Ratios	1	5	10	25	50		
Great Britain:							
Coins	Farthing	Half-Penny	Penny	3d.	6d.	Shilling	2s.
Ratios	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{2}{4}$	$\frac{6}{12}$	$\frac{12}{24}$	$\frac{24}{48}$	$\frac{48}{96}$

The foregoing tabulation shows why British coinage is better adapted for operating a zone system successfully. The penny is the fare paid by about one-half of the riders, and it is exceptionally prominent, although it was not over-abundant during the war years. This last statement is backed by the fact that London banks now are glad to carry off copper at their own expense whereas they formerly expected the depositor to pay for carriage. The half-penny has been pushed into the

background by the rise in costs and the farthing has become almost as mythical as our mil.

American electric railways know of course that paper tickets and metal tokens are permissible substitutes for real money. However, substitutes have usually been employed only for special rates such as four-for-25-cents tickets, and not as direct replacements of standard coins. It would be most desirable to have a single coin to represent each class of ride so that it would be easier for the greater part of the passengers to tender exact fare. More than a generation ago we had both the 2-cent and 3-cent piece, and it is hardly a decade since an unsuccessful effort was made to restore the latter. How helpful that 3-cent piece would be now, either for a short-rate ride or for an increment to the 5-cent fare for extra-length riders! However, a 2½-cent piece would be more logical in our decimal system, as the half-nickel would bear the same relation to the nickel as the latter (once called a "half-dime") does to the dime. Eventually this coin rather than the cent would be our base.

Let us at least agitate for a system of coinage that will show greater flexibility, not alone on systems with graduated fares but on those where the service-at-cost principle keeps the universal rate see-sawing with the income statement. At the worst, we could follow the example of one of the larger British tramways which, finding farthings too scarce for its purpose in encouraging short rides in small towns, successfully sold full-rate farthing strip tickets through the conductors. By the time the war had taken its toll in higher costs, the farthing increments to the base fare of 1 penny were gently displaced by the half-penny increment without any injury to the riding habit.

## Sources of Economy in Automatic Substation Control

### A Resumé of the Savings in Labor and Material and the Increase in Reliability Made Possible by this New Development

BY CHARLES F. LLOYD

Manager Substation Section Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

THE automatic substation presents such economic possibilities in railway operation that its universal use is only a question of time. Its economic value is appreciated in a general way, yet a clear statement of some of its qualities and limitations, with a practical calculation of economies that can be realized by operating railway substations automatically, should be of interest to both the central station and the railway company; to the one as a possibility for increasing its railway power load and to the other as a possibility for securing a better power rate, or more economical substation operation, or both.

The primary economies to be realized with automatic switching of substations are as follows:

1. Labor charges are materially curtailed, especially where two or three operating shifts are required and where a number of substations are made automatic.

2. Labor difficulties are materially reduced or eliminated. With the present-day labor unrest this is a feature to which full consideration should be given even though it may be difficult to figure the value on a monetary basis.

3. Energy saving amounts to a considerable item,

especially on interurban lines where the power demand is intermittent. This saving will result from the elimination of no-load losses, since the automatic switching shuts down the substations when power is not required. This saving means, in general, a conservation of coal, the necessity for which has been brought home to us recently in a forcible manner.

4. Feeder loss can be cut down on account of the practicability of locating substations where required, without having to take labor operating cost into consideration.

5. Feeder copper can usually be reduced on existing properties by relocating substations, or increasing their number, or by both. There are, no doubt, many properties where to-day sufficient copper could be taken down to go a long way toward paying for automatic switching.

6. Electrolysis conditions are invariably improved since the proper location of substations, made possible by automatic switching, materially reduces the length of return circuits and reduces return drops.

7. Reliability of the service can be increased. Considering the ability of the best operators who can be obtained in many cases greater reliability of service is to be anticipated. At least in one case an automatic substation has shown more reliable results than a similar manually-operated one. In any event, it is safe to say that reliability will not be impaired by automatic operation.

8. Maintenance is being classed as a quality since at least in one or two actual cases its cost has run very low. Proper and intelligent inspection and cleaning of the apparatus will undoubtedly result in reduced maintenance expense.

Like all equipment automatic switching apparatus has its limitations and features that partially counterbalance the good qualities. The following are salient items in this case:

1. Inspection must be made by a competent engineer. Since experience seems to indicate that this will not be required oftener than once or twice per week, it is probable that labor saving will not have to be reduced to maintain this talent. It is also probable that the labor for cleaning up the substation apparatus every week or ten days can be obtained by using carhouse men, thereby making it necessary to charge little expense to this item.

2. Investment will probably be increased, entailing, of course, additional capital charge.

3. Hazard to the apparatus may be increased. However the indications are that automatic switching has been developed to such a degree that if properly applied, this fact may even be turned to an advantage in favor of automatic switching.

4. Complication in switching is increased over hand switching; but with proper inspection this should be immaterial since the switching is surprisingly simple.

5. Feeders require careful application to prevent annealing of dropping trolley wires.

6. High-tension lines may have to be rearranged in some cases for automatic substations since there will be no operators to transfer them in case of high-tension troubles. Since the tendency is toward simplification in high-tension switching, with much better line construction, this is not a serious feature. In cases where automatic substations may be used at high-tension switching points, it may be practicable to handle the high-tension switching by remote control.

To illustrate the economies to be realized in substation



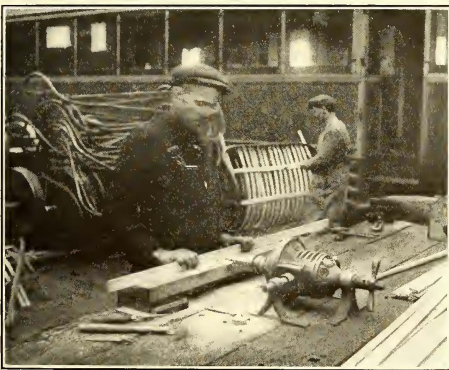
TYPICAL ECONOMIES PRODUCED BY AUTOMATIC SUBSTATION SWITCHING

Headway between cars.....	1 Hr.	2 Hr.
Length of line, miles.....	25	25
Number of substations.....	300	3
Capacity of substations, kilowatts.....	300	300
Distance between substations, miles.....	10	10
Schedule speed, miles per hour.....	25	20
Length of operating day, hours.....	20	60
Total substitution hours (manual operation).....	60	60
Total substitution hours (automatic operation).....	32	20
Running-light loss per station, kilowatts.....	15	15
Energy saved per day (automatic operation), kilowatt-hours.....	420	600
Energy saved per year (automatic operation), kilowatt-hours.....	153,300	219,000
Value of energy saving at 1 cent per kilowatt-hour.....	\$1,533	\$2,190
Labor-saving per year, six operators at \$70 per month.....	\$5,040	\$5,040
Total saving per year.....	\$6,673	\$7,230
Total investment automatic control—three stations.....	\$18,000	\$18,000
Interest, insurance, maintenance, depreciation, taxes, at 15 per cent.....	\$2,700	\$2,700
Cost of inspection per year.....	\$500	\$500
Total annual charges.....	\$3,200	\$3,200
Net annual saving.....	\$3,373	\$4,030
Return on investment, per cent.....	18.7	22.4

operation by automatic control, the table above shows a typical case where the principal features producing savings have been only considered. This tabulation shows what may be considered an average condition and it would not be surprising to find that much greater savings can be effected in the majority of cases, especially when all features are taken into thorough consideration.

Drilling Fender Slats With an Electric Drill Saves Time

SEVERE operating conditions keep car fender work very active in the shops of the Winnipeg Electric Railway. The accompanying illustration shows an electric drill mounted on a bench in a convenient location for drilling fender slats. This drill was formerly used



DRILLING FENDER SLATS AT THE SHOPS OF THE WINNIPEG ELECTRIC RAILWAY

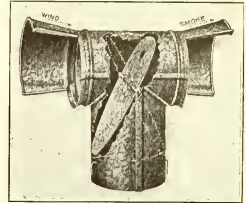
in some other branch of the service. A jig to insure that the holes are drilled in their proper location facilitates rapid operation. This bench is located alongside the place where the fender repairs are made and its convenience has resulted in nearly five times the amount of work being accomplished in the same time as was previously done when this work was performed by hand.

According to results secured in experiments at the University of Illinois 1/32 in. of scale in boiler tubes may reduce efficiency by 9 per cent, while 1/9 in, may reduce it 16 per cent.

A Flue Top for Cars

THE simple ventilator flue top for coal heaters, illustrated herewith, is being used on some of the cars of the Cincinnati Traction Company. It is made by William G. Fischer of that city and is designed to exhaust the smoke, gases and other products of combustion generated in stoves carried on moving vehicles, especially where soft coal is used.

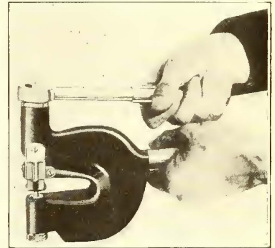
The flue pipe consists of horizontal and vertical sections, the horizontal section being transverse to the length of the car. The open ends of the horizontal section then face the side-quarters of the wind. Inside the vertical section is an oscillating tongue or diaphragm which leads the smoke into both outlets under normal conditions but will swing to void the smoke through the opening away from the wind if the wind pressure is much higher on one side than on the other. Each orifice is provided with semi-circular wings with their convex surfaces disposed forward to avoid back draft.



SECTIONAL VIEW OF FLUE TOP

New Type of Hand-Operated Punch

A NEW TYPE of hand punch has recently been placed on the market by Paul W. Koch & Company, Chicago, Ill. It is called the "Jiffy" punch and punches holes of 5/32 in., 3/16 in., 1/8 in., 7/32 in. and 1/4 in. in metal up to a thickness of No. 10 gage. The particular feature of the machine is a deep throat and one-piece automatic disappearing stripper which gives a clear view to the punch and punch marks for the next operation. This also permits several sheets to be punched with one operation. The punch is shown in an accompanying illustration. It weighs 5 pounds, is 9 1/2 in. long and may be clamped in a vise if desired. One-half turn of the top handle operates the punch and drives it through the metal.



NEW TYPE OF HAND-OPERATED PUNCH

Electrification Shows Surprising Results on an English Railroad

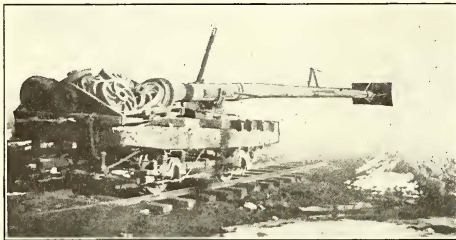
Three years before the electrification of the London & Southwestern Railroad's suburban lines 25,000,000 passengers were carried. Due to the inadequacy of the steam service rendered this number fell off to 23,000,000 just preceding electrification. In 1916 electric service was gradually brought into operation and the number of passengers carried increased to 29,000,000. In 1917 this number further increased to 33,000,000 and in 1918 the total was 40,000,000.

## A Mechanical Pusher for Unloading Flat Cars

By W. L. WHITLOCK

Office Engineer The Denver Tramway Company

THE "pusher" shown in the accompanying photos was constructed by the Denver Tramway Company for the purpose of reducing the labor costs of unloading flat cars with dirt in addition to reducing the length of time that the equipment was tied up on this class of work. The dirt excavations of track, bridge and



"PUSHER" ON TURNOUT

building jobs whenever possible are loaded onto our standard flat cars, and in former years this material was used to backfill a gravel pit that this company leased. At the present time a dump has been established at which waste materials are disposed.

The "pusher" is mounted on a Bemis single truck having a wheelbase of approximately 7 ft. A platform was built over this truck and a wood pole 55 ft. long with a steel plate placed on the end of pole, was mounted on a pivot over the truck and three steel rods, with turnbuckles in the center to adjust strains were provided for reinforcing the pole. Counterbalance is provided by means of a platform weighted with scrap



AN ECONOMICAL DUMPING OPERATION

steel on the rear end of the pole. A coupler is provided on the rear end of the pusher to permit of coupling to a work car equipment.

It is necessary to have the dump track provided with a turnout in order to use this equipment to advantage. The "pusher" stands on the turnout track when not in use. A motor car with a flat car loaded with dirt backs onto the dump track and the brakeman sets up the handbrake on the flat car, removes the brake staff and "cuts off" the motor car. This then backs up, couples onto the "pusher" and runs up to the flat car.

The train crew drop the side boards of the flat car and then unload it by means of the "pusher." The brakeman takes his stand at the head of the "pusher" pole and guides the pole as to depth and side swing and the motor car provides the power. A crew of two men will unload a car of dirt in approximately fifteen minutes.

During a very heavy fall of snow a few years ago, it was necessary to remove snow in certain locations by flat cars, and the "pusher" unloaded these cars into the Platte River through an opening in the bridge as shown in an accompanying photograph. By the use of the "pusher" three men were able to perform the work which otherwise would have required a work gang of fifteen shovelers. Flat cars each holding from 12 to 14 cu.yd. of snow were unloaded at an average rate of six minutes per car. This home-made pusher running day and night, at a cost of \$9 per shift for labor, was able to unload more snow than was handled off flat cars by the city at Sixth Avenue with a cost of more than \$80 per shift.

## New Soot Cleaner Swivel Head

THE Vulcan Soot Cleaner Company, Du Bois, Pa., has just placed on the market a new swivel head for its soot cleaner. Steam from the boiler passes into the swivel head from the bottom through a vertical pipe and thence into the horizontal element which extends from the swivel head through the brick wall and into the setting.

After the steam is turned on the operator rotates the element slowly from one extreme to the other. Steam turbine nozzles inserted in the element discharge the steam between the tubes in high velocity jets, and in the course of rotation the tubes are freed from soot. The limitations of rotation are regulated by stops attached to the link chain. A pointer from one arm of the sprocket indicates to the operator the direction in which the steam jets are discharging.

To take care of expansion and contraction a gastight, sliding joint is provided between the sprocket wheel and the metal housing that is mortared into the brickwork. As the vertical riser expands or contracts, the swivel head moves up or down and the attached end of the element follows.

## Leaks Through Subway Walls Stopped

THE leaks in the Canal Street station of the Broadway Subway, New York, operated by the Brooklyn Rapid Transit Company, which perplexed engineers for many months, have been finally stopped. When the situation was at its worst several months ago, water poured into the station at the rate of 150 gal. a minute. Under the direction of engineers of the Public Service Commission for the First District, a system was devised by which these leaks have been very largely stopped; so that now the total flow of water is less than 2 gal a minute, and it is expected that shortly it will be stopped altogether. The system employed in ending the leaks consists of drilling holes through the concrete side walls of the subway at various points, and through these forcing grout—a mixture of cement and water—until no more can be pumped through the openings. By this means the leaks, which were in reality breaks at the connection of waterproofing laps on the outside of the structure, were effectually stopped.

# American Association News

VALUATION COMMITTEE OF AMERICAN ASSOCIATION AND EQUIPMENT COMMITTEE OF ENGINEERING ASSOCIATION BEGIN ACTIVITIES—  
NEWS OF COMPANY SECTION MEETINGS

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## Changes in Washington Office

W. V. HILL has tendered his resignation as manager of the Washington office of the American Association and has returned to California to resume his work as manager of the California Electric Railway Association. Mr. Hill performed invaluable service in Washington for the Electric Railway War Board and later for the committee on national relations, and his resignation was accepted with regret.

The committee on national relations has placed A. S. Hills temporarily in charge of the Washington office as acting manager. Mr. Hills is the executive secretary of the National Public Utilities Committee.

## Valuation Committee Begins Work

THE valuation committee of the American Association held its first meeting of the year in New York on May 6. The members in attendance were J. N. Shannahan, Hampton, Va.; C. E. Bailey, New York, N. Y.; Martin Schreiber, Newark, N. J.; George Weston, Philadelphia, Pa., and B. E. Tilton, Syracuse, N. Y.; J. H. Pardee, E. B. Burritt and J. W. Welsh were also present. Owing to P. J. Kealy, chairman, being unavoidably detained in Kansas City, Mr. Shannahan was chosen to preside.

The discussion covered the general work of the committee and the program to be followed. Mr. Weston was requested to formulate a statement of cardinal principles of valuation and submit it to the other committee members in advance of the next meeting. It was proposed that these members should then reduce to writing their opinions in regard to this statement, all the material to be presented at the next meeting for discussion.

## Equipment Committee Meeting Well Attended

THE equipment committee of the Engineering Association met in New York City on April 30. The three subjects which had been assigned the committee for study and report were considered, and subcommittees were appointed to collect information and make recommendations on each. These were listed in the *ELECTRIC RAILWAY JOURNAL* of March 22, page 609. The following were present: Daniel Durie, Connellsville, Pa., chairman; W. S. Adams, Philadelphia, Pa.; R. H. Dalgleish, Washington, D. C.; E. D. Priest, Schenectady, N. Y.; K. A. Simmon, Pittsburgh, Pa., and N. D. Trist, Pittsburgh, Pa.

In regard to cooperation with the National Fire Protection Association in formulating a new code for 1200-volt car wiring, the committee considered that it was very important to have representation. The wiring problem and conditions for electric car equipment differ considerably from other forms of electric installation, and as the latest practice is to install the wiring in conduits wherever possible any increase in thickness

of the insulation on the various wires would mean the use of large conduits and heavier construction. All felt that the outside diameter of the wires should be kept as small as would be consistent with the necessary safety protection. The subcommittee appointed to have charge of this subject consisted of W. G. Gove, chairman; J. M. Bosenbury, E. D. Priest and K. A. Simmon.

In the discussion on the development of check gages and templates for wheels and truck parts it was pointed out that the present "standard" wheel is used scarcely at all. It was also felt that the adoption of gages for wheels would properly follow the adoption of a standard wheel which would be used more generally. It was also considered advisable that any standards adopted should be for wrought steel wheels and should not apply to cast iron wheels. The subcommittee to work on this subject comprises H. A. Johnson, chairman; W. S. Adams, R. H. Dalgleish, W. G. Gove, E. W. Lyndon and N. D. Trist.

The topic, "Standardization of Motor Parts," brought out discussion as to the extent to which standardization may prevent progress. The operating members of the committee mentioned the great number of spare motor parts which they find it necessary to carry, many of which differ very slightly. Any standardization would of course be of great assistance in reducing the number of these parts. The manufacturing engineers described the large amount of standardization work that had been going on in their individual companies and said that it was to their advantage as well as the purchasers' to keep the number of parts small. This would reduce the number of dies, tools, etc., which are required. Some of the items which might be standardized are the supports of field coils, field coil terminals, lengths of leads, types of motor lead connectors and style of bushing for leads. Perhaps a recommendation for the use in new designs of only the nose type of motor suspension and box-frame motors might be favored. The subcommittee appointed to consider this subject and make recommendations consists of R. H. Dalgleish, chairman; J. M. Bosenbury, Daniel Durie, E. D. Priest and K. A. Simmon.

The sub-committees were instructed to hold meetings as soon and as frequently as possible, and the next general meeting of the committee was scheduled for June 26 and 27.

## Lively Meeting at Bridgeport, Conn.

THE April meeting of the Connecticut Company section was held under the auspices of the Bridgeport division, J. S. Goodwin manager, at the Hotel Stratfield on Apr. 29. Two hundred or more dined together and after dinner a program, largely of entertainment, was carried out. The membership committee reported additions of fifty-one during the month bringing the total membership to 330. W. E. Jones, statistician, and J. F. Berry, attorney, were presented with gifts in appreciation of their services to the section. Mr. Jones

has joined the auditing department of the Rhode Island Company, and Mr. Berry is taking up the practice of law in Hartford.

Mr. Berry, who has conducted the higher fare and legislative relief cases for the company, explained what had been done in showing the legislature why the company needed relief, but the action taken on the day of the meeting showed that little impression had been made. As long as the cars keep moving, said he, the people will continue to believe that the railways will get along somehow. J. K. Punderford, general manager, followed in the same general strain and urged an even greater co-operation on the part of the organization. Lieut. Devine, a local lawyer, gave a dramatic tale of the soldier's life at the front, closing with a plea for the Victory Loan.

The entertainment comprised orchestral and vocal music, recitation of original verses by "Motorman 4449," solo dancing and "black-face comedy."

### Important Mail Hearings

THE Interstate Commerce Commission has arranged for an important series of regional hearings during June and July in regard to the compensation of electric railways for the transportation of United States mail. It is highly essential that all companies should take advantage of this opportunity to present their case in order that adequate compensation may be secured, for under changes in legislation made in 1918 it is provided that:

It shall be unlawful for any urban or interurban electric railroad to refuse to perform mail service at the rates or methods of compensation thus provided for such service when required by the Postmaster General so to do, and for such offense it shall be fined \$100. Each day of refusal shall constitute a separate offense.

The American Electric Railway Association, in order that the electric railways may be able properly to present their case, is arranging for the designation of different electric railway men to supervise and co-ordinate the work in connection with the regional hearings. There will be one of these railway leaders for each hearing. The hearings are to be held before Examiner George N. Brown at 10 a. m. on the dates and at the places here noted:

June 9, 1919	Office of Interstate Commerce Com.	Washington, D. C.
June 11, 1919	United States Court Rooms	Philadelphia, Pa.
June 13, 1919	United States Court Rooms	Boston, Mass.
June 18, 1919	Hotel Onondaga	Syracuse, N. Y.
June 20, 1919	United States Court Rooms	Cleveland, Ohio
June 23, 1919	United States Court Rooms	Detroit, Mich.
June 25, 1919	United States Court Rooms	Indianapolis, Ind.
June 27, 1919	Federal Building	Chicago, Ill.
June 30, 1919	United States Court Rooms	Minneapolis, Minn.
July 3, 1919	United States Court Rooms	Portland, Ore.
July 7, 1919	Hotel St. Francis	San Francisco, Cal.
July 9, 1919	United States Court Rooms	Los Angeles, Cal.
July 15, 1919	United States Court Rooms	Salt Lake City, Utah
July 18, 1919	Federal Building	Kansas City, Mo.
July 22, 1919	United States Court Rooms	Dallas, Tex.
July 24, 1919	Hotel Jefferson	St. Louis, Mo.
July 26, 1919	Hotel Gibson	Cincinnati, Ohio
July 28, 1919	Rooms of Chamber of Commerce	Pittsburgh, Pa.

The association has also thoroughly canvassed the situation and has prepared under the direction of F. W. Doolittle, consulting engineer, a form of exhibit for the use of the companies in order that data may be presented upon a uniform basis. The subject matter of the exhibit is divided into two general parts relating to the transportation of pouch mail and to the transportation of mail in independent cars. Data on both subjects are necessary to the Interstate Commerce Com-

mission in determining a general theory of rates for electric railway transportation of mail and in calculating specific rates applicable to the companies engaged in this business.

### Utility Commission Inspector Addresses Newark Section

ON APRIL 25 H. C. Eddy, senior inspector Public Utility Commission of New Jersey, read a paper on "The Development of the Electric Railway" before the Public Service Railway company section at Newark, N. J. This was illustrated by means of a large collection of lantern slides from various sources which the speaker had assembled for the purpose. He traced the evolution of the modern car body, track, overhead, and power system using illustrations relating to the local property as far as possible. As the speaker based his talk largely on personal experience gained in the electric railway business in different parts of the world he was able to give a touch of reality to the narration. In his audience were many men who had taken an active part in the development of the local system, their experience extending over many years, and this furnished a strong bond between the audience and the speaker. The audience included a public utility commissioner, the chief engineer of the commission, officials of the railway company and 150 or more employees.

The membership committee reported seventy-four accessions since April 1 and the secretary read a letter from E. B. Burritt reminding the section that the competition for the medal to be awarded by the American Association for the best paper presented before a company section will close on May 31.

### Mississippi Association Reconvenes

H. E. BRANDLI, vice-president and general manager Meridian Light & Railway Company, was elected president of the Mississippi Electrical Association at a meeting held in Gulfport, Miss., on April 15, 16 and 17. E. S. Myers, general manager Vicksburg Light & Traction Company, was elected secretary.

Owing to war conditions this was the first convention held by the State association during the last four years. The meeting was an enthusiastic one from start to finish and was well attended. One of the interesting social features of the program was a boat trip from Biloxi, Miss., around the bay.

In the absence of W. T. Stewart, president Mississippi Coast Traction Company, Gulfport, Miss., Barney E. Eaton, attorney for the Gulf & Ship Island Railroad, an allied interest, gave the welcoming address. Mr. Eaton called attention to the handicap suffered by the utilities during the war period, owing to inability to get satisfactory rates from the communities served.

In the course of his president's address H. F. Wheeler, general manager Hattiesburg Traction Company, said:

While we call ourselves an electric association, we are most of us vitally interested just at this time as to the future of our associated electric railway properties. The case of the small electric railway is infinitely worse than that of the other utilities. The privately-owned automobile first came and made heavy inroads on its revenue. Then the jitney came and took its share, but nothing like the privately-owned machine. The last straw was the war, which doubled the cost of all commodities except utility service and particularly the 6-cent car fare.

In the light of present conditions we are almost tempted

to believe that the small electric railway was a mistake from the beginning and that there never was an excuse for building one in a small community. Some may differ with me in this statement and ask what about residences, schools or hospitals a mile or more from town. The answer is that these would doubtless have been built much nearer town had there been no street-car system, or if there were no street-car system they would doubtless be served by their own bus or by some company operating a bus line. It is easy to look back and see mistakes, and as we now look back it is difficult to understand why a small system was ever built.

Of course we understand the old argument that a street-car system helps to build up a town. The operating expense and fixed charges, however, have to be paid by someone while the town is growing to the system, and it is now getting to the point where these are fast bankrupting the small electric railway. If this is associated with an electric light proposition, it is almost sure to drag the whole company into a receivership unless some drastic action is taken. The small company is not a real necessity but rather a convenience or luxury, and if the fares are placed at a high enough figure to permit the utility to exist, the number of passengers will fall sufficiently to more than offset any increases.

I am not here to propose any radical step, but only to repeat what we have found out for ourselves about the electric railway game. If we follow the policy of least resistance we will hang to our respective railways until our present equipment falls to pieces, with the hope that either gasoline will go to such a point that the use of the auto will be restricted, or that some new type of car may be developed which will save the day.

### Toledo Section Appoints Permanent Secretary

ON ACCOUNT of the present large membership of more than 1300 in the Toledo joint company section, it has been found necessary to appoint a permanent secretary to look after the details of the work. David H. Shapiro, formerly private secretary to Frank R. Coates, has been selected for this purpose. Mr. Shapiro reports that a very successful get-together meeting was held on April 28, with 600 members in attendance. The program comprised vaudeville "stunts," instrumental music, community singing, monolog, and boxing and wrestling matches.

## LETTERS TO THE EDITORS

### How Travel in Large Cities Increases

80 WALL STREET  
NEW YORK CITY, April 29, 1919.

To the Editors:

On page 839 of your April 26 issue, there is published an estimate by Public Service Commissioner Kracke on the probable population and traffic of New York City in 1950. While it is within the limits of probability that the population of Greater New York will reach 12,500,000 persons in 1950, it is utterly impossible that this population should produce over 8,000,000,000 passengers on the city transportation lines. This would mean nearly 700 rides per capita per annum, which, as can be readily shown, is an absurdly high figure.

It is an established fact that during a certain period of a city's growth the traffic increases more rapidly than the population. This is due to the increase of the riding habit, conveniently expressed as rides per capita per annum. The riding habit, however, has a definite limit, and the increase in rides per capita becomes smaller and smaller as this limit is approached. After the riding

habit has reached its limit, the traffic will grow only in the proportion of the population growth.

Only about 40 per cent of the people in a large city are habitual riders and most of these ride only twice a day. The other 60 per cent, children, housewives and those workers who walk to their places of employment, ride only occasionally. No matter how large the city and how extensive the transportation facilities, this part of the population will not ride more than four times per week per person. If this traffic and also that derived from non-residents are prorated to the habitual riders, it becomes evident that no higher figure than 3½ rides per day should be assigned to them. On the basis of 300 business days, therefore, one thousand rides per year per habitual rider or 400 rides per capita of the whole population appears to be the limit of the riding habit.

It may be concluded that even should greater New York become a metropolis with 12,500,000 population the traffic on the city transportation lines would not be over 5 billion passengers. EUGENE E. HALMOS.

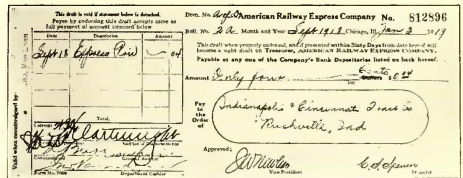
### All the Railway Got During One Month Was 4 Cents

INDIANAPOLIS & CINCINNATI TRACTION COMPANY

INDIANAPOLIS, IND., May 6, 1919.

To the Editors:

On July 1, 1918, the American Railway Express Company took over the privilege of the Adams Express Company for operating over our lines, for which we were re-



REPRODUCTION OF THE CHECK FOR SEPTEMBER, 1918

ceiving 40 per cent of the gross receipts for the transportation of express. The results of the operation of the American Railway Express Company are so striking that I think attention should be called to them. Below, in tabulated form, is a comparison of amounts paid to this company by each of the two companies:

For same privilege Adams Express Company paid for:	While the American Railway Express Company paid the following:
January, 1918..... \$320.00	July, 1918..... \$58.26
February, 1918..... 288.61	August, 1918..... 130.47
March, 1918..... 430.14	September, 1918..... .04
April, 1918..... 439.01	October, 1918..... 18.78
May, 1918..... 456.72	November, 1918..... 3.12
	December, 1918..... 65.13
Total for 5 months..... \$1,934.48	Total for 6 months..... \$275.80

I also inclose a photograph of the draft sent for 4 cents for our 40 per cent of the business for the month of September, 1918.

This surely is a good illustration of the benefits of government control.

CHARLES L. HENRY, President.

# News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

## Transit Work Almost Completed

New York City's \$300,000,000 Municipally-Owned, but Privately-Managed, System Ready

The opening recently of the new Clark Street tunnel between Manhattan and Brooklyn leaves few important parts of the dual rapid transit system for New York City yet to be placed in operation. There are still three more East River tunnels to be completed and placed in service, but they are parts of the system operated by the New York Consolidated Railroad Company (Brooklyn Rapid Transit System).

### MORE RIVER TUNNELS SOON

The first to be opened will be the Whitehall Street-Montague Street tunnel, which will connect the Fourth Avenue subway system in Brooklyn with the new Broadway subway in Manhattan. Another is the tunnel from Sixth Street, Manhattan, to Long Island City in Queens, which will connect the northern part of the Broadway subway in Manhattan with the existing elevated railroads to Astoria and Corona in Queens, over which the New York Consolidated Company will have joint trackage rights with the Interborough Rapid Transit Company. The third is the tunnel from Fourteenth Street, Manhattan, to North Seventh Street, Brooklyn, a part of the Fourteenth Street-Eastern line which begins at Sixth Avenue, Manhattan, runs under Fourteenth Street to the East River, under the river to North Seventh Street, Brooklyn, under North Seventh Street to Metropolitan Avenue, to Johnson Avenue, to Bushwick Avenue, and thence by elevated railroad to East New York.

It will be another year or more before all these lines will be completed, but it is hoped that the Whitehall-Montague Street tunnel will be placed in operation early in the coming Summer. Another line for this system yet to be built is the projected subway extension from the Municipal Building, under Nassau Street to a junction with the Montague Street tunnel line at Hanover Square. The contracts for this subway have not yet been awarded.

### INTERBOROUGH SYSTEM NEARLY FINISHED

With the exception of one short subway line in Manhattan, one elevated extension and one subway extension in the Bronx, storage yards in Brooklyn, the Bronx and Queens, and the extension of the Brooklyn subway from Atlantic Avenue, out Eastern Parkway to Buffalo Avenue, and its branch down

Nostrand Avenue to Flatbush Avenue, and the elevated extension from Buffalo Avenue over East Ninety-eighth Street and Livonia Avenue to New Lots Road, the Interborough part of the dual system is completed.

The subway line in Manhattan just referred to is the extension of the Queensborough subway or Steinway tunnel line westward under Forty-second Street from the Grand Central to Times Square. The elevated extension in the Bronx is the extension of the Third Avenue Elevated Railroad out Webster Avenue to a junction with the White Plains Road branch of the subway at Gun Hill Road, and the subway extension is the elevated part of the Pelham Bay Park branch. All of this work is being built and will be owned by the city of New York with the exception of the Webster Avenue elevated extension, which is to be built and paid for by the Interborough Rapid Transit Company.

## Strike on Canadian Line

A strike of the employees of the Sandwich, Windsor & Amherstburg Railway, Windsor, Ont., controlled by the Detroit (Mich.) United Railway, stopped all traffic on the lines of the company at 5 a. m., on May 3. Attempts at conciliation between the men and the company have so far proved unsuccessful.

The men demand the dismissal of F. E. Hayes, general superintendent of the line, the recognition of the union, an eight-hour day with a minimum wage of 50 cents an hour and a maximum of 65 cents an hour. The present wage scale is 36 cents minimum and 41 cents maximum. The strikers have expressed willingness to compromise on all points except the removal of Mr. Hayes.

Mr. Anderson, manager of the company, stated that the officials of the company had no proposals to make, and contended that an increase in wages could not be granted to the employees unless an increase in fares was allowed by the five border cities in which the railway operates.

No arrangements have been made for continued service and the suggestion that the lines be taken over temporarily by the Ontario Hydro-Electric Commission was rejected by the company's officials.

The action of the men is sanctioned by the Amalgamated Association. The Detroit men are asking practically the same scale of wages.

As a result of the strike business and manufacturing concerns in Windsor and the neighboring municipalities are seriously hampered. There is little traffic on the Detroit-Windsor ferry.

## New York Commission Reorganized

Lewis Nixon Appointed Regulatory Head of Commission for Greater New York

Lewis Nixon, appointed by Governor Smith as the regulatory head of the Public Service Commission for the First District of New York, was designated by the Governor on May 3 to supervise the construction end of the subway work until the appointment of a public service commissioner in charge of construction work. Under the changes made in the commission law at the session of the Legislature ended recently, the commission with jurisdiction covering Greater New York will be organized with two members, one in charge of regulation and the other in charge of construction.

Commissioners Whitney, Hervey and Kracke, who have been serving, completed their work on May 3. Two names for appointment to the post of commissioner in charge of construction are suggested as probabilities. One is that of Col. Merritt Smith, who was chief engineer of the Bureau of Water Supply, Gas and Electricity of the City of New York, and the other is that of Henry B. Seaman, formerly chief engineer of the commission.

### PLANS OF RETIRING COMMISSIONERS

Travis H. Whitney, acting chairman of the commission, has announced that he will resume the practice of law. Mr. Whitney has been connected with the commission since it was created, at first as its secretary and for the last two years as a commissioner.

Commissioner Kracke will enter no business field that would restrict his political activities.

Commissioner Hervey has entered the moving picture field.

Mr. Nixon refused to say anything definite in regard to his plans until after he had formally taken over the work of the commissionership and acquainted himself with his surroundings. He did, however, make the following general statement:

The Governor told me that he wanted a man for the place who knew the value of money, as well as its comparative value with time in certain emergencies, and who had the knack of getting a dollar's worth for every dollar spent. Well, I believe I am that kind of a man. I shall serve the public to the best of my ability, not with the hope of pleasing all, for that is impossible, but surely with the expectation of giving all that I have to the work.

Whatever decided opinions I may have, they must be and shall be subordinated to the statutes. I enter upon the office almost a stranger to its specific duties. I must have time to study the conditions before I venture opinions upon this or that phase of a situation. This will require much time. Meantime I can do only one thing—enforce the law as I find it.

## Wages in Seattle

### Municipal Railway Makes Public Rates for Various Positions from Superintendent Down

The scale of wages for trainmen heretofore in effect on the short existing municipal line in the city of Seattle, Wash., will increase the monthly payroll on the present enlarged municipal line by \$17,894. The city scale is considerably higher than the scale paid by the Puget Sound Traction, Light & Power Company, the railway lines of which were taken over recently by the city. The wage schedule covering all of the executive positions and many of those of the rank and file follows:

	Per Year
Superintendent, unclassified	\$4,500
Assistant superintendent	\$300
Secretary-stenographer	150
Railway construction inspector	145
Service and equipment inspector	145
Subway inspector	135
Pole inspector	135
Gas franchise inspector	135
General utility inspector	135
Junior draftsman	135

#### Clerical Division

Head clerk	\$150
Stenographers (6)	120
Lost article clerk	80

#### Accounting Division

Auditor	\$260
Assistant auditor	185
Bookkeepers (2)	180
Revenue clerk	165
Cashier	160
Assistant cashiers (11)	105
General stockkeeper	105
Assistant stockkeeper	150
Head clerk	150

#### Transportation Division

Superintendent of transportation	\$300
Assistant superintendent of transportation	200
Station masters (4)	170
First assistant station masters (4)	155
Second assistant station master (1)	100
Superintendent of schedules	200
Assistant superintendent of schedules	150
Mileage clerks (2)	80
Inspectors (15)	170
Starters (3)	150
Instructors (3)	170
Superintendent of freight	175
Chief dispatcher	190
Dispatchers (5)	150
Telephone engineer	175

	Per Day
Trainmen (cable gripmen)	\$4.65
	4.90
	4.75
Trainmen (freight and passenger)	4.25
	4.50
	4.75
Trainmen (one-man car operators)	4.82
	5.00
	4.25
	4.50
	4.75

#### Ways and Structures Division

	Per Month
Chief engineer	\$300
Assistant engineer	240
Chief draftsman	160
Railway draftsmen (2)	135
Roadmaster	200
Clerk	120
	145
Bridge tender	140

#### Shops and Carhouses Division

Superintendent of equipment	\$333
Assistant superintendent of equipment	200
Chief clerk	150
Clerks (5)	120
	145
Junior clerk (1)	80
	115
General shop foreman	250
Shop foremen (3)	175
	175
	200
General carhouse foreman	\$200
Carhouse foremen (12)	140
	175

#### Intelligence Division

	Per Month
Supervisor, publicity and contracts	\$200
Supervisor, personnel	200
Assistant supervisor, personnel (4)	180
Supervisor, power	175
First assistant supervisor, power	150
Second assistant supervisor, power	150
Stations	175
Complaints clerk	170
Equipment and ways and structures inspector	175
Service inspector	160
Assistant service inspector	150

The pay of trainmen is to commence at the minimum rates noted previously and increase to the next higher rate after six months' service at any specified rate. Due allowance is to be made for continuous service with any electric railway company, the property of which shall be acquired by the city. Such continuous service, however, is to be immediately prior to the acquisition of the railway property by the city of Seattle.

## Short Strike in Wheeling

The entire Wheeling district of West Virginia, as well as a number of communities in eastern Ohio from Steubenville to Bellaire, was affected for a day by a strike of about 1200 employees of the electric railway companies operating there.

The strike went into effect at midnight on April 30 and was declared off at midnight on May 1, when an agreement was reached to arbitrate the differences. The men returned to work on May 2. The old agreement between companies and their employees expired on April 30. No attempt was made to operate cars during the strike. The companies affected were the Wheeling Traction Company, Pan Handle Traction Company, Steubenville & Wheeling Traction Company, West Virginia Traction & Electric Company, Steubenville, Wellsburg & Weirton Railway and the City Railway.

The strike was the climax to numerous conferences between representatives of the companies during which agreement was reached on nearly every section of the contract except that covering wages. The employees demanded an increase in wages of about 33 per cent over the old scale.

At a meeting of the employees on April 28 it was finally decided that in the event no agreement could be reached with representatives of the companies the employees would agree to arbitration. Difficulties then arose as to what ground should be covered by any tribunal of arbitration and as to just what extent the whole question of wages should be or could be considered. Through the absence of railway officials from Wheeling no conference was held between representatives of the conflicting interests on April 29 and this led to further misunderstanding, as a result of which employees balloted on the question of declaring a strike.

Following the issuance of the strike order the companies affected gave out a statement reviewing the entire situation, including what transpired at the conference looking toward a peaceful settlement of the matter.

## Against the One-Man Car

### President Mahon Sees in It Merely a Device for Making One Man Do Work of Two

W. D. Mahon, president of the Amalgamated Association of Street & Electric Railway Employees of America, has contributed to the *Motorman and Conductor*, the official organ of the association, an article "The One-Man Car Proposition." He says that in listening to the arguments of the representatives of the railway companies on the one-man car "one would think that all the geniuses of the world had been combined to produce in the one-man car a blessing for humanity, while the truth is that the one-man car is about as old as the street railway business itself."

After further reviewing the history of cars Mr. Mahon launches into presenting his case against the one-man vehicle. While telling what a terrible maker of accidents he thinks the one-man car will prove he offers real proof of what a really frightful increase there has actually been under operation with cars on which two men are used. But let Mr. Mahon convict himself with his own pen. Here in part is what he says:

This is a case where the public have forgotten the one-man car and the fight they had to dispense with. They would put this old, discarded and outlawed proposition over you again. They are gilding it a little with gold and stripes and giving it the appearance of something new.

Now, let us analyze the one-man car proposition honestly. If you can find one benefit in it for the motorist or the riding public I will concede without further argument that they should have the one-man car.

There is but one proposition that brings forth the one-man car, and that is the question of finance to the company. It means that one man shall do the work of two in the operation of a car. Does it mean any better treatment to the public? Does it mean more safety to the man who uses the streets? Does it mean more safety to the employee? Does it mean less labor to the operator? Does it mean more safety to the men, women and children that ride upon the cars or that occupy or use the streets? Can you show one single argument that will produce anything of that kind? You know you cannot, and every advocate of the proposition knows he cannot.

What do they claim? They claim that they will run the car faster. What will that do? Will that lessen the danger to the riding public or to the users of the streets? Oh, but he says, the car will be equipped with but one door for passengers to get in and out; that the door will be locked and no one can get out until the motorman stops the car and opens the door. Is that in line with the motto we see painted on the cars, "In a hurry, open the poles—'Safety First'!" This motorman with his passengers locked in must cross the steam railroad tracks and other crossings without anyone to warn or signal him. What does it mean if a railroad train bears down upon this car with these passengers all locked in and no way to escape? Do you remember and think what this means to these people. Suppose this motorman should faint or meet with death while his car is in operation. So you see by the use of this car you are increasing the danger and to add to the speed of it means a greater danger with absolutely no escape or protection provided for. Not only is it a danger to the riding public but to every user of the streets. This motorman will have all the additional burdens of answering the questions of the passengers, making change and doing the other man's work placed upon him, and then, with increased speed, he can readily see what you are confronted with.

Mr. Mahon then quotes from the census of the United States government. He says that the census figures show

that the electric railways killed one passenger out of every 13,015,894 persons carried in 1902 and in the same year killed one employee out of every 1154 in service. In 1907 the railways killed one person out of every 13,603,500 passengers carried and one employee out of 746 employees in service, an increase in five years of more than 106 per cent in number of passengers killed and more than 143 per cent of employees. In 1902 the expense for damages to the electric railways of the United States was \$9,395,545. In 1907 it was \$18,176,305, or an increase of more than 93 per cent. Mr. Mahon says that the 1912 census is silent for some unknown reason on this subject. In conclusion he says:

But we are satisfied from what we know that the death rate is greater to-day than it was in 1907. If these figures say anything to you, they say that as a commission or a council having the welfare of the citizens of your municipality to protect, you cannot afford to pass any ordinance allowing the use of the one-man car, which means to increase the danger to the life and limb of every citizen of your municipality.

### Wages Up for Settlement in East St. Louis

Although the working agreement of motormen and conductors employed by the East St. Louis & Suburban Railway and the Alton, Granite City & St. Louis Traction Company, East St. Louis, Ill., has expired, terms for the 1919-1920 contract have not been decided upon.

Employees of the East St. Louis & Suburban Railway are asking an eight-hour day and 80 cents an hour. The traction company's men demand eight hours and 87½ cents an hour.

Conductors and motormen on both lines were working under agreements made by the War Labor Board after they had gone on strike last year. The traction employees now receive 47 cents an hour and the East St. Louis & Suburban Railway is paying a sliding scale from 41 cents to 45 cents an hour.

The demands probably will be submitted to an arbitration committee for settlement. It has been suggested that this committee shall consist of a member named by the union, another by the companies, and a federal judge.

### Want Wages Almost Doubled

A draft of a new wage scale agreement which calls for an increase that is generally regarded as excessive is being framed by the union for submission to the Rhode Island Company, Providence, to become effective on May 31.

Under an award of the War Labor Board in October, 1918, the wages of platform men were increased to 43 cents an hour for the first three months' service, 46 cents for the following nine months, and 48 cents an hour thereafter. Under the new wage agreement, which has already received the approval of the union, the following scale is demanded: 70 cents for the first three months, 73 cents an hour for the following nine months and 75 cents thereafter.

Prior to the increase granted by the War Labor Board the schedule of wages in effect was as follows: 29 cents an hour for the first six months, 31 cents an hour for the second six months, 32 cents an hour after two years, 34 cents an hour after three years and 35 cents an hour thereafter.

The eight-hour day is demanded, with double time for overtime. Snowplow men are asking in addition to the overtime pay, 20 cents an hour and the motormen on plows 30 cents an hour, the oldest men in point of service to be given the preference for this class of work.

The agreement will soon be submitted to the receivers of the Rhode Island Company for consideration.

## News Notes

**Albany Men Will Demand More.**—The employees of the United Traction Company, Albany, N. Y., will put in a demand for an increase in wages on July 1, the present agreement with the company expiring on that date. It is said unofficially that the employees will seek more than 45 cents an hour.

**County Commissioners Reject Franchise.**—The first draft of a franchise on the Canton-Massillon road, prepared by the Northern Ohio Traction & Light Company, Akron, Ohio, was rejected by the Commissioners of Stark County on May 3 on the grounds that it failed to meet the conditions laid down by the county.

**Kansas City Viaduct Will Go.**—The question of demolishing the old intercity viaduct from Kansas City, Mo., into Kansas City, Kan., has been settled by the City Council granting the Kansas City Railways permission to raze the structure. It is expected that the elevated will be destroyed and the tracks brought to street level within the next sixty days.

**Wage Demand Submitted to Arbitration.**—Recently the employees of the Stark Electric Railway, Alliance, Ohio, made a demand for an increase in wages amounting to 10 per cent. The company offered an increase of 3 cents an hour. This was refused. The matter was referred to a board of arbitration on May 1.

**Wage Conference in St. Louis.**—The wage committee of the local Amalgamated Association at St. Louis, Mo., conferred recently with Rolla Wells, receiver of the company, in regard to the demands of the employees for an increase in pay and for an eight-hour day. The conference was held as the result of a communication addressed to the men by the receiver, declaring that the demands could not be granted at

present. The men have since adopted a proposal to wait a reasonable time to permit Mr. Wells to become acquainted with the situation before pressing a settlement.

**Short Strike in Tulsa.**—The basis for a settlement of the strike of the employees of the Tulsa (Okla.) Street Railway was reached on April 22 after a four-hour conference between C. H. Bosler, president, and the employees. The right of the men to organize was recognized and their demand for more pay was granted. Service was resumed late in the afternoon of April 22.

**Wages Adjusted in London.**—The London (Ont.) Street Railway and its employees have arranged an amicable settlement of wage differences. The new scale will mean an advance of 3 cents an hour, and will give a maximum rate of 38 cents. This amount is 1 cent in advance of rates first proposed as a compromise. The men will also receive 12 cents an hour overtime. Sunday work will be classed as overtime.

**Must Live Up to Wage Contract.**—Employees of the Schuylkill Railways, Girardville, Pa., were notified recently that their application for an increase in wages had been denied by the War Labor Board, on the ground that an increase could not be granted because of a contract existing between the employees and the company. The case has been pending before the board for several months.

**Inspectors Now Want More.**—Twenty inspectors of the San Francisco (Cal.) Municipal Railway have petitioned the Board of Supervisors of the city to increase their salaries to \$150 a month. The inspectors now receive \$4.80 a day. It is pointed out in the request that wages of platform men have been increased 50 per cent since 1915, while the increase to the inspectors has amounted to only 17½ per cent.

**Jitney Men of Newark Organize.**—Permanent organization of the Federation of Jitney-men's Associations was completed recently at a meeting in Newark, N. J. Three representatives from each of the thirteen jitney lines in Newark, which operate more than 300 cars, attended, elected officers and took steps for the establishment of a business office and for the adoption of a constitution and by-laws.

**Canadian Border Cities Want Line.**—Unanimously indorsing the plan to take over the system of the Sandwich, Windsor & Amherstburg Railway, a subsidiary of the Detroit (Mich.) United Railway, the convention of the Councils of Canadian border cities has authorized the Ontario Hydro-Electric Commission to offer the company a price for the entire road from Tecumseh to Amherstburg, a distance of 28 miles.

**Grade Crossing Payments in Columbus.**—An arrangement has been made by which the Columbus Railway, Power & Light Company, Columbus, Ohio, will reimburse the city of Columbus in nine payments for the \$59,000 which



was advanced as its portion of the expense of eliminating grade crossings on West Broad Street. The first payment will be 25 per cent of the total debt and will be made on May 15. The deferred payments will bear interest at the rate of 4 per cent.

**Utilities Bills Killed.**—The bill of Assemblyman Gill allowing any city in New Jersey to acquire and operate transportation lines within the city and for 14 miles distant from the city is dead. The House committee on corporations reported the bill adversely and the Assembly concurred in the report. The bill of Senator Edwards, of Hudson County, providing for an elective Public Utility Commission has also been killed in the Senate. The bill provided that members be elected by districts for a term of six years. The salary was fixed at \$7,500 for each commissioner.

**Wage Increase in Fort Wayne.**—All trainmen of the Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., received an increase of 1 cent an hour in wages on May 1, which brings the rate up to 40 cents an hour for men in the service six years or more, with 35 cents from the date of employment. The former maximum was 39 cents. Following is the rate of hourly wage paid the trainmen under the new scale: first year, 35 cents; second year, 36 cents; third year, 37 cents; fourth year, 38 cents; fifth year, 39 cents; sixth year, 40 cents.

**Home for Trade Organizations.**—During the week ended May 10, work was started upon a building which, it is hoped, will be occupied largely by the trade associations now located, or which will locate in the future, in New York City. The building will be near the corner of Fifth Avenue and Forty-third Street, extending through the block to Forty-fourth Street. It will be twenty stories high. An arcade with display rooms will extend through from Forty-third Street to Forty-fourth Street. The name of the structure will be the National Association Building.

**Civil Service Modified in Seattle.**—The Civil Service Commission of Seattle, Wash., has waived practically all the requirements ordinarily exacted of employees entering civil service employ, in the case of motormen and conductors on the Seattle Municipal Railway. The text as it now stands amounts to little more than a statement of experience and a medical examination, and citizenship qualification. The rigid requirements have been waived in the case of the railway men so that the personnel of the railway system may be maintained with as little change as possible.

**Developing Bridge for Railway Traffic.**—The free bridge committee of the Tenth Ward Improvement Association at St. Louis, Mo., plans to make an active campaign to have the city government of St. Louis, Mo., and the officers of East St. Louis, Ill., arrange

for the construction of an interurban loop in East St. Louis, thereby paving the way for the entrance of interurban business into St. Louis, Mo., via the St. Louis bridge. The committee is actively at work on its program. Up to the present time the city of St. Louis has really done nothing in regard to finishing the upper deck of the bridge for the reception of railway tracks for local and interurban traffic. The Board of Public Works of St. Louis, however, since the program of the free bridge committee was initiated, has started the construction of a short loop in the city of St. Louis and commenced stringing trolley wires on the bridge. The board expects to have this work completed by July 1, at which time two city-owned cars will be put into operation on the bridge.

**Employees and Officers Dine.**—About a hundred persons were present at a banquet held in Parkersburg, W. Va., the latter part of April by the employees of the Monongahela Valley Traction Company, at which officials of the company were guests. The affair followed and supplemented a dinner on the day before which was attended by the following officials of the company: James O. Watson, Fairmont, chairman of the board; E. Blaine Moore, general manager; W. V. Neal, superintendent of the Clarksburg Division; H. S. Newton, manager of the Parkersburg & Marietta Division. W. M. Rogers, Fairmont, president of the State Federation of Labor, acted as toastmaster. He made an earnest appeal for harmony in the relations of the company and its employees and referred approvingly to the way the company had co-operated with its employees. Chairman Watson spoke of the three elements to be considered in the public utility business—the employee, the public and the owner. Both Mr. Watson and Mr. Moore, the general manager, went into detail as to the conditions of public utilities all over the country and emphasized the need of united effort toward conservation.

## Programs of Meetings

### National Association of Corporation Schools

The seventh annual convention of the National Association of Corporation Schools will be held in Chicago, Ill., the first week in June.

### Missouri Association of Public Utilities

The convention of the Missouri Association of Public Utilities will be held at Excelsior Springs, Mo., on June 5, 6 and 7. The association is now at work formulating its program.

### American Society of Mechanical Engineers

The spring meeting of the American Society of Mechanical Engineers will open at the Hotel Statler, Detroit, Mich., on June 16, and close on June 19.

The session on the afternoon of June 17 will be on the subject of industrial relations, with several addresses by men of national reputation. This session will constitute a symposium by leading organizers on the factors dominant in the labor situation, with an interchange of views as to what must be done to assure industrial peace.

### National Highway Traffic Association

The annual meeting of the National Highway Traffic Association will be held at the Automobile Club of America New York City, on May 14. Among the papers of interest to officers of electric railways are the following:

"Development of Rural Motor Express Throughout the United States," by F. W. Fenn, secretary of the motor truck committee of the National Automobile Chamber of Commerce.

"Transportation Surveys for Rural Motor Express Routes," by J. H. Collins, member of the highways transport committee of the Council of National Defense and investigator of market surveys, United States Department of Agriculture.

"Wanted: Rural Motor Express in the State of New York," by James E. Boyle, extension professor of rural economy at Cornell University.

### American Institute of Electrical Engineers

The annual convention of the American Institute of Electrical Engineers will be held at the Lake Placid Club, Adirondacks, N. Y., June 24 to 27.

The convention committee in conjunction with the meetings and papers committee has practically completed the program for the convention, the principal features of which may be announced as follows:

#### JUNE 24

President's address, by C. A. Adams. "Present-Day Practice of Transmission and Tie-Line Relay Protection," by H. R. Woodrow, D. W. Roper, O. C. Traver and P. MacGahan.

"Grounded Neutral," (a) by H. R. Woodrow, (b) William E. Richards.

#### JUNE 25

Reports of technical committees. Conference of committee on development, section delegates and A. I. E. E. officers, at luncheon.

Conference under auspices of committee on development, including section delegates and institute officers, open to all institute members

#### JUNE 27

"High - Tension Single Conductor Cables for Polyphase Systems," by W. F. Clark and G. B. Shanklin.

"Electrostatic Field in Electric Power Cables," by H. W. Fisher and R. W. Atkinson.

"Commercial Problems of 220-Kv. Power Transmission," by A. E. Silver. "The Effect of Transient Voltages on Dielectrics—II," by F. W. Peak, Jr.

On the evening of June 24 there will be an informal reception and dance.

# Financial and Corporate

## San Francisco Municipal Ownership Gains City-Owned Lines Turned 1917 Deficit of \$103,908 Into 1918 Net Income of \$107,587

The preliminary report of the Municipal Railway of San Francisco for the fiscal year ended June 30, 1918, which has just been issued, shows a marked gain in net income. Although the result of operation for the preceding year, after the inclusion of all "comparison" charges required by the charter, was a deficit of \$103,908, the outcome for the fiscal year 1918 was a gain of more than twice this amount to a positive net income of \$107,587 for the year.

The various comparison charges are required by the charter in order that the municipal line may be considered upon the same basis as privately-owned companies when the relative efficiency of operation is being judged. In actuality the municipal railway pays no taxes, and in some instances it pays nothing for services rendered by other departments of the municipal government. The city's "true" net income—that which it really receives—is therefore greater than the comparison net income by the amount of these charter charges. For example, in 1917 the comparison net was a deficit of \$103,908, and the true net a profit of \$31,084; for 1918, the comparison net a profit of \$107,587, and the true net a profit of \$326,306. Electric railway operators and students of transportation economics are, of course, primarily interested in the comparison figures.

### 1918 PASSENGER REVENUE JUMPED 60 PER CENT

The chief reason for the improved showing in the fiscal year ended June 30, 1918, was the fact that the passenger revenue increased to a far greater extent than the total operating expenses. Whereas the gain in passenger revenue was \$893,173 or 60.8 per cent, the operating expenses increased only \$592,272 or 47.7 per cent. As a result the net operating revenue in 1918 represented an increase of \$305,747 or 128.6 per cent over that of the preceding year. The taxes showed a heavy increase, on account of the fact that the State franchise tax went up in direct proportion to the gross revenues, the municipal franchise tax in proportion to the passenger revenues, and the federal income tax in proportion to the net income.

Although the expenses for maintenance of way and structures showed a decrease of \$1,640 or 3.2 per cent, those for maintenance of equipment rose \$25,756 or 36.9 per cent. A heavy increase also came in the item of power,

which rose \$72,927 or 34.5 per cent, and the heaviest in that of conducting transportation, which jumped \$303,318 or 50.9 per cent. The reservation for depreciation and for injuries and damages is reported at a higher figure in view of the fact that it is based on 18 per cent of the revenues.

### GROWTH SINCE 1913

The accompanying statement gives not only the income figures of the Municipal Railway of San Francisco for the latest fiscal year, but also comparative data since its opening on Dec. 23, 1912. The figures show a heavy growth both in revenues and in expenses year by year except in the fiscal year ended June 30, 1917, which was the only one to show a deficit after the inclusion of the comparison charges.

The mileage and passenger figures indicate that the big expansion of the municipal system and its business occurred during 1914-1915 and 1915-1916. Each of these fiscal years, it will be recalled, included six months of the Panama-Pacific Exposition of 1915. This fact not only explains the revenue gains in these two fiscal years, but also has a bearing upon the revenue loss in 1916-1917. In regard to this point M. M. O'Shaughnessy, city engineer of San Francisco, says:

The poorer showing in the fiscal year 1917 was due mostly to the decrease in passenger revenue, exposition travel being over. It is, of course, readily understood that the revenue per car-mile on a system when traffic is on the increase will be much higher than when it is on the decrease even when the volume of traffic is the same, owing to the fact that with increasing density of traffic the increase of service or car mileage lags behind the increase of traffic, whereas when traffic begins to decrease the reduction of car mileage lags behind the reduction of traffic. The reduction of operating expenses per car-mile from 18.32 cents in 1915-1916 to 18.17 cents in 1916-1917 and the increase per car-hour from \$1.579 in 1915-1916 to \$1.687 in 1916-1917 were due to the speeding up of the schedules following the reduction in the heavy service to the exposition grounds.

In this connection it may be pointed out that during 1917-1918, when the business increased so greatly over 1916-1917, the total passenger traffic rose 26,161,313, or 72 per cent, and the revenue passenger traffic 18,250,139, or 60 per cent, as compared to 1916-1917. The car-miles, however, increased only 1,617,821, or 30 per cent.

For the fiscal year ended June 30, 1918, the traffic showed a total larger than ever before, and the unit figures for this year and the two exposition years afford some interesting

comparisons. The passenger revenues per car-mile in 1917-1918 were 34.08 cents, thus substantially exceeding those of 32.90 cents in 1914-1915 and 30.99 cents in 1915-1916. The operating expenses per car-mile increased more rapidly, however, for the figure for 1917-1918 was 20.15 cents as compared to 18.63 cents in 1914-1915 and 18.32 cents in 1915-1916. As a result the net income from operation per car-mile at 4.64 cents in 1917-1918 fell below that of 5.37 cents in 1914-1915, although it was more than that of 4.37 cents in 1915-1916.

The platform expense per car-mile varied from 9.44 cents in 1915-1916 to 10.43 cents in 1917-1918, the average for the whole period since December, 1912, being 9.50 cents. The ratio of platform expense to operating expenses has remained nearly the same for the years of greatest growth—the percentages being 50.8 per cent for 1914-1915, 51.5 per cent for 1915-1916 and 51.7 per cent for 1917-1918.

According to the car-hour figures, the passenger revenue at \$3,081 and the operating expenses at \$1,822 for 1917-1918 produced a gain in operating earnings of about 2 cents over 1914-1915 and about 17 cents over 1915-1916. The net income from operation per car-hour at \$0.419 for 1917-1918 was less than that of \$0.465 for 1914-1915, but greater than that of \$0.376 for 1915-1916. The platform expense per car-hour ranged from \$0.814 in 1915-1916 to \$0.943 in 1917-1918.

The gross income for 1917-1918, less taxes, amounted to \$355,801. Upon the \$6,265,801 representing the cost of road and equipment, this return represented a rate of almost 5.7 per cent. The combined reservation for depreciation and injuries and damages was 6.13 cents per car-mile in 1917-1918 and on the average 5.75 cents for the whole period.

### LARGE DEPRECIATION ALLOWANCE

Regarding the comparison of the San Francisco system with privately-owned lines, Mr. O'Shaughnessy makes these statements:

In comparing the operating statements of the Municipal Railway of San Francisco with privately-owned lines, it is but fair to point out that the municipal railway, in addition to maintaining its property at a very high standard, is setting aside 14 per cent of its gross operating revenue as a depreciation reserve, whereas there are few privately operated properties that carry this depreciation reserve in addition to maintaining their property at the same standard of efficiency. It is claimed by the management of many private properties that it is unnecessary to carry a depreciation reserve, all renewals and replacements being handled as maintenance charges in the same manner as repairs.

The following results of six years of operation of the San Francisco municipal lines (up to Jan. 1, 1919) should be of interest:

San Francisco owns about 60 miles of single track, and for this it has bonded itself for the sum of \$5,000,000. This amount, however, has been reduced by the sum of \$404,000 for redemptions from earnings. In addition to paying all operating expenses and maintenance charges the city has put \$800,000 into new construction and created a depreciation reserve of \$1,000,000, \$567,000 of which is invested in other municipal bonds and the balance is in the form of cash.



### New Blue-Sky Law

Governor Lowden of Illinois, Secretary of State Emmerson, and banking institutions and associations throughout the State are reported to have agreed upon a new form of blue-sky law. The outstanding change in the law will be abandonment of the practice of licensing vendors of securities. The bill requires every person floating securities to file with the Secretary of State the fullest of financial statements prepared under oath. The Secretary of State is to have funds with which to finance complete investigation of all statements. The most important phase of the new bill is that it provides that a copy of all information filed with the Secretary of State as to any flotation must be mailed to any person requesting it.

## Financial News Notes

**Abandonment in Yakima.**—N. C. Richards, president of the Yakima Valley Transportation Company, North Yakima, Wash., announced recently that the company would discontinue service on the North Fourth Street line. The abandonment of this service marks the beginning of the curtailment policy that was predicted when fares were raised to 10 cents.

**Income Bond Interest Passed.**—Payment of interest on the adjustment income bonds due on May 1 has been passed by the Chicago Railways. These bonds are known generally as "adjustment 4s." The last payment of interest, amounting to \$100,000, was made on May 1, 1918. The bonds were issued in 1910 at the time the traction interests acquired the lines of the Chicago Consolidated Traction Company, comprising 128 miles of track.

**To Sell Traction Stock at Auction.**—Notice is given that the Guaranty Trust Company, New York, N. Y., as trustee under the indenture of the collateral trust 4 per cent bonds of the International Traction Company, Buffalo, N. Y., will offer for sale at public auction in New York, on May 28, all of the securities pledged as collateral. The offering will be made in one lot subject to certain conditions, one of which is a deposit of \$50,000 in cash or a certified check for a like amount.

**Valuation Is Suggested.**—In a letter to W. C. Culkins, Director of Street Railroads at Cincinnati, Ohio, C. M. Leslie, receiver for the Interurban Railway & Terminal Company, suggests that a valuation of the track and overhead wires of the company, extending from the city terminal to Coney Island, be made by appraisers to be named by the Cincinnati Traction Company, the Interurban Railway & Terminal Com-

pany and the court. This stretch of track is sought by the Cincinnati Traction Company for purpose of extending its East End line to Coney Island.

**Another Dividend Reduction.**—The directors of the Union Street Railway, New Bedford, Mass., recently announced that the dividend rate would be reduced from 8 per cent to 6. This action was taken as a result of the large deficit in the earnings for the last quarter. Last June the company was authorized to increase its capital stock by \$812,500, the proceeds to be applied principally to paying for a new power house. The company previously had \$1,625,000 of stock outstanding. There is only \$250,000 of outstanding funded debt. The company heretofore has been unusually successful, but increases in operating cost and jitney competition have cut into earnings materially.

**Interest Payment Authorized.**—Rolla Wells, receiver for the United Railways, St. Louis, Mo., recently asked permission in the United States District Court to make a disbursement of \$42,750 as interest on an issue of \$2,000,000 in bonds under a mortgage on a portion of the Broadway line, which the petition says is necessary to the United Railways. In answer to the petition, Judge Dyer ruled that Mr. Wells was authorized to pay, out of the money on hand, derived from the operation of the system, the interest on \$1,900,000 par value of the bonds of the St. Louis Railroad. In presenting the petition Mr. Wells said he had enough money on hand derived from the operation of the system to pay the interest on the bonds and to continue to operate without embarrassment. The interest payment on the bonds was due on May 1.

**Small Bond Issue Approved.**—The application of the Trenton & Mercer County Traction Corporation, Trenton, N. J., for authority to issue \$40,000 of bonds to raise funds for an extension through Trenton Junction and for other work has been refused by the Board of Public Utility Commissioners, but an order has been issued allowing the company to issue \$14,000 of bonds. In discussing the refusal to grant the full amount the board said in its order: "It appears that the balance of the proposed issue is to be used on account of construction work which is contemplated, but which for causes not within the company's control cannot be immediately undertaken. The board withholds approval of the balance of \$26,000 of the proposed issue, with leave to the company to renew its application for approval of the same."

**City Accepts Minneapolis Valuation.**—The Minneapolis (Minn.) Street Railway, controlled by the Twin City Rapid Transit Company, has received from the City Council certified notice of its acceptance of \$22,553,150 as the valuation of the property of the company as of Jan. 1, 1916. The company has thirty days to act upon this. The mat-

ter will be submitted to the board of directors. To become a basis for franchise determination acceptance must be received from the company. To obtain this new figure deductions were made of \$3,381,257 from the estimate of City Engineer F. W. Cappelens, which was \$25,914,307. These deductions were: Depreciation, \$600,000; taxes during construction, \$162,000; Harriet right-of-way, \$632,712; water power leases, \$491,857; going concern value, \$1,494,581.

**Will Resume Receivership Hearings on May 19.**—The hearing in the receivership suits against the United Railways, St. Louis, Mo., which were consolidated under the John W. Seaman suit in the United States District Court by Judge Dyer, will be resumed on May 19, according to an announcement made by Special Master Henry Lamm following a conference with the attorneys for all parties. Rolla Wells, though automatically removed as receiver in the order making the Samuel W. Adler suit an intervening one to the Seaman suit, was renamed by Judge Dyer as receiver under the consolidated suits. Judge Lamm was reappointed as special master to conduct the hearings. The attorneys taking part in the conference with Special Master Lamm were Judge Henry S. Priest, Samuel A. Mitchell, Lon O. Hocker, Charles W. Bates and Ephraim Caplan. No other matters were discussed in the conference, except the date for the hearings of the consolidated suit. Mr. Bates was appointed by Judge Dyer as counsel for the receiver in the consolidated action. The judge said he had appointed Mr. Bates after consulting Receiver Wells.

**A Wheel Within a Wheel.**—The Board of Public Utility Commissioners of New Jersey is considering the case of the Morris County Traction Company and the Morris Railroad, Morristown, which entered into a traffic agreement some time ago as a result of the traction company's inability to extend its line from Morristown to Madison because of the opposition of wealthy property owners along the route. The officials of the Morris County Traction Company organized the Morris Railroad under a steam railroad charter to build and operate over a private right-of-way bordering the Lackawanna Railroad for 2½ miles. It cost \$250,000 to build this part of the line, but its construction gave the traction company a continuous line from Maplewood to the terminal at Wharton and Lake Hopatcong. Without realizing that the approval of the Board of Public Utility Commissioners was necessary, the traction company agreed to guarantee the 5 per cent bonds of the Morris Railroad and the 6 per cent stock and to retire and cancel \$4,000 of the bonds annually. The liability of the traction company under this agreement was subsequently removed by the Board of Public Utility Commissioners instructing the traction company to retire the bonds but not to cancel them.

# Traffic and Transportation

## Safety Day in Baltimore

The Message to Be Careful Is Carried Home Forcefully in Competition in Schools

At the instance of the United Railways & Electric Company, Baltimore, Md., the public, parochial and private school authorities of Baltimore made May 1 "Safety Day" and all the children in the fourth, fifth, sixth, seventh and eighth grades in every school in the city on that day wrote compositions on some phase of accident prevention.

In the lower grades the little tots wrestled with the mysteries of "don'ts" and a delightfully interesting time they had with this valuable lesson.

The schoolmaster for the occasion was "Mister Accident," a special edition of the United Railways *Trolley News*, a leaflet that is ordinarily distributed in the cars of the company. On this occasion *Trolley News* was placed in the hands of every child in the schools, and the lesson that it offered was the foundation of thought for the day's work.

After the reading of the leaflet to her class each teacher put her pupils to work on compositions. That the teachers might have all necessary aid in selecting a definite subject this list of subjects approved by the board of superintendents of the public schools was presented to each class.

Our Poe, Mr. Accident  
Our Friend, Mr. Safety,  
Always be Careful. (The A, E, C of Safety)

Danger of Playing in the Streets.  
Safety.  
How to Get On and Off Cars Safely.

Cross the Street at Crossings.  
Saving Our Lives Is More Important Than Saving Time.  
Do Not Put Head or Arms Out of Windows.

Where to Cross the Street.  
Do Not Risk Life in Play.  
Cross the Street at Crossing.  
Home Is Better than the Hospital.  
Look Both Ways Before Crossing the Street.

Do Not Cross Street in Front of a Moving Car.  
Do Not Get On or Off a Car Until It Stops.

Do Not Play on Car Tracks.  
Helping Others to Be Safe.  
Carelessness Our Enemy.  
Some Accidents I Have Seen (or Heard of) and How It Could Have Been Avoided.

The children of the lower grades in which composition writing is not practiced had another form of the safety lesson. After reading aloud the story of "Mister Accident," the teacher called upon her pupils to suggest "Don'ts," or things not to do in order to protect oneself from mishap.

As little "Jimmie" Jones made a suggestion, as, for instance, "don't play in car tracks," this was written on the blackboard. Then Sarah Smith's "don't get off car until it stops" was written under the other, and so on until a dozen or a score of first-class "don'ts" had been displayed before the class.

The pupils were then called to read the whole list in unison, after which individuals were asked to recite as many as they could remember without looking at the blackboard.

Then all the children copied the list on paper. It is said by the teachers that the children took the keenest interest in the exercises and there was no question that the truths were driven home.

The whole purpose of "Safety Day" was to secure the concentration of school children's minds on accident prevention, and one of "Mister Accident's" strongest points was that the lessons of "Safety Day" should abide in the mind every day.

## Complaint Against New Castle Increase Dismissed

Increases in rates filed by the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, operating the New Castle Electric Street Railway and the New Castle & Mahoning Street Railway, in New Castle, Pa., were approved by the Public Service Commission of Pennsylvania on April 28, and complaints filed by the city of New Castle were accordingly dismissed.

James Alcorn, public service commissioner, in the opinion approving the rate increase, states that the commission will permit the company to charge the present fares until May 1, 1920, when the old rates are to be established unless the company can show that it is necessary to have the revenue realized from the increased charge. The new rates increased fares from 5 cents to 6 cents, sale of tickets in packages of eleven for 60 cents, instead of 50 cents, and school tickets to be used between 7.30 a. m. and 5.30 p. m. in packages of fifty for \$1.50. In concluding his opinion in the case, Commissioner Alcorn said:

The commission is of the opinion that the new rates will not produce more revenue than will be sufficient to provide for operating expenses, taxes, depreciation and a fair return. It appears that in previous years the respondent was doing a successful business and receiving a fair income. In 1916, for instance, the net revenue was \$84,502. This shows that under normal conditions the 5-cent rate is sufficient. As the respondent asks for the increased rates because of the increased cost of operation it should if permitted to put the new rates in effect restore the old rate when the conditions become normal. The new rates cannot be considered excessive. A passenger can by purchasing a package of tickets ride for less than 43 cents. This is not too high, under present conditions as disclosed in this case.

In the opinion that in view of the increase in operating expenses the new rates are just and reasonable, and we will permit the respondent to collect those rates until May 1, 1920, and an order will be entered dismissing the complaints and requiring the company to restore the old rate after May 1, 1920, unless it be shown that the company then requires the revenue which the new rates produce.

## East St. Louis Will Appeal

Company There Dissatisfied with Commission Decision Fixing Six-Cent Fare

The East St. Louis (Ill.) Railway is disappointed at the decision of the Public Service Commission of Illinois continuing in effect the 6-cent fare. The company regards the rate as confiscatory. As explained recently in the ELECTRIC RAILWAY JOURNAL the order extends the temporary order under which the company now operates to July 31 and specifies that the rate may, after that date, be extended in like manner without hearing. The railway company had petitioned some time ago for a 7-cent fare.

W. H. Sawyer, president of the railway company, issued a statement of which the following is a very brief summary:

### RAILWAY PRESIDENT DISAPPOINTED

I have not had time to read the order, but have just noted the general conclusions and am naturally disappointed. My assumption is that we will immediately ask for rehearing in this case, as it would appear impossible to continue with 6-cent fare and still pay the present scale of wages and give good service. If we continue to be limited to a 6-cent fare it means that our rate of return is so low that we will be unable to secure necessary new money for needed improvements. The situation is just as serious for East St. Louis as it is for the East St. Louis Railway itself, because the rate affects the city and the railway are and must continue to be mutual.

The valuation claimed by the company was \$2,898,000. This valuation was supported by J. E. Allison, consulting engineer of St. Louis, who was retained by the company as an independent expert. The commission finds a valuation of only \$1,560,000, but states that this valuation is not necessarily final but "is used in the present case without prejudice to the railway company or others in any future proceeding."

I regard this valuation as absolutely confiscatory, as there is no question whatever but that the actual cost of rails, ties, trolley wire, cars, and physical property which go to make up the railway undertaking was very considerably in excess of this amount.

### INDEPENDENT VALUATION \$2,750,000

Mr. Allison's valuation showed the actual physical property to be about \$2,750,000, to which he rightfully contended should be added the cost of financing and other intangibles, which represent more than any actually spent, approximately \$600,000. The order makes no reference whatever to Mr. Allison's testimony. Mr. Allison testified that the company should be allowed to earn a total of \$300,000 a year, whereas the company is now earning under the 6-cent fare approximately one-third of this amount.

### REPRODUCTION BASIS USED

As to the company's valuation the order states that this was prepared upon a strict reproduction basis," whereas the facts are that in so far as all the physical property was concerned, this was prepared upon a strictly actual basis. The order was made because a reproduction basis would give a higher valuation than we claimed, as no war-time prices were included in our figures, but the costs taken by us were the actual costs at the time the track or cars were built. We, of course, claimed that in addition to the \$2,898,000 we had in our expenditures when the company was purchased which were not included, but Mr. Allison testified that the order should be stated that the company should be allowed to earn, in his opinion, \$300,000, where it did earn in 1918 approximately \$113,000.

In addition to the \$300,000, Mr. Allison rightly contended that there should be earned an amount set aside by the railway company for depreciation purposes an additional amount.

## Seven-Cent Charge Restored

### New Jersey Commission Refuses Request of Cities to Keep Fares at Six Cents Pending Action on Zone System

The Board of Public Utility Commissioners of New Jersey in a decision filed on May 3, granted the application of the Public Service Railway, Newark, for a modification of its order of Sept. 25, 1918, which stipulated that the company was to drop its fare from 7 cents to 6 cents on April 1. The decision of May 3 wipes out that stipulation and the rate goes back to 7 cents, with the additional cent for the first transfer. The 7-cent fare went into effect at midnight on May 3.

#### \$486,127 LOST IN THREE MONTHS

The old rate of 7 cents is to remain effective until the commission passes upon the zoning system of fares, which was prepared by the railway by order of the commission and is now before the commission, "or until this board shall find and determine other rates than those filed as aforesaid to be just and reasonable in the pending proceedings to determine the justness and reasonableness of the schedule of fares filed as aforesaid."

The decision of the commission is based on a comparison of the financial condition of the company on March 31 of this year, with Dec. 31, 1918. The board says it thus appears that the actual loss during the first three months of the present year amounts to \$486,127. This is arrived at by adding the sum of \$94,120, which represented the railways' surplus of Dec. 31, 1918, and the sum of \$392,007, which represented the company's deficit on March 31, 1919.

In order to ascertain the elements entering into the operation of the lines of the company for the first three months of the present year, the decision of the commission includes an analysis of the operating statement for the first quarter, as compared with the same quarter of 1918. The first quarter of this year shows a deficit of \$484,562, on March 31, as compared with \$62,702 on the same date a year before.

#### LABOR AND MATERIAL COSTS VERY HIGH

This is explained by the fact that whereas the railway operating revenue deductions in 1918, for this quarter, amounted to \$3,115,272, they jumped to \$4,554,392 for the same period of the present year. On this point the commission said:

This large increase in railway operating deductions was naturally the subject of protracted investigation in the present proceedings. A fair deduction summarizing the reasons for the increase is as follows: The major part of the increase is due to the increased cost of labor and material and the company did a greater amount of work during the first quarter of 1919 than it did during the same quarter of the year 1918 because of the open weather which permitted the work to be done and which had prevented any work of a corresponding character to be done during the corresponding quarter of 1918.

It is pointed out much of this work was in the rehabilitation of the company's equipment. The testimony of

the general manager is quoted in explanation. He stated, for instance, that on account of lack of labor in January, February and March, 1918, and the severe weather, only six cars were painted. In this connection the general manager's testimony is quoted as follows:

And I defy anyone to point out one piece of track or one car which has been repaired which should not have been repaired.

The decision points out that the board has heretofore criticized the company because of its failure to provide a sufficient reserve for depreciation, and indicated in its order of July 10, 1918, the necessity for the proper maintenance and renewal of its railway by maintaining a sufficient depreciation reserve.

Nor can these expenditures of this year, which greatly swelled the operating expenses of the first quarter, in the opinion of the commission, be properly ordered to what is known as the capital account of a company. Then the decision of the board sums as follows:

#### BASIS OF EQUITABLE RATES

Equitable rates should be based on the average expenditures during the period in which they are to prevail. As established by the record that the expenditures for maintenance of property which the company was required to make by the open winter exceeded the normal expenditures for that purpose, and the strike in March caused a further abnormal loss, and the necessary corrections restoring such abnormal expenditures, however, it is apparent that, under the conditions existing during the second quarter of the year, a 6-cent fare will not enable the company either to recoup the losses incurred in the first quarter or possibly to pay its fixed charges during the second quarter considered by itself. If the company is to continue to render service to the public, all of the evidence in the case justifies the board in concluding that it is necessary to permit the company to revert immediately to the rate providing for a 7-cent fare and a charge of 1 cent for the initial transfer, subject to the board's jurisdiction to modify the same if and when conditions may warrant.

It is urged by the municipalities that this board, having under consideration the putting into effect of a zoning system, shall not require a review of rates and should not act upon the present application but should dispose of the matter with the minimum delay. This is made clear. With full proof before the board that the railway is daily piling up a deficit, to refuse relief for the comparatively short period would be a flagrant failure of justice and a violation of duty.

In the interim and until the schedule of rates is ready for the commission and report entitled "Plan for a Zone System of Fares Upon the Lines of the Public Service Railway," is approved by this board, or until this board shall find and determine other rates than those filed as aforesaid to be just and reasonable in the pending proceedings to determine the justness and reasonableness of the schedule of fares filed as aforesaid, the board will and hereby does modify the order of Sept. 25, 1918, in so far as the same provides for a charge of 6 cents on and after April 1, 1919, and will permit the charge of 7 cents where 6 cents is now provided. The other respects said order to be and remain the same.

Frank H. Sommer, counsel for the municipalities opposed to a return to a higher fare, made a statement in which he said that he would advise the associated municipalities to make an application for a judicial review of the order. Among other things he said:

For the sake of those who are financially interested in the Public Service Railway, and for the sake of those who require the service it affords, I sincerely hope that the game of hide-and-seek as to just and reasonable rates, which now has been going on for almost a year, may soon come to an end, and that as a result of a thorough investigation of all the elements entering into the problem, stable rates may be established for the future.

The Mayor of Newark paid the 7-cent fare under protest, with the object in view of bringing suit for a judicial review of the decision of the commission. The appeal to the courts from the commission order will probably be given precedence on the court calendar.

The railway is distributing a sixteen-page pamphlet, "Inside Facts About Public Service Railway," being testimony of President Thomas N. McCarter before the commission in connection with the proposed zone-fare system.

#### Wants Increase in Mobile

The Mobile Light & Railroad Company, Mobile, Ala., has submitted to the City Commissioners a long statement in support of its petition for increased fares. This statement is signed by J. H. Wilson, president of the company. As the company puts it "Our company is now asking that the contract rate for a car ride be increased slightly, owing to our increased operating costs." The appeal is for 6 cents.

The statement starts out with a review of the franchise contracts establishing the 5-cent fare and then takes up in turn increased costs, how other kinds of business have met increased costs, fare increases elsewhere, the net income that changed into a deficit, the local ownership of the company, the indorsement of fair rates by leading public men, the matter of increased facilities needed for Mobile and the interests of the employees. In conclusion under "Draw Your Own Conclusions" the company says:

We have shown that our company's lines did not earn enough in the past six months to pay operating expenses and fixed charges, falling behind to the amount of \$7,136.

We have shown that including amounts paid for improvements and betterments the deficit was \$71,000.

We have shown that we now have no surplus, but a deficit, so we can not take care of ordinary improvements and betterments, always required by an electric railway company.

We have shown that the ultimate welfare of our employees is dependent upon the prosperity of the company.

Our company has put the greater part of its net earnings for twenty-six years into the betterments and extensions of the property for your service, during which time it has paid only an average dividend of 0.85 of one per cent.

There is no hope of a material reduction of expenses, as prices of coal and labor, our two chief items of expense, cannot be expected to fall enough to make any appreciable difference in our net income.

We do not desire to increase the cost of school children's tickets.

At this time, and not in the future unless it becomes necessary, do we expect to ask for an increased fare in the Winter Magazine Point or Spring Hill divisions, on account of the passengers on said lines having to pay a higher price.

To-day the electric railway fare in Mobile is the only commodity that has not only not increased in price, but is actually just the same price it was in 1892, with vastly improved and increased service. The last commodity to increase is the 20 per cent advance by the post-office department for telegrams.

### From the Loop, Chicago, to Milwaukee

Plans are progressing for operation of fast electric trains of the Chicago, North Shore & Milwaukee Railroad into the heart of Chicago. This road is operated in conjunction with the Northwestern Elevated Railroad, Britton I. Budd being president of both. The elevated cars continue north of Chicago to Wilmette, paralleling for a few miles the service of the North Shore road, which has its southern terminus in Evanston. Part of the right-of-way used by the elevated lines is owned by the Chicago, Milwaukee & St. Paul steam road, and negotiations are being conducted with the management of that company to permit electric trains to continue into the loop district of Chicago from Milwaukee. This is expected to prove a boon for interurban passengers, affording cheaper and more convenient transportation between Chicago and the north shore towns than is possible by use of the steam railroads. The North Shore road has been doing a profitable business owing to the heavy travel to and from Fort Sheridan and Great Lakes Naval Training Station.

### Liberty Becomes License in Seattle

Thomas F. Murphine, Superintendent of Public Utilities of Seattle, Wash., has asked the City Council to pass legislation intended to correct practices on cars which developed during the war when shipyard workers received special consideration on account of congested conditions. For instance, smoking was originally prohibited on all street cars. This rule was modified during the war so that smoking was allowed on the early cars, which contained shipyard workers almost exclusively. This liberty soon degenerated into license, with the result that the practice of smoking was gradually carried over to practically all hours of the day on certain lines. Arguments between smokers and non-smokers were the result. As a preliminary to the enforcement of the proposed legislation forty inspectors and other municipal railway employees have been given police commissions.

### Fare Arbitration in Kansas City, Kan.

Judge John C. Pollock of the Kansas Federal Court has named A. L. Berger, an attorney of Kansas City, Kan., and Frank Hagerman, Kansas City, Mo., as arbitrators to adjust the fare and other disputes between the city of Kansas City, Kan., and the Kansas City Railways.

The appointments were made after word had been received from Topeka that the State Public Utilities Commission of Kansas had agreed to the arbitration plan. Judge Pollock said that he selected Mr. Berger and Mr. Hagerman because both were familiar with the Kansas City railway situation.

Judge Pollock said that he has felt for some time that the railway dispute would never be settled except through arbitration. The questions of fares, of franchises and all public contracts, the use of the Inter-City viaduct and the removal of the "L" road structure will be considered.

Under the stipulation for arbitration Judge Pollock retains the right to modify the findings of the arbitrators if he desires to do so. The city has bound itself to adopt such ordinances as may be necessary to enforce the findings of the arbitrators.

### Many Angles to Spokane Case

The City Council of Spokane, Wash., according to Mayor C. M. Fasset, will refuse a franchise to the proposed consolidated company to take over the local lines of the Spokane Traction Company and the Washington Water Power Company, unless the city obtains a provision for municipal ownership. The local lines are making an effort to consolidate, and the Council has gone on record as opposing any form of franchise that does not include the municipal-ownership provision. While the city has no immediate intention of buying out the lines, according to Mayor Fasset, "it is watching with interest the struggle in Seattle."

The city will also renew its fight for 5-cent fares, according to Mayor Fasset. He states that the consolidation will not only bring about a price value for the system, which would be a basis for possible municipal purchase later on, but will also make the justified earnings of the investment less than in the past.

The City Council is holding over the heads of the local railways the threat of unrestricted jitney competition, although agreeing to hold up the bus licenses until the end of the ninety-day trial with the 6-cent fare recently authorized. On the other hand a strong faction in the City Council is in favor of putting the jitneys out of business, if it will help restore the 5-cent fare.

### Increase Likely in New Bedford

The Union Street Railway, New Bedford, Mass., one of the most conservatively managed and most successful electric railways in all New England, is confronted with the need of increasing its fares. Increases in the costs of materials and supplies and jitney competition are held to be responsible for the depletion of the company's earnings. Company officials estimate that the operation of jitneys has taken \$100,000 in revenue from the railroad. It is said that the only hope of the company in sight lies in the new jitney regulations about to go into effect, which require a bond of \$2,500 and put the jitney operators under so many restrictions that it is believed it will drive the jitneys out of business. The company will not apply to the Public Service Commission for authority to increase fares until the results of the new jitney regulations are apparent.

### Fare Rehearing Asked in Chicago

An application for a rehearing and for the introduction of additional evidence in its fare case was filed by the Chicago (Ill.) Surface Lines on May 1 before the Public Utilities Commission of Illinois. The petition asked that the case be reopened so that the companies could present full and complete evidence with reference to the value of the lines, the commission having recently refused an increased fare on the theory that the companies were earning a reasonable return on a fair valuation of the properties.

In explaining this latest move, L. A. Busby, president of the company, said:

"Our petition for increased fares was presented last November as an emergency measure. In similar cases, decided about that time, the commission granted increases without making a complete and detailed valuation. We proved up the city purchase price as established by the 1907 ordinance, and considered the estimates sufficient upon which to base an emergency order for an increase in fares. The commission, however, finally decided not to treat our application as an emergency matter, and said that the time had come to return to the former course of procedure—that is, a complete valuation of the properties when making a change of rates.

The commission rejected a number of items in our capital account amounting to several millions of dollars, and pointed out that it did so because there was no evidence, or insufficient evidence, to satisfy the members regarding these items. We believe the fair value of the properties is in excess of the purchase price. We will also point out that some of the estimates of the commission as to income available to meet fixed charges are, notwithstanding our increase in the rate of several hundred thousand dollars per annum in excess of the earnings which will be realized.

### Three Cents a Mile for Interurban

The Public Service Commission for the Second District of New York has approved proposed increased fares on the Rochester & Syracuse Railroad on a 3-cent-a-mile basis except in the city of Rochester. The company has been directed to charge a 5-cent fare from Rockwood Street to the city terminal of the New York State Railways. The company under the tariff which it filed on a 3-cent-a-mile basis provided for a 5-cent fare from Rockwood Street to Culver Road and another 5-cent fare from Culver Road on the New York State Railways' tracks. The railroad consented to eliminate the proposed Rockwood Street to Culver Road fare.

The commission holds that with this exception the proposed new rate of fare is just in amount and necessary to yield reasonable compensation for the service rendered, taking into account the present cost of operation. Existing rates are 2.5 cents a mile by ticket, 2.75 cents cash with one-quarter cent refund, 1.25 cents a mile for thirty-day, fifty-ride commutation books and 1.6 cents per mile for fifteen-day twenty-five-ride East Rochester to Culver road. New rates to go into effect are 3 cents a mile by ticket, 3 cents a mile by cash with 10 cents excess redeemable and 1.5 cents and 1.6 cents per mile for the commutation books and mileage books at 2.5 cents a mile.

## Hastings Rebels

Hastings-on-the-Hudson, a quiet little town snuggled in the valley of the Hudson some distance below Storm King and within easy distance of the bridge over which the headless horseman of the "Sketch Book" rode, has had its silence disturbed, its bucolic existence disrupted and its family life thrown into turmoil by a railway controversy. All Hastings is walking. In fact, all Hastings has to walk. This is established beyond a doubt, however much some of the other moves of the Yonkers Railroad and its opponents may be obscured by the conflicting news reports of suits, counter suits, injunctions unheeded, etc.

The Yonkers Railroad was in need of added revenue. Of this it convinced the Council of Yonkers. Hastings, however, remained unconvinced. When the railroad began to collect an extra fare at the limits of Yonkers, passengers to Hastings became obdurate. But the company was insistent. Conflicts between employees of the railroad and passengers followed. Then the railroad, with the approval of the Public Service Commission, decided to abandon service in Hastings. This it did while Hastings was making up its mind to secure an injunction to prevent the discontinuance of operation. When the court order restraining the company was ready all Hastings was walking. A railroad that has already abandoned service cannot be prevented from abandoning service. An injunction does not hold that is issued to prevent something being done that already has become an established fact. Hastings was isolated from Yonkers and from New York. In time, no doubt, the town would have become reconciled to isolation from Yonkers, but to be cut drift from New York was more than Hastings could endure.

Meanwhile the opposition to the fare increase in Yonkers was organizing. The dissenters prepared to fight. As a first move they sought the courts. In consequence there is now pending before Supreme Court Justice Morschauer an action seeking to require the railroad to give passengers rebate checks pending the final settlement of the legality of the extra fare charge. As for Hastings, it still remains cut off from New York, so far as access to that city over the Yonkers Railroad is concerned.

## Wants Seven Cents in Jamestown

A conference has been called in Jamestown, N. Y., between A. N. Broadhead, president of the Jamestown Street Railway, the municipal authorities of the city and Charles R. Barnes, electric railway inspector of the Public Service Commission for the Second District, in an effort to bring about an agreement between the city and the company regarding the discontinuance of transfer service between the company and the Warren & Jamestown Street Railway. The Jamestown Street Railway also seeks a 7-cent fare.

In a communication to the City Council of Jamestown, President Broadhead calls attention to the fact that unless a 7-cent fare is granted the company will have to discontinue its Willard Street line, the latest addition to its system. He points out that the company lost \$70,000 last year and that the company has never paid any dividends. The City Council seeks to force the company to issue transfers to the Warren & Jamestown Street Railway. The Warren & Jamestown Street Railway has already discontinued giving transfers for the Jamestown local lines.

## Jitney Measure Re-enacted

The ordinance in Huntington, W. Va., placing severe restrictions on jitney traffic, which was repealed last July when service on the Ohio Valley Electric Railway was impaired by lack of power, was re-enacted by the City Commissioners on April 30 at the instance of George I. Neal, attorney for the company. Mr. Neal stated the company was preparing to build the South Side line and would be required to float a bond issue to defray the expenses of the improvement. He explained that it would be difficult to sell bonds as long as there was no statute on the books restricting jitney traffic. The ordinance re-enacted on April 30 requires every company operating jitneys to furnish a \$5,000 bond for every vehicle in operation and to pay a license fee of \$50 for each bus of four-passenger capacity. The jitneys are further required to follow a fixed route and operate seven days a week on a regular schedule. A fine of from \$10 to \$100 or imprisonment for not more than thirty days is provided as a penalty for violation of the law.

cent. Within the limits of Cobalt, Haileybury and New Liskeard the fare is now 7 cents.

**Detroit United Class Rate Increase.**—The Detroit (Mich.) United Railway has been authorized by the Interstate Commerce Commission to increase its class rates 25 per cent, but to retain its freight rates at not more than those charged on steam railroads between the same points.

**Orders Fare Increase Suspension.**—The Public Service Commission of Massachusetts has ordered the Massachusetts Northeastern Street Railway, Haverhill, Mass., to suspend until May 15 the operation of the company's tariff proposing an increase in the single cash fare from 6 cents to 10 cents.

**Making the Most of It.**—The Philadelphia (Pa.) Rapid Transit Company is advertising in the cars of its surface lines and on the stations of its elevated and subway rapid transit line that whereas Philadelphia has a 5-cent fare in Boston 8 cents is charged, in Pittsburgh 7 cents and in St. Louis 6 cents.

**Fare Referendum in Akron.**—Opponents of the city ordinance providing for an increase in fares to 6 cents on the lines of the Northern Ohio Traction & Light Company in Akron have filed petitions for a referendum. City officials said that the referendum would be submitted at a special election not later than May 20.

**Fare Request Refused.**—The City Council of Decatur, Ga., has voted unanimously to deny the petition of the Georgia Railway & Power Company, Atlanta, Ga., that the 5-cent fare contract existing between Decatur and the company be suspended and the company be permitted to charge 6 cents fare on this line.

**New Fare Accounting Plan.**—The Aurora, Elgin & Chicago Railroad, Wheaton, Ill., has agreed with its employees that the p-a-y-e fare boxes shall remain locked and be opened only by representatives of the company. The railway company will accept all mutilated coins and will not take into account with its men any shortages or overs.

**Reduction in Buffalo-Niagara Falls Fares.**—The International Railway, Buffalo, N. Y., under a tariff supplement filed with the Public Service Commission for the Second District, and proposed as effective on June 1, will reduce joint one-way fares from Buffalo via Niagara Falls and Niagara Gorge Railroad, \$1.10 to 97 cents to Lewiston and \$1.25 to \$1.17 to Youngstown.

**Fare Increase on Columbus Suburban Line.**—A new fare schedule, providing for an increase of 1½ cents per zone, has been put into effect on the Westerville line of the Columbus Railway, Power & Light Company, Columbus, Ohio. This was done on the contract for a sliding scale, made two years ago. When the working capital for the line falls below \$15,000, the rate of fare is increased and when this fund reaches \$25,000, the fare is reduced.

# Transportation News Notes

**Skip Stops for Municipal Line.**—Thomas F. Murphine, Superintendent of Public Utilities of Seattle, Wash., has announced that the skip-stop system will be employed on the Seattle Municipal Railway. Details of the proposed plan have not yet been worked out.

**Fare Petition Renewed.**—The Topeka (Kan.) Railway has applied to the Public Utilities commission for a 6-cent fare. The commission denied a similar increase a month ago, but the company states in the new petition that it has been compelled to increase wages in the meantime.

**Government Road Increases Fare.**—On the Nipissing Central Railway North Colbat, Ont., Can., an electric railroad owned by the Dominion government, fares have been raised 25 per



**Asks Increase in Freight and Passenger Rates.**—The hearing on the petition of the Ohio Electric Railway for an increase in freight and passenger rates has been set by the Public Service Commission of Indiana for May 8. The company is asking for permission to increase fares on the lines to a basis not exceeding 3 cents a mile for passengers between all stations in Indiana and for authority to increase freight rates approximately 25 per cent between all stations on the railway in the State.

**Seven Cents in Vancouver, Wash.**—The Public Utilities Commission of the State of Washington has authorized an increase from 5 cents to 7 cents in fare on the lines of the North Coast Power Company in Vancouver, Wash., to become effective at once. One of the urgent reasons given for asking the increase is the increasing number of automobiles in use in the city, detracting from the company's revenues. A few months ago, permission was granted the company to raise the fares on the interurban lines to Sifton and Orchards.

**Fare Settlement in Battle Creek.**—Battle Creek's controversy with the Michigan United Railways, Jackson, was settled on April 28. The company is allowed to return to 6-cent fares, but is required to sell nine tickets for 50 cents. There will also be a flat 5-cent fare for workmen between 6 and 8 o'clock in the morning and 5 and 7 o'clock at night. Conductors will be required to carry workmen's tickets. For a week previous to the settlement of the controversy the company charged only 5 cents, but refused to give transfers.

**Agrees to Increase of Interurban Fare.**—On May 3 the City Council of Warren, Ohio, passed a twenty-five-year franchise which grants an increase in fare to the Mahoning & Shenango Railway & Light Company as follows: Between Warren and Niles, from 5 cents to 10 cents; between Warren and Girard, from 10 cents to 20 cents, and between Warren and Youngstown, from 15 cents to 25 cents. Before the franchise becomes effective, however, it must be ratified by the Councils of Niles and Girard and by the Commissioners of Trumbull County.

**Plea for Equalization of Tariffs.**—A petition has been filed with the Public Service Commission of Indiana by the interurban railways operating in Indiana to change the tariffs being used by the lines. The companies ask that they be placed on the same basis of rates as the steam lines. The petitioners are seeking to increase the rates slightly on short hauls and to decrease the rates on long hauls. If the changes are granted they are not expected to increase the operating revenues of the companies. The changes are being sought principally for the purpose of removing discrimination.

**Not Partial to Zone Plan.**—W. F. Ham, president of the Washington Railway & Electric Company, Wash-

ington, D. C., on May 5 reiterated that the company is by no means insistent upon zone charges. It merely has proposed this plan as one of several offering a possible solution of the company's financial difficulties. The company, he stated, has withheld no facts bearing upon its inability to continue furnishing service at the present rates and is willing to leave to the Public Utilities Commission the question of how it shall obtain sufficient revenue to enable it to exist.

**Increased Fares Suspended in Schenectady.**—The Public Service Commission for the Second District of New York at its regular session on April 29 further suspended the effectiveness of proposed increased rates by the Schenectady Railway until May 31, inclusive. Increased fares under suspension are in Schenectady and on the three interurban divisions. The railway has filed a new application for permission to increase its fares in Schenectady from 5 cents to 6 cents. With the application there was filed a certified copy of the ordinance adopted by the Common Council of Schenectady waiving the city's 5-cent fare rights under the existing franchises.

**Service Case Practically Closed.**—The New York State Railways, Rochester Lines, on May 1 practically closed its evidence before the Public Service Commission for the Second District, under the order to show cause which the commission issued relative to increased service in Rochester. Corporation Counsel Cunningham cross-examined Chester G. Brown, an accountant, over various charges and the apportionment to the Rochester city and interurban lines. Mr. Cunningham asked for some additional information along this line which the railway said it would produce at an adjourned hearing in Albany on May 19. The case will be submitted at the next hearing.

**I. C. C. Denies Service Order.**—On the ground that it is without jurisdiction to require increased service even when an increase in revenue is granted, the Interstate Commerce Commission has denied a petition of the city of New Albany, Ind., and others for a rehearing of the application of the Louisville & Northern Railway & Light Company and the Louisville & Southern Indiana Traction Company for an increase in fares. The companies had been granted an increase from 5 cents to 7 cents. The petitioners sought to require them to double the number of motor cars and trailers in use and to establish at certain hours a fixed time schedule.

**Columbus President Not Entirely Satisfied.**—Charles L. Kurtz, president of the Columbus Railway, Power & Light Company, Columbus, Ohio, on his return from Mexico, took up the study of the new ordinance through which the company would be authorized to operate at a fare of six tickets for 25 cents for two years. Mr. Kurtz said that the rate was not sufficiently high to give the people the service they desired

and the company would like to offer. He said figures were being prepared which would show where all the money collected was being expended. Every body would know just what was being done and there would be no need of guessing in the future. A referendum is planned on the six-for-a-quarter fare.

**Eight Cents in Girardville.**—The Public Service Commission of Pennsylvania has announced that "as an emergency measure and for the purpose of giving the company what appears to be the necessary relief" it had granted the application of the Schuylkill Railway, Girardville, Pa., to charge an 8-cent fare, but refused the company the right to sell thirteen tickets for \$1. Instead the railway is to sell seven tickets for 50 cents. The decision was rendered in the complaint of the boroughs of Mahanoy City and Ashland and an application of the company for the right to charge an 8-cent fare. The tariff is to be effective on one day's notice and to run until June 1, 1920.

**Suburban Fares Reduced in Rhode Island.**—Reductions in fares on nine of the suburban lines operated by the Rhode Island Company, Providence, R. I., effective on May 1 were authorized by the Public Utilities Commission in an order issued on April 30, which continues in effect until further order of the commission the rates which have been in force on all other lines. The new rates are, with a few exceptions, the same as were proposed by the Rhode Island Company in tariffs filed with the commission on April 1. As explained in the review of the new fare tariff in the *ELECTRIC RAILWAY JOURNAL* for April 12, page 758, the new rates were offered as a basis for the readjustment of fares on the heavily traveled suburban line. It was suggested that they be tried for three months for the purpose of building up business, as they are lower than the company could offer on the previous volume of business.

**No Fare Action in New York City.**—The Public Service Commission for the First District of New York on April 30 decided to take no further action on the applications of the various surface railways for authority to charge for transfers, because the Board of Estimate is adhering to its decision not to modify the franchises, thus leaving the commission practically without jurisdiction. The commission has felt that the increase in operating expenses should be followed by some concessions in the fare rate, either by a direct increase in the fare, the abrogation of transfers, or a charge of 3 cents for them. It is stated that if the law legislating the present commission out of office had not been enacted some definite steps might have been taken to settle the question of the rate-making power of the commission, but the outgoing commissioners did not feel that they should do anything that might embarrass their successors.

## Legal Notes

### FEDERAL COURTS—*Ruling on Free Transportation of Detectives by Philippine Supreme Court Not Renewable by United States Supreme Court.*

Under Section 248 of the Judicial Code the Supreme Court had authority to review decisions of the Supreme Court of the Philippine Islands (a) where the constitution or any statute, treaty, title or privilege of the United States is involved, or (b) where the value in controversy exceeded \$25,000. Hence, a ruling of the Philippine Supreme Court that a franchise ordinance which required free transportation of members of police department did not apply to detectives with such badges concealed, was held not to come within the jurisdiction of the United States Supreme Court as not falling within the two classes of cases mentioned above. (Board of Public Utility Commissioners vs. Manila Electric Railway & Light Co., 39 Supreme Court Rep., 272).

### CALIFORNIA—*Injury to Person Between Tracks—Contributory Negligence.*

Where, in daytime, a passenger after alighting from a street car, walked around its rear and was injured by being struck by the projecting step of a passing car on the other track, while in a space between the tracks wide enough to permit a clearance of 43 in. between passing cars, she was guilty of contributory negligence as a matter of law, and a nonsuit was properly granted. (Ross et al. vs. Pacific Electric Ry., 179 Pacific Rep. 538.)

### NEW YORK—*Negligence of Pedestrian Held Responsible in Spite of Ordinance Violation.*

One who alighted from a street car, stood until the car had gone 30 ft., then started to cross the street, looking and listening when he could see about 40 ft., and then crossing the opposite track, where he was struck by a car going 20 m.p.h., was negligent, although there was an ordinance requiring street cars to reduce their speed to 5 m.p.h. while approaching and passing a standing car. (Schasel vs. International Ry., 571 New York Sup., 571.)

### NEW YORK—*Orders of Public Service Commission Must Be Executed.*

Where the Public Service Commission directed a company to install an interlocking signal device at a crossing and there was long delay in enforcing the order, and the price of materials had greatly increased, compliance with the order will be compelled by mandamus, despite the company's claim of financial inability. (Public Service Commission, Second District, vs. International Ry., 174 New York Sup., 708.)

### NEW YORK—*The Raising of Trolley Wires to Let a High Obstruction Pass.*

A street railway cannot interfere with the reasonable use of the street by others, even where such use involved temporary obstruction of traffic or interference with wires, as by the moving of a pile driver 16 ft. high. Where the company was informed that such an obstruction could not pass across the street without coming in contact with trolley wires, and sent a wrecking gang of men to raise the wires, such a gang was not a mere "volunteer," but was performing a legal duty and would be liable for injuries due to negligence in undertaking to raise the wires to prevent contact as the truck passed under them. (Chace Trucking Co. vs. Richmond Light & Railroad Co., 122 Northeastern Rep., 210.)

### NEW YORK—*Collision Because Motorman Lost Consciousness Not Negligence Per Se.*

Where a street car motorman fainted in his cab and caused a collision, the responsibility of the company for the motorman's failure to exercise reasonable care must be determined in the same manner as any other question arising in the course of the motorman's employment. (Goldman vs. New York Rys., 173 New York Sup., 738.)

### WISCONSIN—*Reservation of Certain Cars for Interurban Traffic Held Reasonable.*

A regulation of an electric railway company reserving interurban cars for interurban traffic only and excluding city traffic therefrom, was held to be a reasonable one, such a system having been approved by the Railroad Commission. (Campbell vs. Milwaukee Electric Railway & Light Co., 170 Northwestern Rep., 937.)

### WISCONSIN—*Company Not Responsible for Injury to Workman Near Track.*

Where a laborer working near the tracks of a street railway was injured by a passing car and neither his duties nor any obstruction of view prevented him from seeing the car, his failure to keep a proper lookout was negligence preventing recovery. (Yellick vs. Milwaukee Northern Ry., 170 Northwestern Rep., 941.)

## New Publications

### Industrial Safety Codes

Report of conference at the Bureau of Standards, held on Jan. 15, 1919. United States Bureau of Standards, Washington, D. C.

This pamphlet contains a brief report of the conference and a proposal for the organization of an American Standards Association.

### Saving Coal in Steam Power Plants

Reprint of Engineering Bulletin No. 2, prepared by the United States Fuel Administration in collaboration with the Bureau of Mines. Five cents per copy. Address Superintendent of Documents, Government Printing Office, Washington, D. C.

A practical little pamphlet which should be in the hands of every man responsible for the operation of any part of a steam power plant.

### Thirty-fifth and Thirty-sixth Annual Reports of New York Electric Railway Association

Published from the office of the secretary of the association, Rochester, N. Y.; 275 pages.

This volume just issued contains the proceedings of the annual meetings on June 27, 1917, and June 22, 1918, the quarterly meeting of March 2, 1917, and the special meetings of Dec. 13, 1917, and April 29, 1918.

### Combustion and Flue Gas Analysis

Technical Paper 219 of the United States Bureau of Mines, reprint of Engineering Bulletin No. 4 prepared by United States Fuel Administration in collaboration with the Bureau of Mines. One copy free from the Bureau of Mines, other copies at 5 cents each from the Superintendent of Documents, Government Printing Office, Washington, D. C.

This bulletin contains practical information based on an article by Joseph W. Hayes, combustion engineer, and is in the nature of a set of directions for securing efficient fuel combustion.

### Industrial Electrical Measuring Instruments

By Kenelm Edgcombe, D. Van Nostrand Company, 25 Park Place, New York, N. Y. 414 pages. Illustrated, cloth, \$5. net.

This is the second edition of the author's book and it includes very considerable revisions from the original text. The subject of electrical measurements is covered with due regard for theory, but without complicated mathematics. There is little of detail regarding commercial instruments, although a number of such devices are described by way of example. These examples are, however, all drawn from British practice.

### Analysis of Tests of Rigidly Connected Reinforced Concrete Frames

Bulletin 107, University of Illinois Engineering Experiment Station, Urbana, Ill. Copies may be had without charge from the station.

This bulletin gives the results of a series of tests conducted to obtain experimental information on stresses in the reinforcement and the concrete, the continuity in the composing members of a frame, the locations of sections of critical stress, the reliability of a reinforced-concrete frame and the applicability of the theoretical formulas in the design of frames. The following cases have been analyzed for vertical load: Single-story frame, single-span; single story, three-span; trestle bent with tie, single-span; building frame with several stories and several spans, and bridge trestle. For horizontal load, single story, single-span; octagonal reservoir or tank, and rectangular reservoir or tank have been analyzed.

## Personal Mention

Lewis Nixon, State Superintendent of Public Works of New York, has been appointed by Governor Smith to be Public Service Commissioner for the First District of New York (Greater New York) in charge of regulation. Mr. Nixon was born at Leesburg, Va., fifty-eight years ago. He was graduated from the Naval Academy in 1882 at the head of his class. He served on the staff of the chief constructor of the navy, being detailed to Cramp's, Philadelphia, and to the Navy Yard in New York. He afterward had his own yard at Elizabeth, N. J. As a naval constructor, Mr. Nixon designed the Oregon, and the Indiana and the Massachusetts. Mr. Nixon was a member of the East River Bridge Commission in charge of the construction of the Williamsburg Bridge. He won national fame as the man who built the first really big battleship of the American Navy, the Oregon. For a time he was leader of Tammany Hall.

Joseph E. Dozier has resigned as general manager of the Nahant & Lynn Street Railway Lynn, Mass., to become sales manager of the Northway Motor Organization Company of Boston and Natick, Mass. Mr. Dozier entered the traction field only fourteen years ago. He was born in Barnesville, Ga., in 1867, and was reared in Macon, Ga., graduating from Planters' Academy in 1886. In his boyhood he was employed as night operator by the Southern Bell Telephone & Telegraph Company for five years. This experience led to his appointment as an exchange manager soon after leaving school. He remained with the Southern Bell Company until 1894, when he was called to Boston by the New England Telephone & Telegraph Company. He served as manager of various exchanges until 1905 when he resigned to become associated with the Nahant & Lynn Street Railway, which he constructed and has operated ever since. He was elected president of the New England Street Railway Club at the annual meeting of the club last March.

Joseph F. Berry has resigned as attorney for the Connecticut Company New Haven, Conn., to engage in private practice in Hartford. Mr. Berry spent practically all of his time, since graduation from college, as attorney for street railway corporations. He was born on Feb. 13, 1880, in Boston. He attended the public schools in Boston and was graduated from Tufts College in 1901 with the degree of A. B. He was graduated from Harvard Law School in 1904 with the degree of LL.B. Mr. Berry entered the office of Choate, Hall & Stewart, Boston, in July, 1904, where he was principally

engaged in preparation and assistance in defense of personal injury actions against the Boston Elevated Railway, the New York, New Haven & Hartford Railroad and the Boston & Albany Railroad. On Oct. 1, 1907, he resigned to accept the position of assistant attorney of the New York, New Haven & Hartford Railroad in New Haven. He engaged in the trial of cases for the railroad and affiliated companies in Connecticut until March 1, 1914, at which time the Connecticut Company was separated from the New York, New Haven & Hartford Railroad. He was appointed attorney for the Connecticut Company, the New York & Stamford Railway and the Westchester Street Railway on March 1, 1914, and acted as such in trials in all counties of Connecticut. During the last two years he did much general legal work. Mr. Berry was admitted to the Massachusetts Bar in February, 1904, at Boston; the Connecticut Bar November, 1907, at New Haven and the United States Supreme Court Bar in October, 1910, and also is a member of the Bar of the United States District Court and the Circuit Court of Appeals for New York District.

## Obituary

### George O. Nagle Dead

George O. Nagle, who for twelve years up to November, 1915, had been general manager of the Wheeling (W. Va.) Traction Company, died at his home in that city on April 15. Death was due to complications from stomach trouble. At the time of his death Mr. Nagle was city manager of Wheeling. He was the first incumbent of that office and was elected to it in June, 1917, when Wheeling adopted the city manager form of government.

Mr. Nagle was born in Milton, Pa., on Dec. 31, 1868, and moved to Chicago in 1886. Shortly after this he entered the employ of the Chicago, Burlington & Quincy Railroad, serving first in the ticket auditor's office and later in that of the general auditor. In February, 1891, he entered the employ of the Chicago City Railway as junior in the claim department. Six months later he was promoted to the position of private secretary to the superintendent, and in 1898 was appointed superintendent. After he resigned from the Chicago City Railway he became connected with Stone & Webster, first as manager of the Savannah (Ga.) Elec-

tric Company and later in general charge of the properties of this firm in the Southeast. He left the Stone & Webster interests to go to Wheeling in 1903.

Mr. Nagle's ability as a railway manager soon became appreciated in Wheeling and not only brought about good public relations and improvement in the service, but led to his active participation in many civic enterprises. Thus he became an influential member of the Board of Trade, entered the Playground Association and at the time of the Panama-Pacific Exposition was appointed by the Governor a member of the State Exposition Commission. Shortly after leaving the traction company in 1915 he was elected president of the Morris Plan Bank and also president of the West Virginia Manufacturers' Association. His work as city manager was attended by many reforms and economies. In referring to his death the *Wheeling Majority* said, in part:

He could have been a millionaire. Men with much less mental equipment have made much more. But he chose instead to serve others instead of himself. He viewed the city government not as a pension list or public corral but as a public utility, designed to do collectively for the people the things they could not do for themselves. His example of public service cannot help but live.

Thomas B. Jennings, shop foreman for the Texas Electric Railway at Sherman, Tex., was killed by an automobile recently. Mr. Jennings was supervising some track work in front of the company's carhouse in Sherman when he was struck by a passing automobile. Mr. Jennings suffered a fractured skull and other injuries to which he succumbed in a few hours.

Charles Andrew, president of the Electric Railway Equipment Company, Cincinnati, Ohio, is dead. Mr. Andrew, was born at Cincinnati, Ohio, on Feb. 14, 1850. He was a son of Peter Andrew, long identified with the business life of Cincinnati and at one time vice-president of the Chamber of Commerce. Early in his career Charles Andrew was connected with the grain business. He was, however, greatly interested in electricity and with the introduction of electric traction in the early nineties became identified with his brothers in the manufacture of tubular steel street railway poles. With this as a beginning the business was gradually extended to include overhead line material and electric light poles. With the introduction of a patent wirelock swedged joint the business in steel poles greatly increased and there are now few cities in this country or foreign countries where poles with this type of joint are not now well known. Some two years ago Mr. Andrew's failing health compelled him to give up an active participation in business. His health continued to fail and on April 29 he died. In his death the electric railway business loses a pioneer manufacturer and one of the most popular men connected with the production of electric railway materials.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,

SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

## Italian Railways Desire American Equipment

**Water Powers Easily Developed—Credit System Must Be Substituted for Present Cash Transactions**

Before the pressure of war required Germany to curtail her output of electrical machinery for commercial purposes, Italy purchased most of its electrical power-house machinery and railway supplies from that country. When new railroads or traction systems were projected the Italian government, principally or municipality issued subsidies for the work. Much of the capital needed was raised by the territory affected and in many cases the remainder came from Germany.

A single German bank for financing projects of electrical power houses only loomed the required balance of capital and supplied the electrical machinery through the German manufacturing companies. Thus the Italians, with a certain amount of capital, were enabled to secure sufficient credit to carry out their electrifications. And the machinery came from Germany and the lien on the property was held by Germany.

### AMERICAN CREDIT WANTED

To-day the Italians are seeking credit in the United States, a prominent Italian engineer who is in this country told a representative of the **ELECTRIC RAILWAY JOURNAL**, to enable them to construct new traction systems and electrify existing steam lines through the use of American equipment. It has been stated that the cash basis of Americans has been and now is keeping back needed electrifications. A suggestion has been made that an American bank be organized to extend credit on electrical machinery to Italy; 50 to 70 per cent of the total investment has been mentioned as the amount of capital which the Italians could normally invest in the project, while the balance would be necessary in credit from this bank.

Many municipalities in Italy are now connected with light steam lines. The operation of these lines, it has been stated, is almost impossible. Coal is high, the wood substituted for it is green and poor burning and the equipment is in bad repair. Water power is abundant and about 2,000,000 hp. is so available as to make its harnessing a simple task.

Of the many industrial enterprises directly damaged by the war, electric power plants suffered to the extent of approximately \$5,000,000. This industry is third in the list, having been surpassed by cotton and silk mills.

## Open Market for Iron and Steel

**Lower Prices for a Short Time May Result, but Prices Later Will Be Higher**

As has been confidently expected for some time the plan of the Industrial Board to stabilize steel prices by fixing minimums for the current year has failed. The steel producers and the representatives of the Railroad Administration were not able at their meeting on Thursday to agree on minimum prices following the refusal of the Railroad Administration to accept the prices earlier agreed upon by the steel producers and the Industrial Board. The Railroad Administration held out for more than \$3 a ton less for Bessemer rails than the price in the Industrial Board schedule. An open market for iron and steel products now exists. The Railroad Administration is to ask at once for competitive bids on 200,000 tons of rails.

By this action the stage is once more set for big business. Ever since the refusal of the Railroad Administration to accept the minimum prices first agreed on, buying and construction have been held back in large measure. Now that a free market governed once more, after a lapse of many, many months, by the fundamental economic law of supply and demand, exists, a greater volume of business can be expected.

Prices of steel products including rails are, as a result of the meeting, in a peculiar position. The steel producers, it must be remembered, did not state that they would not sell for lower prices but that they would not agree to sell at these lower prices for the balance of the year.

Looking at the situation from every angle the most natural thing to expect is lower prices for iron and steel. In order to stimulate buying there is every reason to believe that the mill operators will accept orders at prices under the cost to produce. Just how far steel men will go in price cutting depends on the rapidity with which buying responds and the need of the individual producer for business.

One thing is certain—lower prices will not prevail for long. Just as soon as the producers are convinced that buying is opening in a substantial way, prices will stiffen. Before the year is over prices for iron and steel, according to present indications, will reach a level higher than the present.

From late in the year on the prices of iron and steel can be expected to fluctuate with a general tendency downward.

## Hewn Tie Prices Expected to Go Higher

**Electric Railway Market Affected by Government Demand—Labor Conditions Better**

The market for hewn ties for electric railway work is influenced to a great extent by the demands of the steam railroads for that same product. At the present time the demands of the government-controlled roads are not being met by the producers of hewn ties. One manufacturer of ties states it as his belief that not one railroad in the country has sufficient supply to take care of its renewals. This manufacturer has notified his best customers that the tendency of hewn tie prices is upward, and that they should anticipate their summer needs and order sufficient for several months' supply by the first of June.

He attributes this rise in price to the small supply available. The government needs more ties for its roads than are now being supplied, and in order to stimulate production he anticipates that the government will offer a slightly higher price to the manufacturer.

This would probably be in the nature of a 5 cent or 10 cent increase per tie and possibly will be applied before the present month is out. The practice of the government has been to notify the manufacturers that it would pay a certain price over a given period, and it has step by step advanced these prices from time to time.

### LARGE SUPPLIES NEEDED

The same tie is used for electric as for steam roads, and the same price changes will apply. In normal times about 70 per cent of the tie business is for renewals, while the 30 per cent is for new work. At present new work has dwindled to practically nothing. Orders are coming in in the neighborhood of 10 to 40 per cent of normal for renewals. This means that both steam and electric roads, principally the latter, are not keeping their roadbeds in shape. Some roads have not placed orders for two years. Consequently, when those roads do buy ties they will have to buy for a large portion of their track.

In the Southern tie camps labor conditions have improved in the last two months. The large number of hewers who left the industry short handed when the army attracted their attention have returned to civilian life and taken up their former work. Deliveries are consequently much improved and are expected to continue so.

## American Rails for British Traction System

City of Birmingham Orders 2200 Tons  
—Price and Delivery Influencing  
Factors in Placing Order

The City of Birmingham, England, after inviting bids on material for replacing its street car rails, finally decided to place its order in American hands. The first quantity of 1000 tons was followed by an order for 1200 tons, and this material has now been shipped. When the British firms lost the contracts protests were so numerous that the municipal government issued an official statement.

One of the British bidders, it was explained, agreed to begin delivering fifty tons a week in April, but would not consent to a penalty clause for non-delivery; the other promised 1200 tons within twenty weeks. The firm in the United States agreed to complete delivery by the end of May and quoted a lower price than either of the British manufacturers. The price and the fact that the authorities were anxious to complete the work this year were the influencing factors in favor of the American bidder.

## Decline in Price of Controller Fingers and Segments

A prominent manufacturer of controller fingers and segments advises that prices of these articles of maintenance declined early in April. Although the traction companies are continuing sufficient sales to keep their controllers in running shape there has been no noticeable increase in purchasing.

Sufficient raw materials are stocked to care for increases in buying, and deliveries can be made for any quantities in about three weeks.

## Rolling Stock

Denver & South Platte Railway, Denver, Col., announces the purchase of two safety cars from the American Car Company for June 1 delivery.

Quincy (Ill.) Railway will soon install twenty-five new one-man cars of the latest type. These cars will permit a five-minute service from the Soldiers' Home and a ten-minute service on State Street and Broadway and Tenth Street. The new cars will cost \$6,000 each.

Manufacturers' Railway, St. Louis, Mo., it is announced, has ordered six electric locomotives, of which two have been delivered, for the 24 miles of terminals now being electrified. These locomotives are capable of drawing forty loaded cars at 15 m.p.h., and are said to have cost \$300,000.

Central Illinois Public Service Company, Paris, Ill., will soon install three new pay-as-you-enter cars on the city line in Paris, it is reported. The cars will be one-man units with safety ap-

pliances and air-equipped doors and brakes, and they will be 28 ft. long and 8 ft. wide. The seating capacity will be thirty-two, with benches crosswise.

## Recent Incorporations

Dayton & Tennessee Railway, Dayton, Tenn.—Incorporated to build a short line in Dayton. Capital stock, \$10,000. Incorporators: J. S. Frazier, E. M. Williamson, Jake Benkovitz, A. P. Haggard and W. H. Jones.

Richmond & Ashland Railway, Richmond, Va.—The State Corporation Commission has granted a charter to the Richmond & Ashland Railway to operate the line of the Richmond & Chesapeake Railway from Richmond to Ashland. Capital stock, \$300,000. Officers: Jonathan Bryan, Richmond, president; D. R. Midyette and W. L. Foy, both of Ashland, vice-presidents, and Oliver J. Sands, Richmond, secretary and treasurer. It is expected that operation of the line will be begun soon.

## Franchises

Petaluma, Cal.—The Petaluma & Santa Rosa Electric Railway has asked the City Council of Petaluma for a franchise to construct an extension of its lines in that city for freight business.

Covington, Ky.—The South Covington & Cincinnati Street Railway has been granted a twenty-year franchise by the City Commissioners of Covington for the use of Rosedale and Latonia Streets.

## Track and Roadway

Pacific Electric Railway, Los Angeles, Cal.—Preliminary work has been begun by the Pacific Electric Railway for the construction of the proposed extension of its La Rambla system. The work will include an extension north of the present terminus in Bandini Street, San Pedro, to the canyon located in the northern section of the Peck properties.

Denver & South Platte Railway, Denver, Col.—Improvements are being planned by the Denver & South Platte Railway to its system.

Quincy (Ill.) Railway.—The Quincy Railway plans to expend \$100,000 for general improvements in Quincy.

Worcester (Mass.) Consolidated Street Railway.—To relieve traffic congestion at Main and Front Streets the Worcester Consolidated Street Railway proposes to construct a loop from Main Street through Madison, Portland and Franklin Streets, back to Main Street.

Manufacturers' Railway, St. Louis, Mo.—It has been announced that the Manufacturers' Railway, which controls 24 miles of terminals in South St. Louis, will be operated with electric

motive power within the next few weeks. Power will be obtained from the hydro-electric plant of the Mississippi River Power Company, Keokuk, Iowa.

Northern Ohio Traction & Light Company, Akron, Ohio.—During this year the Northern Ohio Traction & Light Company plans to construct a single track on Navarre Road from Garfield Avenue to Bryan Avenue SW and on Bryan Avenue and Twenty-second Street SW to the Canton Sheet Steel Company, a single track on Cleveland NW, a single track on Sixth Street SW and a single track on Fourth Street NW. The company also plans to build a Y at the end of Sixth Street and a siding on Tuscarawas Street.

Dominion Power & Transmission Company, Hamilton, Ont.—The Street Railway Committee of Hamilton contemplates the extension of the tracks south on Queens Street to Aberdeen, west to Dundurn Street, north to Charlton Avenue and east to the line on Locke Street.

Fort Worth Mineral Wells Interurban Co., Fort Worth, Tex.—The construction of the interurban line from Fort Worth to Mineral Wells, a distance of about 60 miles, is assured, according to H. E. Robinson, chairman of the executive committee of the Fort Worth-Mineral Wells Interurban Company. The line will be begun at Fort Worth and the 10-mile stretch to Lake Worth will be built at once. It is announced that this line will be in operation by the end of August. It is planned to use the tracks of the Northern Texas Traction Company to the end of the Rosen Heights car line, which will leave about 4½ miles to the lake. The company has been granted franchises through the cities of Weatherford and Mineral Wells [May 3, '19].

Seattle (Wash.) Municipal Railway.—Permanent improvements and additions to the Seattle Municipal Railway are provided for in an ordinance prepared by Corporation Counsel Meier, at the request of Thomas F. Murphine, Superintendent of Public Utilities, authorizing the sale of \$520,000 in utility bonds. The ordinance has been introduced in the Council, and referred to the Finance and City Utilities Committees. Among the improvements proposed are the double-tracking of the Fauntleroy line on Avalon Way, the connection of the East Union with the Madrona lines at Thirty-fourth Avenue; extension of Division Avenue across Pine Street; extension of lines on south approach to Ballard bridge. If the ordinance is passed, it is proposed to provide money to start the work immediately by a loan to the street railway construction fund, and to pay it back when the bonds are sold.

Ohio Valley Electric Railway, Huntington, W. Va.—Plans are being made by the Ohio Valley Electric Railway for the construction of an extension to be known as the South Side line. Under the provisions of the franchise, the line

must be completed not later than one year from the signing of the peace treaty, and it is believed that work on the new line will be begun before the middle of the summer.

### Power Houses, Shops and Buildings

**Georgia Railway & Power Company, Atlanta, Ga.**—It is reported that the Georgia Railway & Power Company plans additional water power development on the Tugaloo River.

**Decatur Railway & Light Company, Decatur, Ill.**—The Decatur Railway & Light Company has leased a tract of land 125 ft. x 500 ft. on Wood Street, just west of the Illinois Central Railroad, where the company will erect a new carhouse and shops. Upon the completion of these buildings the company will abandon practically all of their shops and other buildings in the city, with the exception of one warehouse.

**Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.**—According to an announcement made by Britton I. Budd, president of the Chicago, North Shore & Milwaukee Railroad, the company contemplates the removal of its terminal from Highwood to Waukegan and the construction of repair shops and switches at an estimated cost of about \$100,000.

**New Orleans Railway & Light Company, New Orleans, La.**—A new 15,000-kw. turbine capable of producing 20,000 hp. is being installed at the central power station of the New Orleans Railway & Light Company in Market Street.

**Cumberland Railway & Power Company, Fayetteville, N. C.**—Plans are being made by the Cumberland Railway & Power Company for the erection of a hydro-electric power plant at Fayetteville, with an initial capacity of about 3000 hp.

**Northern Ohio Traction & Light Company, Akron, Ohio.**—The Northern Ohio Traction & Light Company proposes to erect a new transmission line from Canton to Akron.

**Montreal (Que.) Tramways.**—It is reported that the Montreal Tramways contemplates the construction of a new substation at Cartierville.

**Lee Valley, Tenn.**—It is reported that John N. Adams, engineer, proposes to construct a hydro-electric plant and railway.

**Texas Power & Light Company, Dallas, Tex.**—Plans are being made by the Texas Power & Light Company for the construction of a power station at Strawn.

**Monongahela Valley Traction Company, Fairmont, W. Va.**—The United States Engineering Department has granted permission to the Monongahela Valley Traction Company to construct a new high-tension transmission line over the Monongahela River near Hoult, W. Va.

### Trade Notes

F. X. Cleary has resigned as manager of the New York office of the Electric Service Supply Company, 50 Church Street, and is succeeded by Randolph Mann.

Buda Company, Harvey, Ill., announces that F. W. Marvel has again joined the sales force of the company, and will be located at its New York office at 30 Church Street.

Briggs & Turivas, Inc., Chicago, Ill., announce that they have opened a New York office at 1805 Equitable Trust Building. This office will be under the direction of the company's president, Carl R. Briggs.

Terry Steam Turbine Company, Hartford, Conn., announces the appointment of R. L. Thomsen as sales manager. Previous to his appointment Mr. Thomsen was manager of the marine department for the Griscom-Russell Company.

Van Dorn & Dutton Company, Cleveland, Ohio, manufacturers of gears, has opened branch offices at New York and Chicago. At both cities it is the company's purpose to specialize in gears and pinions for electrical work. Harry F. Keegan, formerly with the Chicago Surface Lines, will manage the Chicago branch with offices at 1241 First National Bank Building. His brother, John Keegan, will manage in New York with offices at Room 317, 30 Church Street. The latter comes from the Interborough.

**Engineer Material and Equipment in A. E. F. Depots.**—The War Department News Bureau announces that the articles showing increase from Nov. 1 to March 1 are as follows: switches and fastenings, narrow gage, from 382 to 490 tons; narrow gage rails from 19,500 to 22,300 tons; copper wire and cable from 91,300,000 to 114,000,000 ft. Decreases were noted as follows: electric generators from 881 to 450; 60 cm. mfd. track from 6350 to 5430 tons; 80 lb. and 67½ lb. rails from 55,500 to 47,300 tons; standard-gage switches and fastenings from 9020 to 7180 tons.

Adams-Bagnall Electric Company, Cleveland, Ohio, announces the appointment of R. E. Uptegraff in charge of its transformer department. Mr. Uptegraff was with the Westinghouse Electric & Manufacturing Company seven years, where he had charge of turbine and switchboard operation and was connected with the manufacture of motors, generators and transformers and their accessories. He was also active in transformer designs. His five years with the Pittsburgh Transformer Company as assistant chief engineer were occupied with much transformer design. For two years Mr. Uptegraff was consulting engineer for Rutherford & Uptegraff, in which capacity he still acts, and during this time he redesigned and reorganized the transformer department of the Packard Electric Company.

**Box for Exporting Electrical Insulators.**—A new type of crate for shipment of insulators for high-voltage transmission lines has recently been developed by the Forest Products Laboratory of the United States Forest Service at Madison, Wis. The work was done at the request of one of the large manufacturers of electrical goods whose containers had failed to prevent breakage of contents in spite of the apparent strength and durability of the container itself. The redesigned crates were subjected to severe tests and breakage of the insulators was eliminated. Moreover, it was stated, the container proved under test to be 100 per cent stronger, to occupy 15 per cent less space and to save 15 per cent in the cost of material. It is understood that this new type of package will be used to ship thousands of insulators to China for the construction of electric power lines.

### New Advertising Literature

**Exell Manufacturing Company, New Haven, Conn.**: New catalog of ticket punches.

**Hickey & Schneider, Elizabeth, N. J.**: Bulletin No. 11 on high-tension air-break switches.

**Mitchell-Rand Manufacturing Company, 18 Vesey Street, New York City**: A folder cataloging Hope electrical tapes and webbings.

**American Steam Conveyor Corporation, Chicago, Ill.**: Illustrated bulletin on reducing ash-disposal costs, showing a number of typical installations of the steam jet ash conveyor.

**Portable Machinery Company, Inc., Passaic, N. J.**: A twenty-page folder "Over 1000 Scoop Conveyors." Illustrations show the various uses of the conveyors and describe the features of the machines in storing, reclaiming, loading and unloading coal, coke, ashes and other kindred material.

**Guaranty Trust Company, New York, N. Y.**: A comparative yield indicator for use in the Victory Liberty Loan campaign. This device enables one to tell at a glance the income value of tax-exempt securities as compared with those subject to the Normal Federal income tax and surcharges of 1919. By use of it the investor can determine, without calculation, the yield which would be required from fully taxable investments to give the same net return as tax-exempt investments.

**Green Engineering Company, East Chicago, Ind.**: A complete catalog covering its stoker and furnace equipment. Besides being well illustrated, this book contains considerable engineering information, including cross-sectional drawings of settings for burning coal under various conditions, tables showing analyses of the coal of the world, information on stoker improvement, with particular reference to rear drums, chain skids, air-sealing systems, "Seal-flex" arches and pressure waterbacks.