

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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Volume 56

New York, Saturday, August 7, 1920

Number 6

Another Zone System Gone by the Board

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NEW YORK
PUBLIC UTILITIES COMMISSION OF CONNECTICUT

THAT the plan of the Connecticut Company and the Public Utilities Commission of Connecticut to return to a flat 7-cent fare is a blow to the zone system in this country will be denied by no one. Frankly we are sorry to see events take the turn that they have had to take in the affairs of the Connecticut Company. Particularly, after the abandonment of the zone system in New Jersey, its discontinuance in Connecticut is doubly serious, from the standpoint of those who would like to see a fair tryout in this country.

There must be a reason for this move and we believe every one in the industry, for or against a distance-tariff system in theory, is interested in what explanation may be found and what lessons may be learned.

There are, of course, many difficulties in the analysis of a problem as complex as the fare, the gross and the net of a complete and varied system such as the Connecticut Company, especially when it is at the same time experiencing severe and unregulated jitney bus competition. But there are a few points in this case which are worth the attention both of the industry and of the commissions charged with the regulation of the various companies.

In the first place, it will be recalled that the Connecticut Company, to avoid a higher flat rate fare than its 6-cent fare then in effect, installed last November a zone system of its own devising with zones of different length, depending on traffic and other features, and, on the whole, quite logical. The company prepared the public and its employees and the system was put in operation with surprising smoothness. There was but little dissatisfaction except that ever present human feeling of all of us against paying any more for any thing.

The second step was taken six months later, when the Connecticut commission, in response to complaints from suburban riders, imposed a zone system of its own on the company, making all zones equal in length. While the cash fare per zone was raised, this was tempered by the introduction of a reduced rate ticket and still further made unproductive and complicated by certain special commutation rates.

The change was an unfortunate one, as we pointed out at the time (May 1), first, because it upset a system which, if not perfect, was at least working fairly well and, second, because it substituted therefor a distance-tariff plan which was unsound in that it both complicated fare collection and was based on the theory of equal fares for equal lengths of ride, irrespective of other variables. We referred to the order at the time, also, (May 1 and 15), as one which appeared to exceed the bounds of supervisory regulation and assume more the phases and responsibilities of management.

The results during the latter half of May and all of June and July showed, according to Connecticut Com-

pany officials, a reduction of income below the corresponding period of last year, whereas under its own zone system the company had been enjoying an increase of from 17 to 23 per cent over corresponding months of the previous year and had hopes, at least, of eventually realizing a satisfactory net revenue. To add to the fare troubles, the jitneys and buses have increased manyfold, with corresponding inroads on the legitimate revenue of the railway.

Of course no one can say definitely that the earlier zone system would have proved an entire financial success, or been wholly satisfactory from an operating standpoint. It had undeniably certain elements of weakness. But for the period in which it was in use it had yielded good returns, and it was fairly easy to operate.

Finally, with so many changes in fare systems in so short a time, and with a large part of the public, with the existing zone system before it, complaining against a zone system, it is not perhaps surprising that the company, when it had to change again, decided last week to ask a return of what is practically its original system, using 7 cents in place of 5. The details of this system are given in the news columns this week.

There are two lessons in this story. One is that a zone system, to work in this country, must be right and must be administered correctly. We think the Connecticut Company's own system at least approached this condition. The other is that regulating commissions should regulate, *i.e.*, supervise, check and advise, but they should be very slow to require the adoption of unusual and experimental methods of operation, in view of the fact that they cannot assume financial responsibility in case of the failure of such plans. Much as we admire personally and professionally the Connecticut commission, we believe in this case it committed an error. It has tried to right it by granting the present 7-cent fare application of the company, but meanwhile the zone system dies without fair trial.

We are not unmindful of the other elements of the zone fare argument pro and con. This is not England. American cities have grown on the flat fare basis, though Australia has successfully made the change. People here live far from their places of employment and amusement, and one traffic route doesn't pass through several distinct communities as is common in Europe. The psychology of the public is an important element.

But income measured in dollars must go up. An increase in flat fares causes increasing private automobile traffic; it meets the opposition of those whose income has not increased in proportion to the average; it meets jitney bus competition, etc., so it seems quite logical to try to adapt to our conditions a system of charge which retains the low short-haul fare and yet fairly charges the entire riding public in such a way that the total revenue will permit satisfactory continuance and growth of service. A zone system can do this.

The Swiss Are Unique in Both Engineering and Finance

WALL Street was awakened recently by the call from across the water for a twenty-year, 8 per cent \$25,000,000 bond issue for the further electrification of the Swiss Federal Railways. The high interest rate is significant. Would that American railroads might obtain loans as readily and that their net income might prove sufficient to pay 8 per cent on such an issue. Government control might assure the proper gross revenue as a result of arbitrary and immediate increase of rates, but experience during the war with soaring operating costs under government control indicated that such a solution would not produce the necessary net return. The Swiss government evidently did not profit greatly by its national credit, but paid the market price for the accommodation. The interesting feature of the deal to railroad officials is the fact that the loan was made under what would normally be considered adverse circumstances in order to reap the rewards of electrified operation and further development of water powers.

But the activities of Swiss engineers are of interest as well. In this issue some rather unique features of heavy traction are described. The determined stand taken by Swiss and Italian engineers years ago in favor of single-phase high-voltage trolley operation is further confirmed by the rather extensive addition which is now being made to their locomotive equipment. The successful solution of the problem of regenerative braking in connection with single-phase energy supply, as indicated by the engineers responsible for the designs, represents no small portion of their pioneer work.

Swiss engineers have apparently standardized the intermediate geared shaft which in turn operates the drivers through the agency of connecting rods. This is in marked contrast to the return to direct drive which has been adopted for similar service upon the new locomotives for the Chicago, Milwaukee & St. Paul Railroad. Although it is true that gear reduction and even combinations of gears and side-rod drive are in use in this country, particularly for heavy freight service, the complicated arrangement described herein which is used upon the foreign locomotives would seem to have the disadvantages of more parts to disturb the schedule as well as higher repair and maintenance costs.

The apparent solution of the gear problem by the Swiss was especially interesting. *Engineering* of London for May 28, 1920, publishes a very complete analysis of the gear troubles encountered upon the early locomotives and the method of eliminating them. In a nutshell, it seems that the two motors geared to a single countershaft were found to be swinging in a pendulum-like fashion about the countershaft as a center, thereby producing tremendous strains upon gear teeth, frame and connecting rods. After extensive tests, confirmed by calculations, a new split herringbone gear was substituted with a separate forged steel rim provided with eight radial springs. This rim is free to move about the periphery of the spider upon which it is mounted. The problem was solved, but more expensive parts were added as the result.

Thus it appears that in both financial and engineering matters the solutions of railway problems adopted by our European friends seem complicated and expensive to American engineers. However, results are being accomplished, and accomplished rapidly. An occasional reference to their methods may therefore be refreshing.

The Increase in Railroad Rates, the Interurbans and Electrification

THE Interstate Commerce Commission has spoken. And it has spoken in a manner which should bring satisfaction to every one in the transportation business. We believe the public on the whole is glad to see the railroads get a living revenue and is now chiefly concerned in seeing that the increase is not passed on five or ten fold in increased prices:

For electric railways we see two distinct benefits, even though most electric traction lines are not directly affected by the order.

One of the benefits is in the question of traction rates. There is bound to result a different psychology in transportation rates as a whole. After long study the most important rate commission in the country not only declares steam rates are too low but gives to the electric roads within its jurisdiction the right to increase their freight rates and tacitly approves also an increase in their passenger rates by saying that its order "is not to be construed as an expression of disapproval of increases, made or proposed in the regular manner, in the passenger fares of electric lines." In other words, the commission realizes that relief for the electric passenger rates will have to come largely from the individual state commissions, but promises that it will not oppose reasonable advances in interstate fares.

Undoubtedly, also, the form in which the advance for the steam roads was recommended is better for the electric lines than if all of the increase in income had been placed on freight. The latter policy was strongly advocated by a number of trunk line officials. This suggestion, however, was not accepted by the commission, and the authority to increase (in the Eastern group) passenger fares by 20 per cent and freight rates by 40 per cent with somewhat lower freight charges in the Southern, Western and Mountain Pacific Groups followed. This means, if the passenger fares are increased according to the ruling, that interurban railways will have a considerable margin in cents per mile to increase their fares until the two are equal.

Again, the principle of valuation as a basis for utility rates is helped by the decision. In fact, the rates are granted primarily upon tentative valuations made by the commission, which, incidentally, are found by groups of roads to be not greatly different from the book costs as shown by the carriers.

Another phase of the increase which is of electric railway interest is that it should advance the cause of trunk line electrification. It has been said for some time that most steam railroad officials with electrification projects did not need to be convinced of the advantages of such a step. What they needed was money, and money should now come. That the credit condition of the roads will be immediately improved seems certain. As a result it should be possible to realize some long-cherished desires to gain the many benefits of electrification.

And there is more than a mere opportunity to carry through some electrification plans. There is also a duty to do this. While the present recognition of the transportation problem may be tardy it has, at least in part, come, and the transportation world now owes it to the public to put into operation all the economies and better service features which the public has been told could not be accomplished without more money and which the public will expect now that more money is available. One of these benefits is proper electrification.

Lord Ashfield's Survey and Solution

ALTHOUGH, as its title, "London's Traffic Problem," denotes, Lord Ashfield's contribution to the May, 1920, issue of the *Nineteenth Century and After* is devoted chiefly to London, the questions discussed are, in a measure, of wider character. Furthermore, these questions are treated by a man who has had the widest practical contacts as a transportation administrator, first in the United States and then as director of the great London traffic combine itself. Whether just "Al" Stanley, Sir Albert or Lord Ashfield, we have, in him, always listened to a man whose deserved success comes largely from the faculty of looking into the future and of acting courageously upon his deductions. Indeed, in these times when the need for revenue is driving some managers to dangerous lengths in cutting service and other practices that discourage travel, it is well to recall that Lord Ashfield's success as a manager in London was built upon the theory of attracting the greatest possible amount of patronage. One may say with truth that long before town planning was a live subject, his fare and service schemes for encouraging suburban development did more in a direct, practical way than thousands of resolutions and hundreds of exhibitions by professed town planners.

Turning to Lord Ashfield's article, we find a most illuminating discussion of the need for anticipating the growth of a city rather than limping decades behind. It is many a year since the Royal Commission on London Traffic produced ponderous tomes but generated no action on the subject of traffic co-ordination and development. Instead, the work was left very largely to the operating and financial genius of this one man, who succeeded in putting under one management every private transportation undertaking in Greater London, whether tramway, underground railway or motor bus. Unfortunately, he could not go further and co-operate with the municipal undertakings of the London area. The result has been mutual strangulation. The buses, in particular, proved such obnoxious competitors by their incursions into tramway territory and their tax-free operation over tramway routes that the municipal authorities could only bide the time when changed conditions—such as the higher costs of today—would enable them to marshal public sentiment against increases in fare. So, too, the necessity for conserving its own enormous investments naturally led the Traffic Combine (as it is locally dubbed) to oppose any municipal work that would cut into or duplicate its own services. And, to make matters worse, there are jealousies aplenty among the political sub-divisions themselves. All of which accounts for the haphazard conditions of today and the likelihood of a stalemate so long as these conflicting interests continue.

Lord Ashfield believes that the best way out is co-ordination under one management of all private and public transportation facilities with a wide degree of public regulation of such management. He would have such a co-ordinated system operate on a commercial, even on a competitive basis, so that the public would get the most efficient use of all the facilities available without precluding a worthy reward to the organization that handled an undertaking of such consequence to the public welfare.

From our own experience with regulators who evade accepting the consequences of their regulations, we are not quite so hopeful about satisfactory co-operation

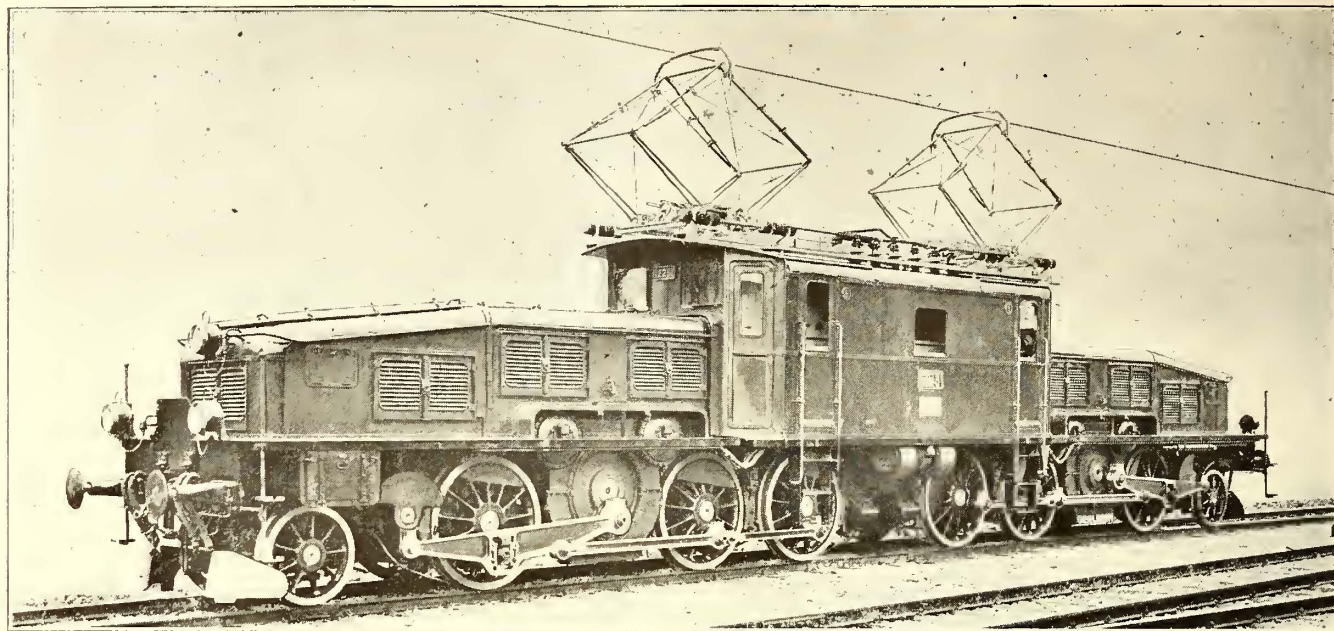
between private operators and public controllers. Judging by our own history, we would say that the trend is toward service-at-cost operation in which the difference between the rate of return and ordinary bank interest will represent a reward for operating ability. The day of the great *entrepreneur* and of large profits in transportation development is gone, never to return, but so large are the opportunities in *conducting* transportation enterprises that no important city can afford to ignore any plan which would combine the money-making incentive of private enterprise with the welfare-making incentive of public enterprise. Men of the type of Lord Ashfield are surely as entitled to liberal rewards for their ability as are capable directors in far less important lines of endeavor. The day may be near when managements will be rewarded chiefly upon the basis of increasing usefulness to the community.

How the Bus and Tram Compare in Cost

WE HAVE purposely discussed the last part of Lord Ashfield's article first because it would serve to illuminate his comments on the respective fields of the means of transit—the street car, the non-surface car and the bus. Of the street car he says: "The tramway is accepted as the most efficient means of local communication in well-developed cities of a diameter not exceeding 10 to 12 miles." Even for London, in comparing the cost per seat-mile of each class of transportation his cost indices are 44 for a train to 27 for the seventy-eight-seat car and 43 for the very latest London bus of forty-six-seat capacity. He says, however, that the economic advantage of the tram is lost by the operation of lightly loaded units throughout the day. This condition, we believe, could be ameliorated by the operation of one-man cars for the base schedules. Indeed, Lord Ashfield himself says of American practice that one-man cars equipped with safety devices are being freely adopted and present advantages which must always seem denied to a motor omnibus. These and other means make tramways more effective, he says, but of course do not solve the capacity problems, which are better handled by rapid transit routes.

In comparing specifically motor bus versus tram in the London district, Lord Ashfield makes the point that the municipal authorities have often confused street widening with tramway development, so that the cost of the tramways is very high in the end. But this is not all.

While the motor bus in London has been operating free from street widening, paving taxes and the like, the London County Council Tramways have had the two-fold burden of taxation and extraordinarily high fixed charges because of so many obligatory miles of conduit construction. Then consider that the motor buses work from the rich, short-haul territory outward, while the tramways work from the thin, long-haul territory inward, and with but one real entrance into London's richest district. Under the circumstances, there can be no real comparison of bus and tram in London, but conciliation there must be, else the public loses doubly in the depreciation of transportation securities and demoralization of transportation service. Each side having "carried on" to the point of exhaustion, it is high time that competition should be succeeded by some sort of unified and co-operative management as set forth so ably by Lord Ashfield.



LATEST 1-C+C-1 FREIGHT LOCOMOTIVE

Swiss Federal Railways Buys New Electric Locomotives

Details Are Now Available Regarding the Unique Construction of the New Single-Phase Freight Locomotives Manufactured by the Oerlikon Company—Recent \$25,000,000 American Loan Used for Purchase

INTEREST in railway and financial circles has recently been centered upon the \$25,000,000 loan placed in this country by the Swiss Federal Railways for the purpose of extending and equipping their electrified section.

It will be recalled that electric traction was adopted upon the Swiss Federal Railways several years before the war. As a result of successful operation upon the Swiss Federal Railways, including Bern, Loetschberg and Simplon, and carefully prepared calculations and estimates based upon local conditions, it was decided during the war to convert an important section of the St. Gothard line, that between Erstfeld and Bellinzona, part of the main line from Switzerland to Italy, for operation as a 15,000-volt, 16 $\frac{2}{3}$ -cycle, single-phase trolley railroad.

Several types of locomotives were proposed and tried experimentally for both express and freight service. Four of the original test locomotives ordered in May, 1917, were described by Prof. Hugo Studer of Zurich, Switzerland, in the *ELECTRIC RAILWAY JOURNAL*, Sept. 7, 1918, page 411. In this article the freight locomotives are described in particular.

In March, 1919, the Swiss Federal Railways, which is electrifying its lines, placed a large order for electric freight locomotives for use upon the St. Gothard section of this system with the Oerlikon Company of Switzerland. Later, in the fall of 1919 and early this year, twenty-three additional units have been placed on order with the latter company, the delivery of ten of which has already begun. The Swiss Winterthur

Locomotive & Machine Works co-operated in the mechanical design and construction.

The conditions under which these freight locomotives are expected to operate are particularly severe. Upon the Gothard Railroad between Goldau and Chiasso, a distance of 122 miles over which these locomotives are expected to operate, there is a difference in elevation of 5,100 feet, representing an average grade of nearly 1 per cent. The maximum grade is 2.6 per cent. The locomotives are scheduled to haul an 860-ton train over this distance and return in twenty-eight hours, allowing fifteen minutes at each terminus. Upon a portion of this run between Chiasso and Bellinzona the train load for a single 1-C+C-1 locomotive will be reduced to 625 tons. The temperature of no important electrical part is to exceed that specified in the standardization rules of the A.I.E.E. during this service. With loads of 430 tons a speed of 22 miles per hour is to be maintained upon the maximum grade of 2.6 per cent, while upon the same grade with a 300-ton load the trains are scheduled for 31 miles per hour. On grades over 1 per cent pusher locomotives will be used.

Their rating for continuous service is 1,250 kw., with overloads provided for one and one-half and one-quarter hours of 1,620 and 1,850 kw. respectively. Upon the maximum grade the locomotive must be capable of exerting 20 per cent excess power, either as the result of an increased torque, because of the necessity of operating at increased speed, or a simultaneous combined demand for both excess speed and torque. A torque sufficient to start a 430-ton train upon a 2.6 per cent

grade and to accelerate to a speed of 22 m.p.h. in four minutes is specified. This corresponds to a rate of acceleration of approximately 0.09 m.p.h.p.s. With a 300-ton load a speed of 31 m.p.h. must be attained with an acceleration of 0.13 m.p.h.p.s. As the maximum speed rating is 40 m.p.h., upon a 1 per cent grade with a 300-ton train, it is practicable to operate passenger and express service upon mountain grades with the same equipment. The maximum starting tractive effort at drivers is 53,400 lb. Further details regarding the operating characteristics of these units will be found in accompanying curves.

MECHANICAL CONSTRUCTION

As will be seen from the accompanying illustration of the 1-C+C-1 type of freight locomotive a rather unusual frame construction has been adopted. Although two distinct interchangeable trucks, articulated at the center of the complete locomotive, are used, yet but one small cab is employed, which is located in the central third of the entire structure. Upon the top of this cab are mounted, with proper insulation for 15,000-volt service, the two pantograph bow current collectors. These are raised into position upon the contact wire by means of air pressure controlled from the operator's position in the cab. This cab is supported upon the inner ends of both truck frames by two spring pressure plates mounted within the truck frame upon each side of a pivot bearing. One of these pivot bearings is fixed permanently in the truck frame, while the other has a limited longitudinal motion, so that no pull can be transmitted through the frame of the cab.

The ventilated motor housings shown in the illustration to occupy the outer ends of the two trucks are fastened rigidly to the truck frames. These hoods are sufficiently low not to interfere with the view of the engineer and are provided with the necessary side and top openings for inspection purposes. In fact, the motors located under these hoods can be inspected during operation by uncovering an opening and looking through small windows in the cab. The housings are readily lifted off the truck frames for repairs to the motors or other auxiliary equipment. The cab proper overlaps the end housings, giving the appearance of a

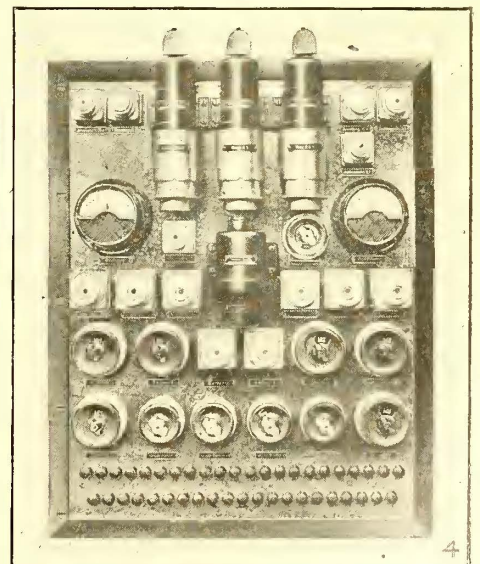
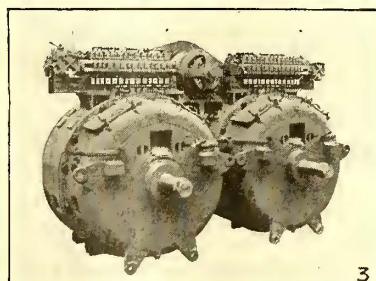
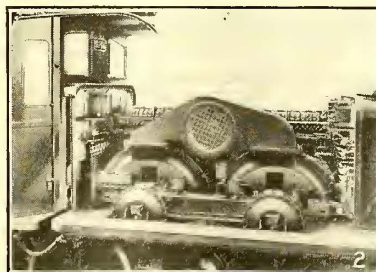
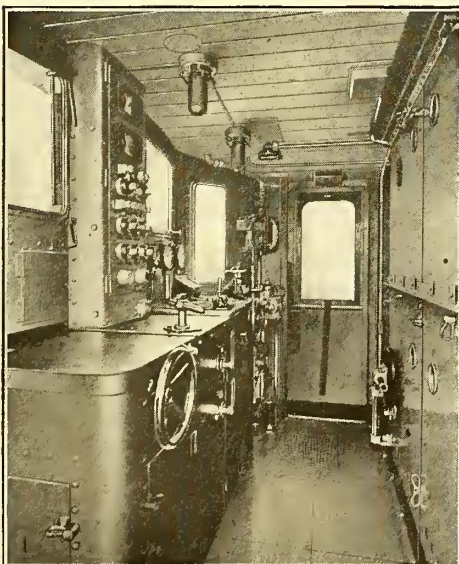
single continuous superstructure. The construction also prevents the entrance of rain and snow.

Each truck comprises three pairs of coupled drivers and a pony axle. The usual method of spring suspension of the truck frames has been adopted. In order to equalize the axle pressures, however, the supporting springs of the first driving axle are connected to the pony axle with a compensating lever, while the second and third drive axles are connected in a similar manner. The middle driving axle of each truck is provided with a side play of 1 in., while the pony axle is free to move transversely through a range of $3\frac{1}{4}$ in. This is to provide better tracking on curves. Upon re-entering tangent track from a curve the pony or leading axle is returned to its mid-position by the action of leaf springs. The truck frames are connected by means of a powerful short coupler containing a leaf spring element for the purpose of transmitting compression and tension forces from one truck frame to the other.

One pair of motors is mounted directly upon each truck frame between the first and second driving axles. Pinions upon either end of the motor shafts engage gears with crank pins. A triangular connecting rod transmits the power from the crank pin of the gear to the forward driver through the agency of a sliding journal. The end bearing of this connecting rod is flexibly supported from the truck frame at a point slightly ahead of the first driver. The motion of this countershaft bearing is limited by a heavy spring. The two other drivers are operated by means of horizontal side rods which articulate with a driving pin upon the triangular connecting rod. This rather complicated driving mechanism will be apparent from an inspection of the illustration.

ELECTRICAL EQUIPMENT

The cab, centrally located in this type of locomotive, provides the most convenient mounting for the transformer, which is of the oil-insulated, air-cooled, outdoor type. The laminated iron core is so stacked and the transformer tank so designed as to form a central vertical shaft, open at top and bottom, through which air is circulated for cooling purposes by means of motor-operated fans. The cover of the transformer is really



1. The engineer has unobstructed view ahead. The control is at his left side.

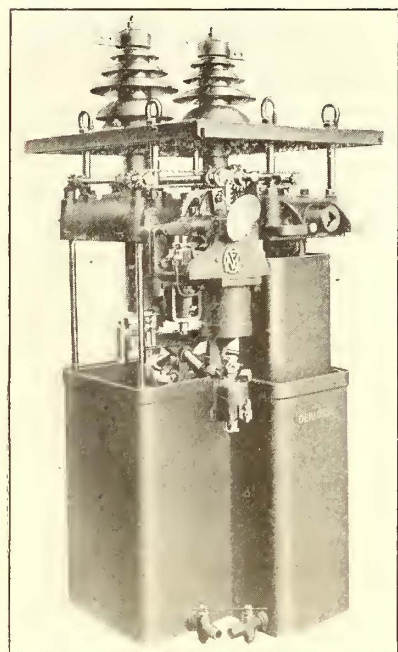
2. Two motors with inclosed pinions and gears are used per truck.

3. Control switches are located over motors under the end hoods of both trucks.

4. Overload and no-voltage relays are mounted upon control panels.

a part of the roof of the cab. The latter, however, is so designed as to permit the ready removal or repair of the transformer from the top, if necessary, when the current collectors are raised.

The transformer is designed for operation at either 7,500 or 15,000 volts at 16 $\frac{2}{3}$ cycles. It is understood



THE OIL SWITCH FORMS A PART OF THE CAB ROOF

that a change will be made from 7,500 volts to 15,000 volts after the complete conversion has been made from steam to electrical operation. Variations in voltage up to 15 per cent may be permitted without serious operating difficulties by means of potential taps upon the low-voltage side. A rather unusual feature of the transformer winding is the provision of two distinct secondary circuits, one supplying the driving motors and the auxiliary equipment of the locomotive, while the other is connected to the heating

circuit of the train. The former, or motor secondary, is made up of two coils equally distributed upon the two legs of the core and tapped at twenty-one different points. Twelve leads from these taps are carried out through the lower portion of the case to the tap switch as indicated in the outside view of the transformer. The two coils are normally connected in series with the middle point grounded. Each is wound for a maximum voltage of 567.

COMPENSATED MOTORS ARE USED

The motors, four in number for the complete locomotive, are provided with series compensated windings with commutating field coils. They are rated at 550 hp. at drivers for one and one-half hours when operating at a voltage of 400 and a speed of 560 r.p.m. At 380 volts, other conditions being unchanged, the rating is 425 hp. The frames are semi-enclosed and forced ventilation is employed. As twelve poles are provided a corresponding number of sets of carbon brushes are mounted upon a cast-steel ring so designed as to provide for the shifting of the brushes upon the commutator. Open slots are used in the stator core, while those in the rotor are partially closed. An attempt has been made to avoid wave-form distortion by skewing the slots around the periphery of the rotor. Although resistance leads were used between the rotor coils and the commutator bars in former designs they have been omitted in the later types.

SPEED CONTROLLED BY VOLTAGE VARIATION

The principle used in controlling the speed of the locomotive is that of varying the voltage supplied to the motors by changing the taps upon the secondary winding of the transformer.

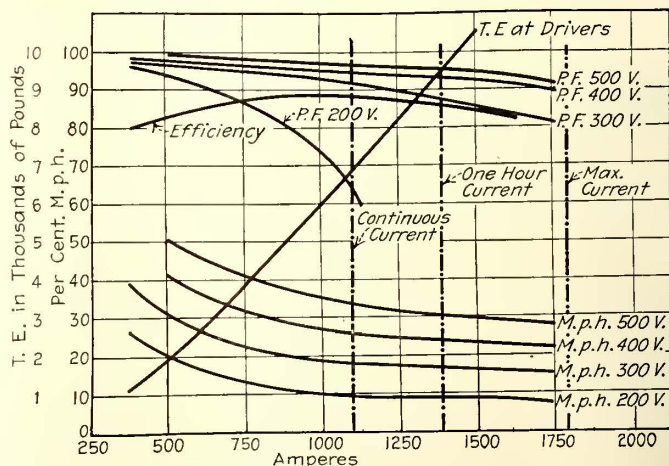
Two different types of tap switches are used, one for hand operation and one for pilot motor operation. The succession of connections is the same in both. The manual switch is provided with a cam-shaft which actuates contact levers with pressure contacts and a central magnetic blowout. This switch was developed for easy manual operation as the friction of the motor-operated switch proved too great. The motor-operated switch is of the drum type similar to those developed for the Loetschberg locomotives, except that in the new switch the two drums are located one over the other and the pilot motor, instead of running all the time, operates only when the drivers are in motion.

In addition to the two transformer tap switches previously described a control switch is mounted upon each motor frame. This furnishes two running points, two for regenerative braking and one "off" position. The four running points are manipulated pneumatically, but in case of emergency they may be controlled by hand. The "off" position can be manipulated only by hand.

REGENERATIVE BRAKING IS ADOPTED

One of the early forceful arguments against the single-phase system was the difficulty with which regenerative braking was accomplished. The advantages of such control upon down grades, including the elimination of wear upon wheels and brakeshoes, the absence of metallic dust, the saving of energy and the smoothness of retardation need no further elaboration. It is claimed that these advantages are now available with the single-phase system with but little added complication. One additional choke coil is included in the main line and a smaller one is connected in parallel with the commutating-pole windings during regenerative operation. The controllers and tap switches previously described are common to both running and braking circuits. The change of connections to the braking circuit is accomplished by means of a reversing switch.

Upon starting down a grade where regenerative braking is to be used the tap switch is first moved to the "off" position. The reversing switch is then thrown to the braking notch. The position of the running con-



CHARACTERISTIC CURVES OF ONE MOTOR
Gear ratio, 4.03; drivers, 53 $\frac{1}{2}$ in. diameter; frequency cycles, 14.3

troller handle then determines the speed by changing the voltage impressed upon the motors. The speed range is the same as that available when running under power. This braking system also permits continued application until the locomotive comes to rest. It is claimed for this system by the manufacturers that

regenerative operation at the highest speeds is possible without causing sparking at the commutators or harmful disturbance in the system, nor is the braking process materially affected by fluctuations of voltage and frequency. In fact the full braking power may be interrupted suddenly without harmful results by the automatic opening of the high-tension oil switch as the result of the current collector leaving the contact wire.

After the braking operation is concluded the master controller and thence the tap switch are placed upon the "zero" position. After the reversing switch is then placed in the forward running position, normal operation is again possible. All switching operations are interlocked in such a manner that an incorrect sequence of switching is said to be impossible in both running and braking processes.

The efficiency of regenerative braking is claimed to be approximately 75 per cent under normal operating conditions. However, the power factor of the returned energy is low, ranging from 50 to 70 per cent.

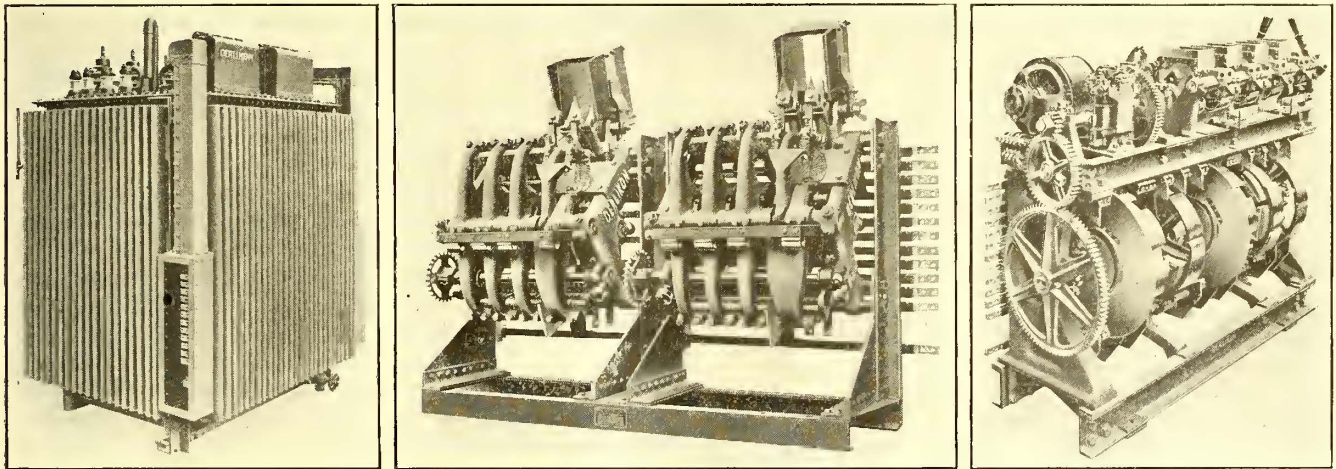
The regenerative braking system is supplemented by the usual hand and air-brake equipment, consisting of a pair of brakeshoes for each pair of driving axles. A

the necessary air pressure can be secured in less than one minute. The ladder leading to the top of the cab is pneumatically interlocked with the pantograph operating mechanism, so that no one can mount the ladder with the apparatus upon the top of the cab at high voltage. The entire roof equipment is subjected to ten successive tests at 60,000 volts, *i.e.*, four times normal operating voltage, for a period of thirty seconds at intervals of five minutes. During this test the parts normally grounded are connected to ground.

Between the current collectors and the main oil switch two high-voltage disconnecting switches are inserted which may be operated from within the cab to disconnect a damaged current collector.

PROTECTIVE DEVICES EMPLOYED

Like the transformer, the main oil switch is so constructed that its cover forms part of the cab roof, thus concentrating the high-voltage parts at the center of the cab, well out of reach. The grounding switch, contrary to the usual custom, is located inside the transformer case. In the whole locomotive there is no high-voltage conductor or terminal exposed in such a way



AT LEFT, LOCATION OF TRANSFORMER TAPS INDICATED. IN CENTER, THE TAP SWITCH IS CONNECTED TO SECONDARY WINDING BY END LUGS. AT RIGHT, THE PILOT MOTOR TAP SWITCH MAY BE OPERATED BY HAND IF NECESSARY

15-in. brake cylinder is installed upon each truck. The air brake provides a maximum braking force equivalent to 80 per cent of the total adhesion weight of the locomotive. On each truck four sand boxes are mounted, two in front and two behind the coupled drivers.

CURRENT COLLECTOR IS UNIQUE

Each of the high-voltage current collectors is designed to carry the full current of the locomotive at the lower operating voltage. The second collector is therefore merely a reserve unit. The long radius arm used upon the current collecting mechanism permits considerable variation in height of the contact wire without corresponding movements in the pneumatically operated pantograph. The pressure of the shoe upon the contact wire is practically constant for all heights from 16 to 23 ft. of the latter above the rail. Both collectors may be raised from either control position within the cab by means of air pressure, the motion being so damped as to provide smooth and quiet operation at all temperatures. To provide for the possibility of raising the pantographs after long idleness, when no compressed air is available, a hand air pump is installed with which

that it may be touched either by mistake or in performing the duties incident to the operation of the locomotive.

The main switch can be operated pneumatically from both cabs. Manual operation is also possible in case of emergency. This switch is opened automatically by either one of two overload relays in the motor circuits and one in the transformer circuit. A no-voltage relay connected to the low-voltage side of the transformer opens the switch when the power supply is interrupted.

DATA ON 1-C+C-1 FREIGHT LOCOMOTIVE

Height	12 ft. 5 in.
Total length	63 ft. 6 in.
Wheelbase length	54 ft.
Wheelbase of truck	22 ft.
Fixed wheelbase of truck	15 ft. 5 in.
Width of locomotive	9 ft. 8 in.
Gage	4 ft. 8½ in.
Cab length	19 ft. 2 in.
Height contact wire (maximum)	23 ft.
Driver diameter	53½ in.
Crank pin stroke	23 in.
Transmission ratio	4.03
Weight, mechanical parts	141,200 lb.
Weight, electrical parts	112,800 lb.
Total weight, locomotive	256,000 lb.
Adhesive weight	208,000 lb.
Axle loads 24,000 + 36,400 + (4 × 33,800) + 36,400 + 24,000 lb. respectively.	

Additional protection against personal accidents is provided by a system of interlocking devices connected with the oil tank of the main high-voltage switch. For example, this tank is so arranged that it cannot be removed when air is supplied to the air line of the pantograph cylinder or when the grounding switch is closed.

In order to protect the locomotive from the application of sudden abnormal voltages due to surges or lightning, a chokes coil is mounted upon insulators upon the top of the transformer and connected in series with the main high-voltage circuit near the pantograph current collectors. Previous experience has demonstrated that further protection is unnecessary upon the locomotive. It is considered better and sufficient to protect each section of the distribution system with excess voltage protective apparatus.

For the protection of the motors and transformer from excessive current when the process of regenerative braking brings the locomotive to a standstill an additional choke coil is inserted in the circuit of each pair of motors.

UNUSUAL PROVISIONS FOR TRAIN HEATING

Provisions made for locomotive and train heating are rather unusual. As previously stated, the main transformer is equipped with two secondary windings. One of these, entirely independent of the motor and auxiliary circuits, supplies a voltage of from 800 to 1,180 volts, with adjustable taps for a heating circuit. This circuit extends through an oil switch and coupler connections to the train. It is designed to supply for heating purposes 400 kw. of power at 1,000 volts or a maximum of 480 kw. at 1,180 volts during the preliminary heating process when cars are cold. During this period it is expected that the transformer will not be called upon to supply energy to the driving motors.

Railway officials and designing engineers will be interested to learn more about the results of operation of these rather unique locomotives upon single-phase lines at high voltage. Service under similar conditions of grade and heavy freight traffic has not been undertaken in this country with single-phase motors and time only will indicate the adequacy of the design and construction described.

All Cars in Service

OVER the Decoration Day holidays, from May 29 to June 1, and the Fourth of July holidays, from July 3 to July 5, the Long Island Railroad had all of its electrically equipped cars in service. This company owns 474 motor cars and 90 trailers. In order to accomplish this, it was necessary that extreme care be used in making repairs and on inspection to make certain that all parts of the equipment were in proper condition for continued operation and also that all other departments concerned co-operate. Credit is due the transportation department for its careful handling of trains, which prevented any serious accident to cars which might have resulted in their being damaged and withheld from service.

The passenger service on the Long Island Railroad has exceeded all previous records during this season and all departments have been impressed with the necessity of keeping all available equipment in service. This record over the holidays is particularly noteworthy, as it was accomplished with but a very small amount of overtime.

New Type of Gear on Swiss Locomotives*

AN INTERESTING problem in gear reduction has been recently solved in connection with an experimental electric locomotive for the Bernese Alpine Railway Company in Switzerland. Gears for the locomotives of this company have in the past been furnished by the Citröen Gear Company, but during the war they were produced by a German manufacturer under license.

It will be remembered that these locomotives are equipped with two motors each, mounted near the center of the locomotive considerably above the floor, and geared to an intermediate shaft carrying crank plates, pins and connecting rods. The pinions of this drive, of 2 ft. 2 $\frac{1}{2}$ in. diameter and 9 $\frac{1}{2}$ in. width, are of highest test forged steel, keyed to the rotor shaft. These mesh with special herringbone gears 4 ft. 11 $\frac{1}{2}$ in. in diameter, which consist of cast steel hubs, upon which are shrunk forged steel rims.

Although these locomotives operated successfully during test runs up to speeds of 24.5 m.p.h., the operating conditions at higher speeds at a later date developed a peculiar vibration of the whole locomotive frame, which seemed to be particularly severe throughout a critical range of speed from 24.5 to 25.7 m.p.h., although above and below this speed the phenomenon ceased. This seemed to indicate that the difficulty was due to some resonant vibration at a critical frequency, dependent upon the design of the locomotive frame.

Upon further detailed investigation, during road tests, it was found that the centers of the motor shafts were vibrating with a pendulum-like motion about the intermediate shaft as a center, first toward and then away from each other, with a maximum amplitude of nearly $\frac{1}{4}$ in. As the locomotive motors were mounted rigidly upon the frame plate, this indicated that the latter was itself in vibration. Such a motion was necessarily in the same direction of rotation as one rotor and opposed to that of the other rotor, and consequently excessive stresses were set up in the connecting rods, causing several to be broken.

Before the true cause of the broken connecting rods had been discovered they were sufficiently strengthened to resist the internal stresses, but the vibration still continued. The difficulty was finally overcome by the installation of special gears provided with rims free to move in either direction, about the shaft as a center, upon the steel spider as a base. Eight groups of radial laminated springs, mounted upon the spider and extending outward into recesses in the rim, limit the movement of the latter. They are so designed, however, as to permit motion in either direction circumferentially with respect to the shaft. It was at first considered necessary to equip both motors of each locomotive with such gears, but one only was found, upon trial, to suffice. No difficulty has been experienced at any speed since these new gears were installed.

An instructive forty-page pamphlet has recently been published by the Illinois Committee on Public Utility Information. It is a treatise by William Keily, giving in authoritative but brief form the history of the application of electricity to industrial purposes and a summary of the present situation. Considerable attention is given to the electric railway, and a plea is made for fair play for the "burden bearer."

*Abstracted from *Engineering* (London).

High-Voltage Insulator Development Indicated at Portland Convention

Several Excellent Papers Presented at the Pacific Coast Convention, A. I. E. E., Show Changes Necessary in Suspension Insulators to Adapt Them for 220-Kv. Service

THE following are the principal causes of failure of the conventional type of suspension insulator unit and to some extent the multi-shell pin-type unit, according to W. D. A. Peaslee in a paper entitled "Factors Controlling the Design and Selection of Suspension Insulators": (1) The use of materials having widely different coefficients of cubical expansion, as in conventional cap-and-pin construction, which cause enormous stresses under temperature changes; (2) mechanical overloading; (3) shocks such as shooting; (4) lightning and power arcs; (5) actual electrical puncture; (6) leakage under adverse conditions, followed by flash-over and heavy power arc; (7) porosity.

The author supports the use of porcelain in tension and draws the analogy to the use of cast iron in a similar manner in many designs in place of steel, which is known to be much stronger in tension. A mechanical strength of from 9,000 to 10,000 lb. is considered adequate for a suspension unit up to 150 kv. operation if the unit is so designed that the repeated mechanical stresses do not injure the unit electrically.

The design of hardware must be a compromise between ease of assembly and security of the connection against failure or uncoupling. The author feels that in order to take advantage of a symmetrical design, conforming in outline as nearly as possible to the lines of force in the electrostatic field surrounding the insulator to avoid corona formation at too low a voltage, a departure will have to be made in the method of attaching the hardware to the porcelain.

Losses due to the absorption of moisture by the porcelain are considered rather serious, due to the resulting localized internal heating of the insulator produced by leakage current. It is disconcerting to read that "good glazing postpones the deterioration of porous porcelain but cannot eliminate it." The statement is challenged, which is said to be quoted from another manufacturer, to the effect that "a low moisture absorption is desirable, but it must not be assumed that any satisfactory porcelain can be made which will have zero absorption."

Attention is again directed toward the importance of puncture tests of insulators. The value of such tests has been a matter of controversy for years, involving widely varying opinions. Owing to the high time lag of highly damped, high-frequency transient voltages encountered upon transmission lines, it is predicted that the fundamental basis for the design of a rational suspension insulator unit should be to make the puncture voltage about three times the dry flash-over voltage.

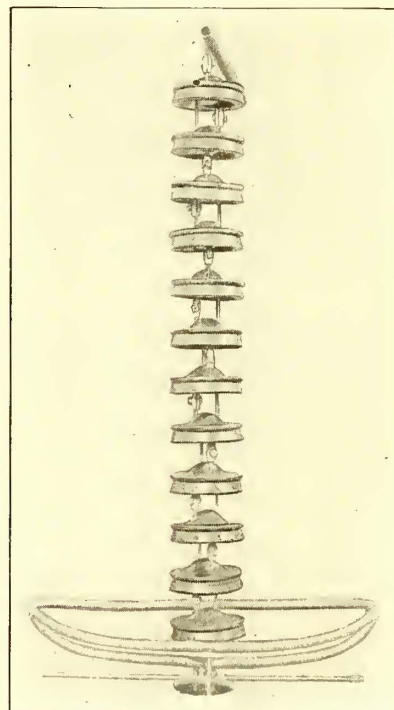
The prevention of corona upon an insulator at relatively low voltages is advocated, and the necessity of adding extra units of high insulating value in some cases to prevent corona forming on the line units is quoted as an argument in favor of designs having higher corona-forming voltages.

A rather radical departure in the design and manufacture of suspension units is proposed which is illustrated on page 262. It will be noted that an attempt has been made to reduce the large mass of metal and its tendency to introduce thermal strains in the porcelain by the use of a spider construction embedded in the porcelain by means of a special alloy said to have sensibly the same cubical expansion as porcelain. One is immediately impressed with the relatively large mass of porcelain in this new unit, but improvements in manufacture are said to have been developed to overcome the weakness associated in the past with such a type. Tests both in laboratory and of a routine factory nature are outlined to substantiate the claims for this new design.

ELECTRICAL CHARACTERISTICS OF THE SUSPENSION INSULATOR²

A second paper upon this subject was presented by F. W. Peek, Jr., which points out in particular the comparison between the duties of the suspension insulator at voltages above 100 kv. with those imposed at lower voltages. That the deterioration experienced in line insulators after a few years of good service is due largely to mechanical causes is conclusively shown by the fact that many old types of insulators made of porcelain known to be inferior to that manufactured at present, but supplied with loose-fitting hardware, have shown a much better life record than modern designs.

The solution of the deterioration problem seems to be to start with a design as free as possible from expansion troubles and the selection of a tough, non-porous porcelain. Years of service have been the best criterion of design. Regarding the selection of material, no present electrical test will anticipate future cracking due to internal strains or brittle porcelain or will indicate porosity in dry porcelain. The desired results



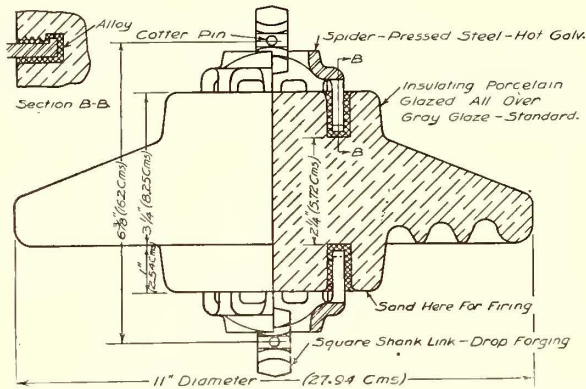
ANTENNA SHIELD FOR EQUALIZING VOLTAGE ON INSULATORS

¹Journal A. I. E. E., June, 1920, page 571.

²Journal A. I. E. E., July, 1920, page 623.

can probably best be attained by testing a small percentage of the product to destruction from day to day after the usual electrical and inspection tests have been made, the object being to determine if the product is up to the standard and of uniform quality. The idea is not new, but is used in the manufacture of lamps and in other industries.

Electrical, mechanical and porosity uniformity tests are necessary. Extremely accurate tests are not necessary, but it is necessary to have tests that can be quickly



THE PROPOSED SUSPENSION UNIT WITH SPIDER CONSTRUCTION

made so that any fault can at once be detected and remedied.

Passing to the question of extra high voltage problems, the tendency of the unit nearest the line to absorb a constant percentage of the line voltage regardless of the number of units in the string is clearly noted from the test data. For example, in strings of over five units in length from 20 to 30 per cent of the line voltage is impressed upon the unit nearest the line wire. The variation indicated is due to different designs of insulator and hardware. Thus at 220 kv. the stress upon the line unit will reach the rather undesirable value of 38 kv. This objectionable value may be reduced by any one of the following methods:

1. Increase the capacity of the units without increasing the capacities from the various sets of hardware to ground.
2. Increase the capacity of the various units along the string in proportion to the currents flowing through them. This means the highest capacity upon the line unit, less on the next unit, etc. This is generally called grading.
3. Elimination of the ground capacities by means of antenna shield from the line. This may be called shielding.

The first two of these methods have been used considerably in the past. The third, which is brought about by means of a specially designed shield, is illustrated in the photograph. The results obtained with and without the shield are seen to be very creditable from the curves which have been reproduced herewith from the original paper. This result is expressed in a more forceful manner in the statement that "the maximum unit stress would be less upon a 220-kv. shielded string than on present non-shielded strings operating successfully at 100 kv. and less."

The effects of rain, dirt, corona discharge at high voltages upon both graded and ungraded strings are then described, with the conclusion that the use of shielding is likely to be more generally effective at extra high voltages than grading. Grading has the

further disadvantage of requiring special units which must be kept in proper proportions for replacements.

An interesting method of measuring the voltage between the various units and ground is described in which such voltages are balanced against those existing upon the various taps of a water resistance connected between line wire and ground.

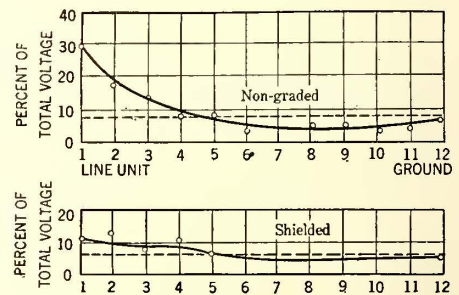
It was concluded that:

1. The old method of basing everything on electrical tests should be abandoned. Severe electrical tests are often harmful. The electrical strength is often secondary to other characteristics.
2. For the very high voltage lines that are at present being considered, greater reliability may in many respects be anticipated than for the lower voltage lines. The lightning arc-over voltage and dielectric strength will be relatively higher, and indeed lightning voltages, sufficient to cause arc-over, will be less than on low-voltage lines. Increasing the number of units decreases the probability of complete string failure.
3. Uneven distribution can be corrected by shielding. Shielding prevents excessive corona on the line end units and tends to direct the power arc away from the string.
4. Briefly, outages due to insulator troubles will probably be less frequent at the higher voltages than at present.

UNIT VOLTAGE DUTIES IN LONG SUSPENSION INSULATORS³

A paper bearing this title was presented by Harris J. Ryan and Henry H. Henline, which sets forth some very interesting tests made at Leland Stanford, Jr., University. These tests involved varying numbers of suspension units per string, with and without shielding rings.

In order to study more fully the various voltage stresses upon the units of a string, a convenient ratio of maximum to average voltage for a string has been adopted. A standard string of 10-in. "bomb and link type units" is used to establish an empirical curve plotted between this voltage ratio and the number of units in a string. With this as a basis an equation is derived which may be used to determine the maximum voltage duty of cap and pin units at voltages not yet used in practice.



VOLTAGE DISTRIBUTION ON A STRING OF TWELVE INSULATORS (Laboratory hardware)

For example, "when used to support and insulate a 220-kv. line a thirteen-unit cap and pin string would operate at maximum and average unit voltage duties of 25 and 10 kv. respectively. Many engineers feel that a duty of 25 kv. for a single 10-in. cap and pin type unit is too high because of corona formation and the injury to hardware and porcelain that may result, likewise because of the low factor of safety against flash-over by cascading. It is generally conceded, therefore, that in the present state of the art

³Journal A. I. E. E., July, 1920, page 631.

some additional means must be employed in suspension insulators for the 220 or 250-kv. lines whereby the maximum unit duties will not be excessive compared with those of present practice."

Results obtained by Dr. Leonard F. Fuller and one of the authors of this paper are quoted to show the reduction of maximum unit voltage duty for a double unshielded string for 220-kv. service from 23.5 to 15.5 kv. as compared with a single unshielded string and to 10 kv. for a double string equipped with static shields.

Test results quoted in this paper are confined to combinations of insulators of present standard manufacture for the very definite reasons stated as follows:

"Not until the manufacturer has amply demonstrated his immediate readiness to deliver by economic quantity production durable units in which radical changes have been made in design, size and rated mechanical and electrical duty, can the transmission engineer count upon the use of units that may thus differ materially from those in use at present for the support of extra high-voltage (220-kv.) power lines.

"Suspension insulators in common use can be satisfactorily employed for the make-up of insulators for 250-kilovolt lines.

"Increase in the number of strings in the suspension insulator will permit the use of a limited increase in line voltage.

"Static shields in requisite forms will lower maximum unit voltage duties so as to permit the satisfactory insulation of lines for the use of voltages far above 150 kv."

City Buys Lines in Berlin

Surface Railway System Badly Run Down and Fares Three Times Pre-War Figures Conditions Which Led to Purchase

BY DR. E. C. ZEHME

Privatdozent at the Technische Hochschule, Berlin

THE system of the Grosse Berliner Strassenbahn was sold to the city of Berlin and neighboring municipalities as of July 17, 1919. The experts for the city had valued the property at 104,000,000 marks, while the company had raised its first figure of 198,000,000 marks to 349,000,000 marks! The latter price undoubtedly was excessive in view of the depreciated condition of the property. The associated municipalities, which may be considered to form the metropolitan district of Berlin, would have been obliged to pay 150,000,000 marks had they waited until the expiration of the grant in 1925. They offered 137,000,000 marks in view of the fact that 40 per cent of the track and much of the rolling stock demanded immediate replacement. They had also declared that if the company stayed in business they would not permit the continuance of the 17.5 pfennig fare (the original pre-war fare was 10 pfennigs), but would insist upon a return to a 12.5 pfennig fare, thereby forcing a decline in the shares and value of the property. Furthermore, a nationalization measure then under way would have led to almost any price the government saw fit to pay. So the municipalities' offer was accepted as a matter of necessity.

This purchase has ended a tenacious struggle of long standing between the community and the company. During the course of this struggle the city of Berlin had built some competing street railways, but neither these railways nor the lines of the Berlin Elevated & Underground Railway had proved sufficient to meet the

growth of traffic, as may be deduced from the accompanying table.

The total number of passengers carried on the Grosse Berliner system in 1917 was 896,000,000.

MUNICIPALIZATION HAS NOT REDUCED FARES

The hope that municipalization would lead to a reduction in fare has not been fulfilled. Instead of a reduction to 12.5 pfennig, the fares were raised first to 20 pfennigs, then to 30 pfennigs, and at the present

ANNUAL NUMBER OF RIDES PER INHABITANT, BERLIN

Year	Omnibus	Street Railway	City Steam Lines	Electric Rapid Transit	Total
1870	13	..	..	..	13
1875	15	16	..	..	31
1880	10	40	..	..	50
1890	18	74	13	..	105
1900	43	105	43	..	191
1910	70	150	53	16	289
1917	19*	264	48	33	364

* Withdrawal of gas-driven motor buses due to war conditions.—EDITORS

writing are 50 pfennigs. This figure, corresponding nominally to 12 cents, represents an enormous outlay to the Berliner, especially in view of his shorter average ride in comparison to New York.* The end is not yet because of the general rise in costs. Within the coming months we may expect to see fares of 60 pfennigs and later even of 80 or 100 pfennigs.

To judge from these initial experiences, the municipalities' experts were not in error in placing a low price on the property. The company had permitted it to run down in pre-war days by paying excessive dividends instead of putting more money into renewal funds. It is doubtful whether any other metropolis is burdened with a more out-of-date street railway. The twenty-year-old single-truck cars are in such condition that even on straight track they behave like bucking camels! On the large cars the trucks are out of square, hard riding and noisy. Most cars are still without vestibules. The method of fare collection is particularly annoying. As prepayment is not in vogue, the conductors are obliged to squeeze their way through cars that are so crowded that many a passenger rides free despite the requirement that each passenger must be able at any time to show a receipt for the fare paid. The ordinance calling for a 1 mark fine if the passenger has no receipt has proved neither just nor workable. Platform accidents and running by stops desired by passengers are numerous because the conductor is not on the platform when needed. Only a few cars have separate entrance and exit aisles, which are due to the influence of the American prepayment system.

The war intensified these evils. The fact that the street railway still shows heavier traffic from year to year is due largely to the small rapid transit mileage. The present route length of such lines in Berlin is now 23 miles (37.5 km.), with but 16 miles (20 km.) more under construction, which gives a total of only 39 miles (57.5 km.). The development of the Berlin transit system as a whole will be discussed by the writer in a later article.

*Dr. Zehme's statement that the average ride in Berlin is shorter than in New York requires explanation. The average ride in Berlin is probably shorter than the average ride in the Borough of Brooklyn, but is probably not shorter than the 1.25-mile average estimated by Stone & Webster late in 1919 for the Manhattan Borough lines of the New York Railways Company. The flat fare system prevails throughout the greater part of the Berlin surface railways, but owing to the absence of transfers many rides are longer than they would be under the American system of shortening the ride through transferring instead of through-routing.—EDITORS.

Safety Cars in Trenton

Report of Inspector for Public Utility Commission of New Jersey Answers Objections Raised by Complainants

THE Board of Public Utility Commissioners of the State of New Jersey has recently made public a report on safety cars particularly as operated in Trenton, made by H. C. Eddy, electric railway engineer, in response to a complaint by a local blacksmiths' union.

This local had adopted a set of resolutions to the effect that the safety car as operated in the city is a deadly menace to the lives and limbs of the people of this community, that too much responsibility is placed upon the operator, that the cars are frequently overcrowded, resulting in distraction to the operator, that the speed of the cars is too great and that the number of accidents caused by the operation of the cars is excessive. The Board of Public Utility Commissioners caused an investigation to be made and the results incorporated with the inspector's report.

The report cited the fact that for several years inspectors of the board have been studying the subject and have accumulated much data. On the basis of these, the general situation is summarized. Attention is directed to the generally increasing popularity of the safety car, at least among employees, and the board's inspectors find that whereas the general attitude of the public when the cars were first introduced was rather unfavorable the cars are increasingly popular as the patrons become accustomed to them and learn of the advantages which accrue from their use. The cars appear to be more popular in the smaller communities, but it is believed that with their more general use in larger cities most of the popular prejudice against them will be eliminated. Such prejudice as exists appears in part to be caused by a misconception of the use of the car and to a feeling that reversion to the single-truck type is a step backward.

The report points out that there are undoubtedly certain disadvantages in the operation of the one-man car, particularly overloading, resulting in the crowding of the front platform, which in turn is liable to result in physical interference with the motorman in the operation of the car. This matter had been taken up previously by the board in connection with the city of Trenton, where it had been recommended that the load be limited to fifty passengers. Attention was also directed to an order of the board, issued Nov. 27, 1918, prohibiting the occupancy by passengers of the platforms of the cars operated by the Trenton & Mercer County Traction Corporation.

The report also took up the difficulty of ingress and exit to the safety car, especially when the car is crowded. This was said to be due entirely to the use of one opening for both entrance and exit, and no reason is seen why this car cannot be constructed so as to provide a double opening, permitting passengers to board and alight at the same time. Counts made by the inspectors indicate that the average time of loading and unloading per passenger and the average time for passenger interchange is practically the same in Trenton for both one-man and two-man cars, except at one point where there is considerable congestion and where the one-man car interchange is slower. However, as the cars are designed to accelerate more rapidly than the ordinary two-man cars, time lost through delays can be readily made up.

As to the complaint that too much responsibility is placed upon the operator, the report points out that most of the extra duties are performed while the car is at rest. Provision is made in the design so that if he has to handle fares or transfers, or use his hands for any purpose whatever other than operating the car, the control of the car can be transferred to his foot. The fact is that the operation of the one-man safety car does not involve any duties other than such as are required of the operator of an auto bus, and the latter has the added duty of steering the vehicle.

As to the alleged excessive speed of safety cars in Trenton and the liability to accident, the report states that the speed limits prescribed by ordinance in the city are low, and that 12 to 15 m.p.h. would be reasonable. It is true, however, that the safety car sometimes exceeds this limit, which is objectionable. However, the accidents which occurred have not been due to the type of car and most have been of a minor nature. Many were not in any way due to the operation of the car.

The claim that the one-man car causes a reduction in the number of employees is true only to a small degree generally and is not true at all in the case of the local company. The adoption of this car has been largely for the purpose of furnishing more frequent service, which is possible as but one operator and only one-half the capital investment per car are required.

CO-OPERATION FROM PUBLIC IS URGED

The report suggests that the full co-operation of the traveling public would be a great aid in the successful operation of the safety car, particularly in such matters as passengers having exact change, rapid movement in boarding and alighting, moving toward the rear of the car when entering, etc.

In conclusion the report points out that there is no evidence to show that the one-man safety car should be withdrawn from service, but recommends:

1. That whenever and wherever the so-called "one-man car," whether equipped with automatic safety devices or not, is operated within the territory coming under the jurisdiction of the board, said car being of such design as that it is fitted generally with cross seats and has a seating capacity of from approximately thirty to thirty-four persons, the maximum number of adult persons who shall be carried in such car at one time shall not exceed fifty, and that notices be posted on the inside and outside of said cars to this effect.

2. That on and after July 15, 1920, in all cases where cars of the types referred to in (1) are operated, such cars shall be provided with a removable guard rail, so located as to prevent passengers from being crowded against the operator of the car and also to prevent the occupation by passengers of at least a portion of the front platform.

Norfolk & Western President Talks to Public

IN A STATEMENT which N. D. Maher, president Norfolk & Western Railway, made recently to the public a new note was sounded. The purpose of the statement was to show that the company was doing the best that it could with its facilities to meet the constantly growing demands of the section which it served.

To prove this such facts were given as gross earnings, equipment of cars and locomotives, engines and cars out of service and other facts on operation to show what has been done and what could have been done with improved facilities.

Illinois Association Holds Annual Meeting and Golf Tournament

Two Supply Men Read Good Papers on Getting Traffic and Car Inspection—Result of Ten-Cent Fare in Joliet and Publicity Discussed

A GOLF tournament, a fine luncheon, given by the Sangamo Electric Company, and two well-received papers, by W. McK. White and L. E. Gould, were the features of the one-day annual meeting of the Illinois Electric Railways Association at Springfield, July 30. Although the association had not held a meeting since July 16, 1919, the attendance was disappointingly small, only seven railways being represented by eight men. In the absence of President W. C. Sparks, general manager Rockford & Interurban Railway, who was prevented from attending the meeting due to a long illness from which he was reported to be recovering, the meeting was presided over by First Vice-President E. M. Walker, general manager Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.

In the report of the secretary-treasurer, R. V. Prather, the work of the year was briefly reviewed and the attention of the members called to the fact that public utility matters appear to be the main issue in the race for Governor. The propoganda being put out by certain of the candidates for Governor and other state offices and the action of the City Council of Chicago in sending out to all municipalities a resolution providing for the abolishment of the Public Utilities Commission, and requesting its adoption might, it was feared, cause a bad reaction against the utilities in the work of the new Legislature. In this connection members were urged to secure the co-operation of their local chambers of commerce, rotary clubs and other civic associations, and enlightened citizens generally, in counteracting the attack against state regulation in favor of home rule.

The secretary also made reference to the fact that the Illinois Gas Association had elected him secretary and had entered into the maintenance of a joint office with the Illinois Electric Light Association and the Illinois Electric Railways Association, the expenses of the office to be borne 75 per cent by the electric light association and 12½ per cent by each of the other associations.

Messrs. J. R. Blackhall, Joliet; Britton I. Budd and W. V. Griffin, Chicago, sent telegrams to the meeting expressing their regret that important matters made it impossible for them to attend. These men had been expected to take part in the program. A communication from Edwin C. Faber of Aurora directed the attention of the association to the meeting of the International Traffic Association, August 23 to 27, in San Francisco, at which it was expected that uniform traffic laws for use in the United States and Canada would be drafted. Mr. Faber's letter suggested that the electric railways should make some move to be properly represented at this meeting. D. E. Parsons, general manager, East St. Louis & Suburban Railway, remarked that he expected to be on the Coast at that time and intended to be present at the meeting, and that he would be glad to take care of any matters which any railway company

might care to bring up before that meeting. No action was taken toward appointing an official representative.

The paper by Mr. White, which appeared in last week's issue practically in full, was then read and was discussed briefly by John Benham and Mr. Walker, who indorsed most of the points made in the paper. This was followed by Mr. Gould's paper, which appears elsewhere in this issue.

RESULT OF 10-CENT FARE IN JOLIET, ILL.

In the absence of Mr. Blackhall, who had expected to read a paper on the results of the installation of a 10-cent fare in Joliet, W. H. Heun, superintendent of transportation, Chicago & Joliet Electric Railway, presented some statistical matter from a letter prepared by Mr. Blackhall to show the results which had obtained.

Approval of the Public Utilities Commission to increase fares from 5 to 7 cents, effective Aug. 7, 1918, was the first move accomplished in the effort of the company to improve its revenue situation. Owing to the influenza epidemic that prevailed that year, reaching its height in October, it was impossible to determine just what effect this increased rate of fare had on traffic. The rate was further increased to 10 cents, effective Aug. 12, 1919. From that date to Dec. 31, 1919, the traffic showed a decrease of 1.4 per cent as compared with the same period in 1918, under a 7-cent fare.

Taking the first six months of 1920, under a 10-cent fare, and comparing this with the results obtained for the first six months of 1919, under a 7-cent fare, and the first six months of 1918, under a 5-cent fare, it was thought that a fair comparison of the results obtained could be made. The following table was presented to show the results during these three periods:

REVENUE PASSENGERS CARRIED	
During six months ended	
June 30, 1918, with 5-cent fare.....	2,960,691
June 30, 1919, with 7-cent fare.....	2,485,633
June 30, 1920, with 10-cent fare.....	2,574,901
1919 over 1918, with 40 per cent increase in fare, there was a 16 per cent decrease in traffic.	
1920 over 1919, with 42.7 per cent increase in fare, there was 3.6 per cent increase in traffic.	
1920 over 1918, with 100 per cent increase in fare, there was 13 per cent decrease in traffic.	
REVENUE FROM PASSENGERS	
First six months of 1918, with 5-cent fare.....	\$146,961
First six months of 1919, with 7-cent fare.....	174,005
First six months of 1920, with 10-cent fare.....	248,442
1919 over 1918, with 40 per cent increase in fare, there was an 18.4 per cent increase in revenue.	
1920 over 1919, with 42.7 per cent increase in fare, there was 42.8 per cent increase in revenue.	
1920 over 1918, with 100 per cent increase in fare, there was 69.2 per cent increase in revenue.	

Mr. Blackhall's letter pointed out that it is reasonable to believe that if the fares had remained at 5 cents there would have been a natural increase in traffic and revenue in 1920 over 1918 of at least 12 per cent, so that the increase in revenue shown during that period cannot be entirely credited to increased fares. He thought it was safe to say, however, that 100 per cent increase in the rate of fare had resulted in increasing

the revenue 50 per cent. On city lines 11 per cent more passengers were carried in June, 1920, than in June, 1919.

The additional revenue derived from increased fares, however, has been practically all used to pay increases in wages granted after the fares were increased. In each instance the increase in wages became effective two months before the increase in fare as approved by the commission became effective.

Asked about the attitude of the public toward the 10-cent fare, Mr. Heun said that there had been very little complaint about it; in fact, there had not been as much opposition to this rate of fare as there had been when the company asked for a 7-cent fare. It was also pointed out that the 10-cent fare has not developed any jitney competition. At one time, when the fare was still 5 cents, jitneys began to operate, but after a period of three months, when the city forced them to take out bonds they suspended operations.

Not by way of comparison, but simply to show how different conditions may be in different cities, Mr. Walker said that in Terre Haute for the twelve months of 1918 the total receipts had been \$390,000, while for the first six months only of 1920 the receipts had been \$335,000, the fare being 5 cents in both cases. The car-miles operated now as compared with last year have been increased 60 per cent, while the revenue has increased 65 per cent. The two cities were parallel only in that in both Terre Haute and Joliet the total revenue had about doubled this year as compared to last. Speaking of jitney competition Mr. Walker remarked that if the haul was short and the pavement good anything above a 5-cent fare was an invitation to jitney buses to begin business.

PUBLICITY SITUATION REVIEWED

B. J. Mullaney, who has been very active in the work of the Illinois Committee on Public Utility Information and the spread of this idea to other states, was then called upon. He said that committees had now been organized and were functioning in Indiana, Kentucky and Nebraska as well as Illinois, that organizations in Ohio, Iowa, Wisconsin and Missouri were getting started, while in Michigan and Texas plans were under way for completing an organization of a similar publicity committee. He said he also felt confident that co-operation on the part of the main national associations might be expected before long.

Mr. Mullaney urged the electric railway men to greater activity in putting before the public the simple and obvious facts of the utility business. He said that if all of the men of the industry would simply keep passing along the simple truths to all with whom they come in contact in the course of time this could not help but have a very beneficial result in securing an understanding on the part of the general public as to the true light in which they should look upon the public utility servants. The speaker said he regretted to say that the railway men were not yet doing as much as they should in this matter of proper publicity. He commented that many were not doing any advertising in their local papers, and it was his opinion that every company should be a fairly frequent space user in the local papers. He said that if we in the utility business do not look after our own interests in the perfectly legitimate way which is at our command there is no one else who is going to do this for us, and it will be

our own responsibility if the public is not in due time made to understand that the welfare of the utilities is their own welfare.

Directing his talk to the supply men present, Mr. Mullaney said that they were vitally concerned in the welfare of the electric railway industry and should take it upon themselves to seize every opportunity to spread the proper knowledge of the industry to the general public. He pointed out the selfish interest of the manufacturers and supply men in the well being of the utilities, saying that the utility companies could now, for the most part, operate their properties as they are, on present rates, and "get by" so far as earnings are concerned. The real trouble which they face is the necessity to expand facilities and their inability to get the necessary money to make such extensions. Making extensions calls for the equipment of the manufacturers, and that is why they should take a keen interest in helping the utility companies to bring about a proper understanding of their problems on the part of the public so that popular sentiment will not react against the ability of the company to get new money for extensions. He said the supply men could help not only by direct activities in contact with the people but also by making suggestions to the railway men and the publicity committees as to ways and means of solving the problems.

Mr. Parsons stated that he had found that about the only way he could get the local papers to use the matter sent out by the Illinois committee was to make some comment upon that information, tying it up with the local situations. In fact, he said that the newspapers had flatly refused to publish the matter unless it did have a local aspect. In this connection he asked Mr. Mullaney if it would not be possible for the committee to send the information it expected to put in the hands of the newspapers to the local managers long enough in advance to give the operating man a chance to add some expression which would tie the general situation up with the local situation, so that the matter could go to the newspapers accompanied by this local interpretation. Mr. Mullaney said that this might be possible in a few cases, but that many times it would involve a delay which would make the news too old. It was pointed out that this local handling of the general information by the local managers was the manner of presentation that the committee was trying particularly to obtain.

Nic LeGrand, National Safety Car & Equipment Company, St. Louis, Mo., was called upon and he spoke briefly of the high prices which now obtain for safety cars and the present reluctance of the bankers to arrange long term car trust equipment notes providing for deferred payment. He said that two years was about the longest term the bankers would now make and that they wanted a rate of 8 per cent. He considered these conditions practically prohibitive. In explaining the slow delivery of safety cars he said that the car builders had been very seriously interrupted by the strikes in their plants, but that conditions were now much improved.

The nominating committee, of which Mr. Parsons was chairman and R. A. Moore, Joliet, and John Benham were the other members, recommended the election of the following officers for the ensuing year, and the convention approved, instructing the secretary to cast the unanimous ballot of the association.

President, E. M. Walker, general manager Terre

Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.; first vice-president, W. L. Arnold, managing director Elgin & Belvidere Electric Company, Chicago; second vice-president, A. D. Mackie, general manager Springfield Consolidated Railways; secretary-treasurer, R. V. Prather, Springfield, Ill.

ENTERTAINMENT FEATURES OF CONVENTION

At the close of the meeting at noontime, the Sangamo Electric Company, in whose assembly room the meeting had been held, entertained the members and guests at a luncheon, which was so enjoyable and so elaborate

that there were many remarks during the afternoon indicating that this was responsible for many of the low scores turned in in the golf tournament. After the luncheon the delegates made a brief inspection trip through the plant of the Sangamo company and saw the manner of making and testing meters from the beginning to the finished product.

In the afternoon, at the Springfield Country Club, a handicap match tournament against par for the president's cup was won by Robert E. Belknap, Bethlehem Steel Company, who with a handicap of 21 made a gross score of 86.

Basing Car Inspection on Energy Consumption*

Advantages of This System Over Mileage or Time Basis Pointed Out — This System Is Flexible, Accurate and Controls Length of Inspection Period According to the Work Done

BY L. E. GOULD

President Economy Electric Devices Company, Chicago, Ill.

PROMPT and regular inspection of electric railway rolling stock is of great importance, not only from the standpoints of safety and good operation but also, because forehandedness in inspection results in lower over-all car maintenance costs, while deferred maintenance means mounting costs for repairs.

Most car inspection work now is based on mileage or a combination of mileage and time. With either of these a system of clerical records is required for calling in the cars for inspection. Extensive clerical work is necessarily expensive, particularly so when the keeping of mileage in the mechanical department duplicates similar work in the transportation or auditing department. The expense for accurate mileage keeping has deterred numerous roads from inspecting on the mileage basis, and therefore the time basis is being used, even though the time unit is generally recognized by engineers to be a much less accurate and less efficient unit.

The most accurate unit to use in determining when cars should be called in for inspection is one which will most nearly measure the punishment which the car has received. This unit should fill every situation developed in revenue as well as non-revenue service. And the unit should be one which will admit of applying a uniform factor of safety rather than one which does not take into account the actual work which the car has done. It should be a unit of punishment.

Consider first the time unit. It does not in any but a very approximate way take into account the distance a car is operated between inspections. Neither does it account for the kind of service treatment the car has received. Likewise, the mileage unit, of say, 1,000 miles, will call in a car for inspection only on the distance basis, irrespective of whether that car has been well or poorly operated; whether it has been in a fast or slow schedule; with or without a trailer, with or without heavy loads or on hilly or level track.

We believe the energy consumed is the most desirable inspection unit. Kilowatt-hour consumption between inspections is the safest, most accurate, most efficient and most readily available measure of work done by the

essential parts that wear and need inspecting. It is the most accurate basis for measuring the car inspection interval, because most parts of the car require attention in direct proportion to the work done by the car motors.

Electrical equipment depreciates and wears in direct proportion to the energy consumed by the motors. The wear of truck parts, brakeshoes and wheels depends upon speed, number of stops per mile, condition of track, weight of car, etc., all of which are factors in determining the rate of energy consumption. If for any reason, such as faulty connections, open armature coils, short fields, binding brakes, tight side or center bearings, etc., a car is working unsatisfactorily, more energy will be consumed for a given mileage of the car than if the equipment were in good condition and the car will automatically be called in early for inspection.

If a car is on an easy-schedule line, having infrequent stops and level track, it will consume less energy than a car operating on a difficult schedule with frequent stops and severe grades. On a mileage or time basis each car would receive an equal number of inspections. On a kilowatt-hour basis fewer inspections would be given the car operating on the easy schedule, and thus a substantial saving in labor would be effected.

If the equipment is unsuited for the service to which it is assigned it will consume more energy and be punished more than the proper equipment for this service, and hence, on the kilowatt-hour inspection basis, will come in oftener for inspection. A car with tight brakes, nosing trucks, short-circuited fields or when roughly or improperly handled by the motormen will consume more energy and will need inspection more frequently. Inspection on the kilowatt-hour basis automatically shortens the inspection period on the roughly handled car and prolongs the period on the properly handled car.

Work done by a car operated by barnmen or in switching around the yards is not accounted for on a time or mileage basis. The kilowatt-hour basis measures every bit of work done by a car, no matter who operates it.

When a car is hauling a trailer it is required to do more work than when operated alone, but under the

*Abstract of paper presented at meeting of Illinois Electric Railways Association, Springfield, Ill., July 30, 1920.

mileage or time basis of inspection this additional work is not taken into account, while on a kilowatt-hour basis this additional work is automatically taken care of. In brief, car inspection on the kilowatt-hour basis brings a car in for attention in direct proportion to the punishment that that car has received.

DEVELOPMENT OF INSPECTION SYSTEM BASED ON ENERGY CONSUMPTION

The idea of car inspection on the work done or kilowatt-hour basis was first conceived as an alternative method of inspection on a large Eastern property which was at that time inspecting its equipment upon a time basis. The management of this property recognized that the time basis of inspection was unsatisfactory and the officials were desirous of changing to the mileage basis, but the local conditions made it almost impossible to obtain the car-mileage within a reasonable period of time. Hence there were many chances for missing inspections or for cars exceeding the mileage allowance between inspections. At about this time Economy power-saving watt-hour meters were being installed on this property and one of our engineers advanced the idea that the kilowatt-hours consumed could be used as a close measure of the car mileages. The proper inspection unit could be determined by finding, for each class of equipment, the average total kilowatt-hours consumed in running the desired mileage between inspections.

One of the first objections raised in this connection was that under some operating conditions a car might consume more energy than under other conditions and hence would come in for inspection more frequently than would happen under the mileage system. As the general plan was developed, however, it was found that this seeming objection to the kilowatt-hour basis of inspection was one of the strongest points in favor of it, since it provided that the car would be inspected on a basis of the actual work it was required to do rather than upon the mileage covered.

In addition to these fundamental advantages there are also the following features in favor of this method of handling inspection intervals as developed for use with the Economy power-saving railway meter equipped with car inspection dials. (1) The meter automatically indicates without any clerical labor when a car is due for inspection; (2) the inspection periods are instantly indicated, no time being required to figure the mileage made, which, under the very best conditions, means a delay of a day; (3) the meter shows at a glance how much more work a car can do before inspection; (4) in case of a road failure the meter indicates how much work the car has done previous to the failure; (5) an inspection dial set-back feature assures that the foreman checks the inspection as having been made.

The kilowatt-hour basis of inspection is very flexible and the length of the inspection period may be changed to suit conditions. If it is found that the inspections are too frequent one need merely increase the kilowatt-hour interval to a point which will give the desired increase in the amount of work which a car will do between inspections. Experience on roads which are using this system shows that very substantial savings can be accomplished by this method.

ECONOMIES THAT HAVE BEEN EFFECTED

On a route on one property where this method of calling in cars for inspection has been used for nearly two years we have twenty-one cars operating out of a certain

barn. Practically all of these cars are operated during the rush hours, while only five cars are operated during the non-rush period. Under the old method of inspection on a time basis these cars were inspected every four days. This required about 150 inspections per month. On the kilowatt-hour basis of inspection the average inspection period is a little more than twenty days, or a total of thirty-two inspections per month, as contrasted with 150 formerly, and the factor of safety has not been decreased. The average time necessary to make an inspection is said to be about two hours. Therefore, the adoption of the kilowatt-hour basis shows a total saving in time of 236 hours per month, or about ten hours per car per month. This saving in time may be absorbed either in more thorough inspection or by a reduction of the inspection force.

Another large road estimates that the reduction in maintenance labor, due to the decrease of the number of inspections by the use of the kilowatt-hour basis of inspection, will be about \$30 per car per year. While this figure is not so high as that previously quoted, in the latter case it represents a reduction from the cost of inspection on a mileage basis as against a reduction from a time basis of inspection in the first instance, and experience is showing a reduction in road failures on the cars so far equipped for kilowatt-hour inspection.

Summing up these points in favor of this method of inspection, we have the following: It gives more uniform intervals of inspection based upon the actual work done by the car; it is flexible and allows a change of inspection interval when needed; it cuts down shop expense by eliminating unnecessary inspections; it indicates the inspection interval instantly and automatically, and in addition shows the shop men how much more work a car may do before inspection so that they may assign the car to the proper run which will bring it back to the barn at the time it will be due for inspection.

CONSTRUCTION OF METER FOR HANDLING INSPECTION WORK

In order to handle the kilowatt-hour inspection plan with Economy watt-hour meters a new meter train was designed and is now in production. Separate dials were added so that the indication of inspection intervals is automatic and in no way confused with the dial regularly read by the motorman when entering his power-saving records.

In the standard construction as now being made by the Sangamo Electric Company for a substantial number of roads the inspection dial has three circles placed at the bottom of the dial face. These are marked respectively A, B and C, and each has a successively higher value in kilowatt-hours per revolution. For example, the dials for safety cars are: A = 1,000, B = 7,500 and C = 30,000 kw.-hr.

Each dial is equipped with a red marker hand, which may be set at any desired inspection interval value, and a meter-driven hand can be set back to zero when the inspection is made. This reset hand is controlled by a key, so that it is impossible for any unauthorized person to change the setting when the key is withdrawn from the lock.

The red marker hand on dial A is set so as to indicate a value of kilowatt-hours equivalent to the usual inspection period for brakes and controllers. This is usually about one day's work, an average of 90 to 100 miles for city service and 100 to 200 miles for interurban

service. When the black meter-driven hand reaches the marker hand the shopmen know that the car is due for inspection of brakes and controllers. Likewise the marker on dial B is set to indicate the proper inspection interval for oiling and dial C is set to indicate the proper inspection interval for general inspection. The values given for a complete rotation of each dial are made so as to allow a great deal of variation in the settings of these marker hands, thus allowing local conditions to be taken properly into consideration.

Three sets of gear ratios for inspection dials are manufactured, one for light-weight city cars, one for double-truck city cars and one for interurban cars. These, together with the wide range of settings of the marker hand on any one dial, make a very flexible and easily adjusted medium for the proper indication of inspection intervals.

Selling the Zone Fare Idea in San Diego

**Carefully Planned Educational Methods Overcame
Adverse Public Opinion—Girls Sell \$5,000
Worth of Tickets in Advance**

DURING the annual meeting of the California Electric Railway Association held at the Palace Hotel, San Francisco, May 25, 1920, William Clayton, vice-president San Diego Electric Railway, declared the new zone system of fares which went into effect in San Diego Jan. 1, 1920, by order of the California Railroad Commission, to be a complete success.

During the first four months to April 30, 1920, the revenue passengers decreased 164,196, or 2.06 per cent, as compared with the corresponding period during 1919, while the revenue received from the transportation of passengers increased \$93,662, or 28.40 per cent. The company's income shows an increase of \$91,036, or 25.35 per cent, and the outgo an increase of \$34,880, or 7.20 per cent. As a result, the net increase for the first four months amounted to \$56,155, or 44.87 per cent.

Mr. Clayton expressed the opinion that the zone system of fares was the best method of increasing the company's income, for the reason that under conditions existing in San Diego it is the best and most economic plan for the public and the company. At first the public did not believe this. In fact, with the exception of the Mayor, the entire official family of the city was opposed to the zone system, and in entire agreement with them were the real estate men, the Merchants' Association and the Chamber of Commerce. However, an educational campaign of such comprehensive scope was carried out that not only were a large number of tickets sold in advance, but in many other ways the riding public was so well prepared for the change from straight fare to zone system that there was no confusion or congestion when the new plan went into effect. Moreover, the public had been won over from opposition to approval so effectively that receipts since the change, as noted below, are highly satisfactory.

The educational work began with the company's own men first, and all transportation department employees attended one-hour classes (on company time) until they had been thoroughly grounded in the principles involved. These classes were addressed by E. J. Burns, assistant to the vice-president, the manager of transportation or the traffic man.

As it was believed that success could be attained only through personal contact with the public, it was deemed necessary to supplement the work which the company's own employees could do by extra help. Accordingly, twenty intelligent girls were selected and given a ten-day course of training. In this time they were coached not only on the matters involved in the zone system but also on the financial affairs of the company. The company made arrangements so that these girls were provided with tables where they would meet the public in banks, department stores and hotels. The tables were provided with placards and literature and the girls were to answer questions about the new zone system and to sell street car tickets. To encourage competition, prizes were offered the girls who sold the greatest number of tickets. The contest extended over ten days, just prior to Christmas, and the girls were provided with books of tickets containing coupons for forty rides, good until used. The books were neatly made up in Christmas covers and sold for \$3. In this ten-day period this team of twenty girls sold about five thousand dollars' worth of tickets.

The fundamentals of the zone plan were explained to the heads of large industries, wholesale houses and department stores, and through their co-operation the street railway company employees were enabled to address the workers in these stores and industries. For example, the traffic man talked to a meeting of employees at every large mercantile or industrial establishment, explaining what the zone system was, how it would work and answering questions or objections that were raised. In each of these talks the traffic man was accompanied by platform men in uniform who sold books of tickets. Arrangements were ordinarily made with the employers beforehand so that any employee could get a book of tickets by signing a receipt, to be turned over to the company, which authorized a payroll deduction. It is notable that employers were willing to have employees attend these meetings during working hours even in the rush season just before the Christmas holidays. One of the most important features of the plan for "selling the idea" was to give platform men 3 per cent of ticket sales. Under the plan 3 per cent of all money received from the sale of 7½-cent tickets each month is set aside as a bonus for platform men and is added to their wages on the basis of the number of hours worked. The total number of platform man-hours is made equal to this 3 per cent fund and the number of hours each man has worked determines his share of the total.

Under this plan the conductors and motormen are always anxious to sell tickets, and in the several months' experience with the plan it is found that more than 95 per cent of all 7½-cent tickets sold are purchased on the cars. Under this plan the platform men are charged with so many books of tickets when they receive them, and accounting is simplified because each man is responsible for his supply.

Arrangements were made with the telephone company so that on New Year's Eve and New Year's Day every telephone subscriber was called up and reminded that the zone plan was going into effect. The usual conversation was "Happy New Year! This is the San Diego Electric Railway. Just to remind you that the zone system goes into effect Jan. 1." This telephoning was done from the four branch stations of the telephone company, in each of which special switchboards had been fitted up for the purpose. The railway company

kept men on duty in each of these stations to answer inquiries which might call for more information than the girls could give.

Several days prior to the adoption of the new system cars carrying signs were sent over all lines of the system. A real test of public sentiment was made on Christmas Day, when 10,000 people had gathered in the stadium to witness a football game. For this occasion the company had one of its line wagons fitted up with signs bearing announcement of and statements about the zone system. This wagon made the circuit of the stadium between the two halves of the football game. Observers stationed throughout the crowd did not hear any adverse comments. In fact, platform men in uni-

register which the conductor carries. The company supplies a special vest equipped with pockets for tickets and transfers, which has been found to be most convenient for speedy service to the passenger. Under the San Diego plan there is only one collection per passenger on each trip, and identification slips, issued when fare is paid, are taken up when zone boundary is crossed. Transfers are issued in three colors, this being sufficient to identify the ride to which the passenger is entitled under the several combinations that are possible. Under this plan all looping is prevented.

Owing to the decrease in the number of men stationed at Camp Kearney, North Island and other military points in the vicinity of San Diego it was expected that

SAN DIEGO ELECTRIC RAILWAY COMPANY
Comparative Statement of Income and Outgo and Operating Statistics for the first four months, January-April, 1920, Compared with the corresponding period of 1919

Item	First Four Months January-April, 1920		First Four Months January-April, 1919		Increase or Amount	Decrease Per Cent
	Amount	Per Cent	Amount	Per Cent		
Income:						
Revenue from cash-fare passengers	\$152,771.65	33.93	\$287,738.53	80.12	\$134,966.88	46.91
Revenue from ticket passengers	270,667.39	60.13	42,038.31	11.71	228,629.08	543.85
Revenue from transportation of passengers	423,439.04	94.06	329,776.84	91.83	93,662.20	28.40
Other revenue from transportation	358.00	0.08	1,016.02	0.28	658.02	64.76
Revenue from other railway operation	22,348.82	4.97	25,316.47	7.05	2,967.65	11.72
Non-operating income	4,017.95	0.89	3,018.44	0.84	999.51	33.10
Total income	\$450,163.81	100.00	\$359,127.77	100.00	\$91,036.04	25.35
Outgo:						
Way and structures	\$24,551.36	5.45	\$25,765.95	7.17	\$1,214.59	4.71
Equipment	22,059.39	4.90	21,289.24	5.93	770.15	3.62
Power	64,583.07	14.35	55,508.13	15.46	9,074.94	16.35
Conducting transportation	138,964.12	30.86	120,263.59	33.49	18,700.53	15.55
Traffic	7,462.65	1.66	3,448.19	0.96	4,014.46	116.39
General and miscellaneous	47,974.90	10.66	50,591.08	14.09	2,616.18	5.17
Transportation for investment—Cr	186.19	0.04	24.09	0.01	162.12	673.54
Operating expenses	\$305,409.30	67.84	\$276,842.11	77.09	\$28,567.19	10.32
Depreciation	91,306.84	20.28	103,547.06	28.83	12,240.22	11.82
Taxes	28,540.84	6.34	23,255.82	6.48	5,285.02	22.73
Rent of Point Loma Railroad	7,453.37	1.66	7,453.37	2.08	—	—
Interest on funded debt	62,066.67	13.79	62,733.33	17.47	666.66	1.06
Amortization of discount on funded debt	4,774.20	1.06	4,825.56	1.34	51.36	1.06
Sinking fund (retirement of bonds)	19,600.00	4.35	13,066.64	3.64	6,533.36	49.99
Total outgo	\$519,151.22	115.32	\$484,270.52	134.85	\$34,880.70	7.20
Deficit	68,987.41	15.32	125,142.75	34.85	56,155.34	44.87
Operating statistics:						
Revenue passengers carried:						
Cash fare passengers	2,785,171	35.64	5,738,171	71.92	2,953,000	51.46
Revenue ticket passengers	3,873,862	49.57	1,147,663	14.38	2,726,199	237.54
Transfer passengers	1,155,201	14.79	1,092,596	13.70	62,605	5.72
Total revenue passengers	7,814,234	100.00	7,978,430	100.00	164,196	2.06
Car-miles and car-hours:						
Car-miles operated	1,258,619	.....	1,170,229	.....	88,390	7.55
Car-hours operated	132,117	.....	129,631	.....	2,486	1.92
Car-miles per car-hour	9.53	.....	9.03	.....	50	.....
Platform hours and wages:						
Platform hours	235,730	.....	234,034	.....	1,696	0.72
Platform wages	\$105,822.04	.....	\$97,925.50	.....	\$7,896.54	8.06
Average cost per platform hour	44.89c.	.....	41.84c.	.....	3.05	7.28
Average cost per car-mile	8.41c.	.....	8.37c.	.....	0.04	0.48
Passenger revenue statistics:						
Average revenue per cash fare and ticket	6.76c.	.....	5.22c.	.....	1.54	29.50
Average revenue per revenue passenger	5.76c.	.....	4.50c.	.....	1.26	28.00
Average revenue per car-mile	35.76c.	.....	30.69c.	.....	5.09	16.58
Average revenue per car-hour	3.41c.	.....	2.77c.	.....	0.64	23.10
Average income per day	\$3,720.36	100.00	\$2,992.73	100.00	\$727.63	24.31
Average outgo per day	4,290.51	115.32	4,035.59	134.85	254.92	6.32
Average deficit per day	\$570.15	15.32	\$1,042.86	34.85	\$472.71	45.33

form, who handed out pocket size maps showing the limit of the zones, as the crowd was leaving the grounds, sold some three hundred dollars' worth of tickets.

So many tickets had been sold and the details of how the plan would work were so thoroughly explained in advance that there was no confusion or congestion on Jan. 1. During the first week instructors were detailed to ride the cars and answer questions or aid the conductors in their work. A few days before the end of each month this plan is repeated.

Under the plan as used in San Diego tickets are not put in a fare box. The fare register rings up 5-cent fares on one side and tickets and transfers on the other. Ten-cent fares are registered by a portable neck there would be a considerable decrease in the number of passengers carried in the first four months of this

year. As shown by the accompanying table, however, there has been only a 2 per cent decrease in the business in these months, and in the months of April there was a 1 per cent increase. In May this rose to 5 per cent. It is notable that the table shows a 29.50 per cent gross increase, which is the equivalent of a 6½-cent fare. This indicates, company officials believe, that there has been no shrinkage on account of the increased fare, and all of the short-haul business has been retained, which would not have been the case had an increased fare for the entire system been adopted. Moreover, the company has the great advantage that in the event that some later change may be necessary this can be accomplished by rearranging the zone limit much more easily than would be possible if it were necessary to change the amount of fare.

London's Traffic Problem¹

Comparison Given of Means of Transport in London and Other Cities on Basis of Carrying Capacities and Weights per Seat—As Auxiliary to Rapid Transit Lines Bus Has Many Advantages—All Transportation Means Should Be Co-ordinated with Unity of Financial Interest

By LORD ASHFIELD

Chairman and Managing Director London Electric Railway and Associated Companies

RAILWAYS, tramways, motor routes are alike in purpose, though different in form. The tendency is to judge them by their form and to insist on their diversity, forgetting almost wholly their essential likeness as carriers of passengers. If it is considered that a railway, or railroad, as it may be better named, is but a special type of street, one common aspect of the three is more quickly recognized and one common problem of the three more easily solved.

There is a street and in it passengers requiring to be carried along its way. At first the passengers are few and a motor omnibus serves, then the passengers increase in numbers and more and more motor omnibuses are added, until there comes a time when the street is full of vehicles. For, after all, the motor omnibuses are only a part of the whole vehicular traffic. The street must be widened to relieve the congestion, and the question that should present itself is whether a new and special street should not be built to take off one class of the traffic; it may be heavy goods, but it is much more likely to be passengers. This special street may be underground, as in London, or elevated, as in New York, but it is only a special street, where greater speed is possible and fewer interruptions from cross and converging traffic are experienced.

What is the position of a tramway? It is intermediate between a motor route and a railway. It enjoys severally the virtues of both, but it accumulates their defects. It can deal with the casual passenger of the street almost as well as a motor route. It can deal with a heavy occasional load of passengers almost as well as a railway. But it needs a costly special track with its equipment like a railway, and that special track is subject to all the hazards and delays of the street, which means no advance in locomotion over the motor route. Is it cheaper to widen a road to build a tramway or to build, above or below, a special railroad? The answer turns not merely upon the capital expenditure, though that may be decisive; it turns also upon the public advantage.

In America there are practically no motor routes. The motor omnibus (except for the Fifth Avenue Coach Company of New York, which has a special sphere of influence there and works about 300 motor omnibuses)

¹[Lord Ashfield, formerly Sir Albert Stanley, has contributed an extended article on "London Traffic Problems" to the May issue of the *Nineteenth Century and After*. In this article he discusses the present transportation systems in London, in which the rapid transit lines and buses, with certain outlying trolley lines, are owned by private interests, while the tramways serving a large part of the central part of Greater London are owned by the London County Council. Lord Ashfield urges in his conclusions, among other things, the "transfer of all transportation agencies to private enterprise, subject to public control, and the establishment of a pooling scheme under which measure of co-ordination may be taken without prejudice to any specific interests." Outside of the purely local situation considered, Lord Ashfield's article contains much that is of general interest and application. The accompanying article is an abstract of that part of his contribution in the *Nineteenth Century and After*.—Editors.]

is a new thing and its development is only just beginning. There have been street railways for many years, not stereotyped like the tramways of England, but always progressing in design and construction and in methods of operation. The street railway, as an intermediate type capable of dealing with long- and short-distance passengers, with heavy and light loads of passengers, has so far met the needs of the expanding cities in America efficiently and well. It fulfills its function. But there comes a time when the expansion is too great even for the most efficient street railway to meet the public demand for travel. It is generally recognized that when the population tends to reach the second million the time has come to resort to some other instrument of travel.

RADIAL ROUTES BECOME OVERLOADED

Two causes lead up to this conclusion. First, the city has spread out over a territory extending some 8 miles or more on every side from the center. The time taken on the journey between the center and the fringe of the built-up districts, under ordinary street conditions, is prolonged to fifty minutes or more, which is felt to be too extravagant a consumption of the working day. Second, out there the size of the city is the index to the magnitude of its business, and this business has filled the main radial routes with a great volume of vehicular traffic, to be in itself a hindrance to speedy movement, and has created a density of passengers at certain busy hours on those radial routes with which a street railway, still less a motor route, cannot satisfactorily cope. The task of decentralizing a city is one not to be lightly undertaken, and unless this can be achieved another remedy must be found. What is needed is grasped at once in America. It is a special street above or below the existing surface street upon which the passenger traffic can be carried conveniently and quickly. The obstacle in resorting to this remedy is the capital invested in street railways. There is rarely enough passenger traffic on a radial route to support both an expensive elevated or underground railway and an expensive street railway or tramway. American cities are one by one being compelled to face the loss which such a conjunction involves. It is this obstacle which is now slowly directing attention to the motor omnibus.

The motor omnibus is just what is required to supplement and feed a railway. It has no fixed capital in track and equipment. It is not tied to a route. It can follow the passenger traffic to its source or it can lead the way to new settlements. It can take up the casual short-distance passenger and by a complex ramification of routes, each independently worked, meet his closest requirements. All the while the main volume of

passengers can be carried swiftly in the leading directions by the special railroad system without occupation of the street capacity. Once a city passes a certain size the street railway solution of the traffic problem is seen not to have been the right one. The street railway is an intermediate solution, good until a more highly specialized scheme of transport facilities is wanted.

SPEED GOVERNS DISTANCE SERVED

More important than the capacity of the transport facilities, for mere multiplication of services will meet this, is the speed. The citizen of New York has made a fetish of speed. He gives himself pains to catch up a few minutes. He chooses instinctively not the most comfortable conveyance but the fastest. Thus he crowds the subway to distraction. Now that London is outgrowing the distance that can be covered by the ordinary stopping train it must learn the same lesson and by taking thought for the future it must avoid the misfortune that befalls the New York passenger.

What time will a regular passenger give for his journeying day by day between his home and his workplace? Not much more than 45 to 50 minutes, of which only 30 to 35 will be available for the actual journey by train, tram or omnibus, the higher allowance occurring where the time taken to reach the transport agency is less, as with the train or omnibus, on account of their more frequent stops. Given a practical time limit, such as this, the speed governs the distance that can be served.

The present average speed of the underground railways is about 18 miles per hour. By the present non-stop working this speed is raised to about 25 miles per hour. This corresponds closely with the average speeds reached on those portions of the main-line railways now electrified where the stops to be made are infrequent. The number of stops is the real factor governing the speed. The average distance between stations on the underground railways is about half a mile, on the main-line railways more than a mile. The demand for frequent stops on a railway is short-sighted, and the tendency for the future must be to space out the distance between stations on urban railways, leaving to the tram or omnibus the task of the more detailed distribution of the passengers and the carriage of those traveling comparatively short distances. It will then be possible, with the aid of improved equipment, to raise the average speed of a suburban railway service to 30 miles per hour and so cover the circle of 15 miles radius of the center in thirty minutes, which is, as nearly as may be, the problem to be solved.

Turning to street transport agencies, the omnibus is more speedy than the tram for several reasons. Trams running on a fixed track must observe a fixed order or sequence, and the slowest tram of a series determines the speed of all. Tram stops are longer than those of the omnibus, and at the same time more frequent, in consequence probably of the larger seating capacity of the tram. Trams are also more liable to delays. Whatever the causes, the result is that the average speed of trams in London is about 9 miles per hour and of omnibuses about 10.5 miles per hour.² The distances which they can cover in the allotted journey time are therefore 5 and 6 miles respectively. This affords the

most conclusive argument against either of these agencies taking a place as the mainstay of passenger movement in a Greater London. Both must be auxiliary to railways, and as an auxiliary the omnibus has great advantages. Looking to American experience once again the best record for speed on a street railway system is 11 miles per hour, and this is only secured by careful and efficient operation and a scientific study of stopping places. It is exceptional.

CAPACITY A FUNCTION OF HEADWAY

Although the factor of speed is emphasized, it is not to the neglect of the factor of capacity. The real criterion of capacity is the number of seats in a traffic unit—a train, a tram with its trailer, a motor omnibus. When the underground railways were built the designers made inadequate provision for trains of the length which now seem to be requisite. The earliest tube, the City & South London Railway, has platforms capable only of accommodating a train of five small cars seating thirty-six passengers each. This railway is in urgent need of modernization and enlargement. The Central London Railway has platforms capable of accommodating seven cars of the present standard size seating forty-eight passengers each. The Baker Street & Waterloo section, the earliest portion of the London Electric Railway, has platforms to accommodate five standard cars, but the later sections of this railway have longer platforms for six cars. Working the platforms to their fullest limits and making such alterations as are feasible a standard of seven cars to a train, giving seats to 336 passengers, is the best prospect. Compare with this the present practice of New York, where ten-car trains, each car seating ninety passengers, are run.

Turning to street passenger vehicles, the standard tramcar of the London County Council seats seventy-eight passengers and when coupled with a trailer 132 passengers. The present motor omnibus seats thirty-four, and the new omnibus, under construction for the replacement of the present fleet, forty-six. This must not be regarded as the limit to the seating capacity of a motor omnibus. In Chicago there is already a motor omnibus seating fifty-four, and designs have been prepared and an experimental vehicle is being built in this country to seat fifty-six. In this connection it is important to consider weight. The tramcar seating seventy-eight passengers weighs 15 tons, or represents a dead weight per passenger of 400 lb. The present omnibus seating thirty-four weighs 7,300 lb., or represents a dead weight per passenger of just over 200 lb. The new omnibus seating forty-six weighs 4 tons, or represents a dead weight per passenger of 175 lb., while the still larger omnibus to seat fifty-six will weigh, it is expected, 8,500 lb., and this represents a dead weight per passenger of only 150 lb. It is a repetition of the old instance of the goods wagon where the argument for a greater load capacity was based upon the economic gain in the better relationship of tare to gross weight. The main weight of the empty omnibus is already there in the present small vehicle and the increase in weight for the increase in capacity is very slight. A better distribution of the load over the four wheels, improved springing and more resilient tires will mean less and not more road shock and vibration for the augmented weight. While, therefore, there is an excellent case for a larger omnibus, opinion is divided upon the question

²[In the article by Walter Jackson on London Tubes and Buses, *ELECTRIC RAILWAY JOURNAL*, Oct. 11, 1919, page 708, the over-all schedule speed of the buses as officially approved by the company is given as 3½ m.p.h. This discrepancy may be due to the data having been taken at different periods or under dissimilar conditions.—EDITORS.]

whether the tram is not too large and cumbersome. Certainly it is slow and ponderous in operation, and, as the figures given above show, is a much less efficient vehicle from the point of view of dead weight.

The maximum capacity of a transport agency turns not only upon the possible size of the traffic units employed but also upon the frequency of service with which they can be operated. It is possible with electrically controlled automatic signaling to bring the capacity of a single track of railway up to 40 trains in the hour in one direction. The highest number worked in one hour on the underground system has been 43. The number of passengers which can be carried in the hour on the basis of the seating capacity of the trains is therefore about 13,500, or with 50 per cent of standing load about 20,000. A tramway track worked by trams and trailers attached is found by observation to permit of the movement of sixty-five units in one direction in the hour. The number of passengers which can be carried in the hour on the basis of the seating capacity is therefore about 8,500, or with a complement of standing passengers about 10,000. It is not suggested that sixty-five is the maximum possible movement. American results would suggest a higher figure by about 25 per cent, but to secure this a considerable simplification of routes and track would be necessary.³ The maximum possible passenger movement may be taken as 12,500. An arterial road used by motor omnibuses is found by observation to permit of the working of 150 in each direction in the hour, which on the basis of forty-six passengers to the vehicle means a total possible passenger movement of about 7,000 in the hour, or, on the basis of fifty-six passengers to the vehicle, 8,500. In comparing tram and omnibus it is assumed that the roadway is sufficiently wide to permit of at least four lines of traffic, two in each direction; a less width were unsuited to metropolitan street conditions.

The railway on these figures is clearly best adapted to the movement of heavy densities of passengers, the tramway second, the motor route third, the difference between tramway and motor route constantly diminishing. The conclusion already indicated is therefore confirmed, which is that railways are essential to free and extensive passenger movement in a metropolitan area, and that as auxiliary to railways, which take off the heaviest traffic, the motor omnibus has distinct advantages over the tram.

COST OF ALL AGENCIES ABOUT THE SAME

This is more marked if consideration is given to the capital and operating costs. Taking capital first. A railway underground costs between four and five times a tramway, leaving out of count the cost of the street to the tramway and the cost of the acquisition of rights of way to the railway. If street cost were added to the tramway there would be many instances where it amounted to more than a railway. A tramway for a given maximum service costs more than thrice as much as a motor route worked to the same extent, ignoring differences in seating capacity. Next, taking opera-

tion, a tramway and a motor route cost per mile run almost the same sum, as might be expected, the advantage resting with the tramway, and both cost over half as much again as a car-mile on a railway. If all elements of cost, *i.e.*, operating expenses, reserves, fixed charges and reasonable interest, are brought together it will be found that the costs of the various transport agencies are approximately alike, being in the ratio of 21 for a railway car-mile to 22 for a tramway car-mile and 20 for a motor omnibus-mile.⁴ It is only fair to add that the seating capacity is as 48 is to 78 is to 46, so that the cost per seat-mile is as 44 for a train is to 27 for a tram is to 43 for an omnibus, which brings out the economic advantage of the tramway. This economic advantage is, however, lost by the operation of lightly loaded large units throughout the day. If, in place of the seating capacity, the average passenger load carried were applied the ratio would be as 123 is to 71 is to 74. On this basis it is seen the same factor now prejudices even more severely the railway.

SCIENTIFIC ALLOCATION DESIRABLE

A study of the performance and functions of the various transport agencies on these lines is the only way by which a scientific and accurate allocation of duties in the carrying of metropolitan passenger traffic can be assured. Maybe there is a want of dispassionate argument in this paper, and it can only be put forward as an index to what is required. Unfortunately, while the case against the tramways from several points of view appears very strong, there is a large vested interest in the tramways of London already in existence amounting to £23,000,000. It is impossible in these days of economic hardship to advocate a bold and courageous policy of scrapping, even if it were right. The evidence is not sufficient to warrant the assumption that it is right, but it is sufficient to deter any further ventures in tramway enlargement and construction.⁵

The program before a tramway undertaking upon a review of modern progress must, it is suggested, be limited to the consolidation and completion of the existing system, the straightening out of routes and the modernization of their equipment. A policy of rerouting cars is adopted frequently in American cities, and every effort is made so to arrange the routes as to avoid intersections. By this means over 180 cars, including trailers, can be moved over a single line of track in the hour. The size and arrangement of cars are tested in relation to the speed of operation, and the smaller car used in England giving a higher speed has been the general tendency in design as giving a maximum result. One-man cars equipped with safety devices are being freely adopted and present advantages which must always seem denied to a motor omnibus. By these means tramways are made more effective, but all these means cannot confer on them a capacity which will enable them to maintain their position as against railways in a metropolitan area. This decision may come hardly to a tramway man and to a tramway authority. And here is the real difficulty: A tramway authority is a local authority, tramway capital is public money.

³[In a report on Detroit in 1915 by Barclay, Parsons & Klapp, data are given showing the movement of 167 cars north bound and 167 south bound cars per hour on Woodward Avenue, 205 south bound and 189 northbound at Michigan and Fort and 181 cars in each direction per hour at Congress, Larned and Jefferson. This heavy traffic is opposed by conflicting traffic on cross streets amounting to 116 west bound and 45 east bound cars per hour on State Street, more than 100 cars per hour in each direction on Michigan and Monroe, 52 west bound and 56 east bound cars per hour on Fort and 85 west and 42 east bound cars per hour on Jefferson.—EDITORS.]

⁴Based on the costs at the close of the year 1919. [Author's note.]

⁵This paragraph refers only to metropolitan areas in which considerable distances are to be covered. The tramway is accepted as the most efficient means of local communication in well-developed cities of a diameter not exceeding 10 to 12 miles. The provincial tramway systems are eminently well adapted to provincial requirements at this stage of development. [Author's note.]

Politics conflict with a decision on scientific and statistical grounds.

And so the last part of this article is reached. How is the conflict of interests in London to be cleared up? How are traffic considerations to be divorced from politics?

CONCLUSION

The essential condition precedent to any attempt to achieve a satisfactory solution is to secure a unity of financial interest, not at all necessarily by municipal or state ownership, but preferably by a traffic pool, out of which the losses of one transport agency may be met out of the gains of another—a legitimate procedure where the gains on one side and the losses on the other side are the consequence of interference by some outside authority. Only where it has at its disposal the means to administer justice can any authority that may be set up enter safely upon a policy of interference with transport undertakings established and conducted with statutory or public sanction.

Upon the form there is no doubt that a single dictator would be most effective if he had a wise experience and a careful judgment. Because they doubt the existence of such a dictator, the advocates of bureaucratic control fall back on the combined wisdom and experience of three, and trust to the clash of opinion among them to insure a reasonable measure of good judgment. But opposed to them are other advocates who think that a bureaucratic control is contrary to the spirit of our English institutions, that executive action must be approved and confirmed by some representative body who must be responsible to the citizens for such action. The difficulties which beset this view are serious. A representative body is unwieldy, unswift, uncertain and uninformed. On the other hand it is always imbued with a spirit of compromise and endowed with a liberal measure of common sense, so long as the questions debated in it are not colored by party politics. There is the risk that traffic being mixed with party politics now, it may not be possible to unravel the two, and in such event control of traffic by a representative body becomes hopeless of benefit.

It is interesting to review in this connection the extent to which the local authorities have provided transport facilities compared with the extent to which private undertakers have done the same. The public moneys of the local authorities of Greater London invested in traffic facilities amount to about £18,000,000, but the public's own private investments in traffic facilities amount to about £80,000,000. The average dividend on the private investment as a whole has been about 3 per cent at the best. The average dividend on the public money has been higher, being about 3½ per cent. There are no profits to limit. Whoever owns the transport facilities becomes an academic question when the rate of interest on the capital will be the same whatever happens.

There are two alternative solutions of the problem of traffic control in London. There is the board or commission of three members, whose task is that of adjudicating in a fair and impartial manner upon the disputes coming before them with a view to smoothing out all the obstacles to a co-ordination and development of all transport agencies. Or there is the turning over of all transport agencies to private enterprise and the arming of the local authorities, severally and jointly, with such

powers as may be requisite to secure the conduct of traffic in a fair and impartial manner toward the public. It is hard to conceive a permanent solution which is a compromise from one or other of these alternatives—a statutory independent board, or an elective representative authority.

The advantage of private enterprise is that the business must be managed and conducted on a commercial basis, even on a competitive basis. We are apt today to underrate the advantages of the commercial outlook upon which the industry and prosperity of the country have been established in the past. The new spirit in affairs fights shy of the commercial spirit. It is agreed that they are not the same, but they are not antagonistic like oil and water; they will blend, and in their blending is the hope of the future. This admission is not to be taken as contradictory to the view already expressed that an ultimate unity of financial interest is the condition precedent to successful co-ordination. Competitive management does not imply competitive finance. The various transport agencies of London have their periods of prosperity and their periods of failure. Thrice already the omnibus industry has risen to opulence only to fall later into penury. When the common fund was set up under the London electric railway companies facilities act, 1915, the London General Omnibus Company was well enough off to assist the underground railways.

At the close of 1919, the underground railways had to come to the assistance of the omnibus company to meet its working costs. The old saying that what you gain on the swings you lose on the roundabouts is very applicable to London traffic and affords a good reason for some pooling scheme, which, subject to full publicity and with the supervision of those concerned with the public interests, cannot but be helpful and fair to all concerned.

The conclusions appear simple, but it is appearance only; underlying each of them, as this article has attempted to show, are controversies which can only be settled by men of good will.

Chicago Elevated Safety Record


IT WAS mentioned in the Jan. 31 issue of the ELECTRIC RAILWAY JOURNAL that the Chicago Elevated Railways was displaying a car card calling the public's attention to the wonderful record of the company in the matter of fatal accidents. The card referred to has since been obtained and is reproduced in the accompanying illustration.

A WORLD RECORD

TWELVE YEARS without a fatal
accident to a passenger on a train

TWO BILLION passengers
carried in that period

THINK IT OVER




SAFETY RECORD DISPLAYED ON POSTERS

Railway Operation in Buenos Aires

Railways Contribute to Pension Fund—City Fixes Wages for Employees—Thrift Stamps Used as Change—Cost Data

IN December, 1918, the street railway companies of Buenos Aires, the Anglo-Argentine Tramway Company and the Lacroze Tramway Company, presented a joint petition to the municipality asking for an increase of 2 cents (0.85 American cents) in the 10-cent fare (4.25 American cents), at the same time requesting the Mayor to appoint three municipal accountants to examine the financial and economic condition of the companies.

The street railway companies were forced to take this step because of the necessity of obtaining relief from the desperate financial condition brought about by the enormous increase in the prices of all kinds of equipment and materials, fuel, freights, as well as by the loss in traffic, increase of wages, the establishment of the eight-hour day and the threatened adoption of the pension law, which would oblige the companies to contribute to the pension fund 8 per cent of the wages of their employes and workmen.

Three accountants were appointed by the Mayor, who made thorough investigation of the financial condition of the companies. In regard to the pension law they reached the conclusion that, legally, the companies could not be forced to contribute to the fund, since, under the terms of the concession, the taxation, which already amounts to more than 10 per cent of the gross receipts, cannot be further increased except with the consent of the companies. They proved also that it was financially impossible for the companies to comply with the pension law, the eight-hour day ordinance or the workmen's demands for an increase in wages.

The new burdens that would be imposed on the companies are shown in the following table:

	Anglo-Argentine Company	Lacroze Company
Contribution of 8 per cent of wages of employees to pension fund.....	\$480,000	\$87,000
Increase in wages required by the minimum wage ordinance.....	260,000	35,000
Increase in number of workmen and consequent wage increase, due to the eight-hour day ordinance.....	480,000	85,000
General increase of 10 per cent in workmen's wages.....	570,000	140,000
Total.....	\$1,790,000	\$347,000

The net earnings of the Anglo-Argentine Company dropped from \$5,400,000 (American) in 1913 to \$3,300,000 in 1918, while the capital investment in 1918 was \$96,000,000. The annual interest charge alone on debentures amounts to \$2,650,000. This company has not paid dividends on the common stock since 1914, on the second preferred stock since 1916 or on the first preferred since 1917. The net earnings of the Lacroze company dropped from \$845,000 in 1916 to \$680,000 in 1918. The company has a capital of \$10,650,000 with a yearly interest charge on debentures of \$478,000.

As the present fare could not produce a sufficient revenue properly to provide for depreciation and give an adequate return on the capital invested and leave a fair surplus for emergencies the committee of accountants studied different methods to obtain the relief asked for by the companies and reached the conclusion that the fairest solution for all concerned was to grant the petition for an increase of fares.

After the several hearings and one year after the petition was filed the City Council granted the increase

of fares by introducing the following amendment to the concession, which recognizes the fact that every burden which is imposed on a public utility necessarily must eventually be transferred to the car rider.

ARTICLE 1—The city will enter into a new contract with the Anglo-Argentine and the Lacroze Tramway companies authorizing them to increase to 0.12 pesos paper the uniform tariff established in the ordinance of May, 1904; June, 1908, and December, 1909.

ART. 2—The increase referred to in the aforementioned article will be granted to the companies under fulfillment of the following conditions: (a) Establishment of a minimum daily wage of 4.50 pesos paper, or 120 pesos monthly, for all traffic laborers and workmen above eighteen years of age and 4 pesos paper daily, or 100 pesos monthly, for all car and track cleaners.

(b) Maximum working day shall consist of eight hours and shall not normally be exceeded, but if so, in all cases overtime will be paid separately. In so far as the traffic staff is concerned this wage will be calculated weekly, and in no case shall the working day consist of more than nine hours. The maximum working day for the subway guards and motormen shall consist of seven and one-half hours.

(c) General increase of 10 per cent shall be given on all the present salaries and wages which do not exceed 250 pesos per month.

(d) Immediate contribution by the companies of 8 per cent of all wages and salaries toward the formation of the pension fund.

ART. 3—The city will arrange with the tramway companies for the immediate incorporation, in their respective contracts of concession, of the pension scheme contained in the proposed law sanctioned by the Chamber of Deputies, thereby anticipating its definite promulgation.

ART. 4—The increase of 2 cents paper established in Art. 1 shall rule during the term of three years. In the event of the tariff being reduced to the present 10-cent fare the municipality will come to an understanding with the companies regarding the manner in which the contribution of 8 per cent to the pension fund, referred to in subsection (d) of Art. 2, shall be made.

ART. 5—Within two years following the signature of this contract the Anglo-Argentine and the Lacroze companies shall present to the city complete documentary evidence of their invested capital. All new investments must be approved by the city.

ART. 6—During the existence of this authorization the companies shall not earn a greater net profit than 8 per cent per annum upon the whole of their capital invested and approved, and the municipality shall have ample power to investigate all new authorized investments. Should the yearly balance show a net profit greater than the 8 per cent aforementioned the surplus shall be held by the municipality pending a decision regarding the possibility of reducing the fares. The books, balance sheets, reports and other documents shall be drafted and printed in the national language. The city is free to examine the companies' books and statistics at any time, to ascertain whether they comply with the conditions contained in the present agreement, and each company shall present to the city at the beginning of every half year a complete and detailed balance sheet showing the business records for the preceding year. The companies must not, on any account, impose fines upon their staff.

ART. 7—The workmen's fare shall be maintained at the present 5 cents paper tariff and the transfer tickets shall also be maintained at their present rate of 15 cents paper. In the workmen's cars during the morning hours return tickets will be sold, good for a return trip at any time after mid-day on any surface car.

ART. 8—To facilitate the sale of tickets, the companies are obliged to sell, on all their cars, coupon books containing five and ten coupons each.

ART. 9—The Anglo-Argentine company promises to construct 30 km. of new tracks within the term of three years in accordance with specifications to be agreed upon between the municipality and the company.

ART. 10—In the event of any difference of opinion arising between the workmen and the companies, either individually or collectively, regarding labor matters, and always provided that the parties in conflict have been unable to come to an understanding, the company must submit the solution of the conflict to the arbitral judgment of the municipality.

The scarcity of pennies in circulation and the dislike of the people for them because of their large size introduced the difficulty of making change. To solve

this problem the companies, besides selling books of five and ten coupons each for 0.60 and 1.20 pesos paper respectively, are authorized to offer postal saving stamps as change if the people prefer. The companies, however, do not accept these stamps in payment for the tickets or change.

This method is used to develop thrift in the people, and the Postal Savings Bank has extensively advertised this plan in the street cars. If the car rider does not buy coupons and does not have the exact change he is obliged to accept the saving stamps. For example, when he gives the conductor 15 cents the change given back to him is composed of a 2 cent copper and a saving stamp of 1 cent, as the 1 cent coppers are not in general circulation. There are many car riders who prefer the saving stamps to the cumbersome coppers. In exchange for the fare or the coupon the conductor issues to the passenger a fare receipt.

The coupon books are good for two months and the unused coupons are exchanged for new ones at the expiration of the term. To prevent fraud, frequent changes of color, design, etc., are made. The workmen's fare, 5 cents paper, has been unchanged and gives laborers the opportunity to buy during the morning hours, in the workmen's car only, a round-trip ticket for 10 cents paper and to return to work in any surface car after mid-day. The workmen's cars are trailers that run from 5 to 7 a.m.

The price of the transfer has also been unchanged and is 15 cents paper for most changes, including subway to surface lines and *vice versa*.

The minimum wages fixed by the City Council are the same as those fixed for their own workmen and for those of all contractors who are working for the municipality.

By this law the City Council has recognized two rights which are of great importance, *i.e.*, the right to earn an adequate return on the whole of its invested capital and the right to get compensation of some sort for the 8 per cent contribution to the pension fund, in case the fare is reduced to 10 cents after three years. There was no serious objection to the increase in fare on the part of the public.

A list of prices of materials and parts of equipment is given in the accompanying table:

PRICE INCREASE IN THE ARGENTINE ¹				Per Cent Increase
Material	Unit	Cost in Dollars—		
		1914	1919	
Metallic filament lamps 25/115	Each	0.138	0.258	92
Controller fingers	Each	0.085	0.345	330
Trolley wire	Ton	396.00	775.00	95
Wheel tires	Each	7.34	43.80	500
Car axles (rough)	Each	9.05	34.50	400
Gears	Each	15.90	40.85	157
Pinions	Each	2.58	7.31	183
Springs (body end)	Each	3.50	9.50	171
Spring (body)	Each	0.22	0.86	292
Brake-shoe head	Each	1.11	2.80	154
Fish plates	Pair	1.51	4.30	186
Steel wire	Lb.	0.54	5.40	900
White enamel paint	Lb.	0.087	0.178	107
Window glass	Box	11.65	32.30	178
Rails	Ton	38.80	103.50	167
Calcium carbide	Lb.	0.055	0.127	132
Wrought iron in bars	Ton	51.80	147.00	183
Varnishes	Gal.	4.12	8.60	109
Sheet bronze	Lb.	0.352	0.714	103
Coke	Ton	21.600	60.30	180
Coal	Ton	25.00	38.900	50
Dynamo oil	Lb.	0.045	0.098	117
Wood (average)	Sq.ft.	0.14	0.23	64
Turpentine oil	Sq.ft.	9.45	25.80	173

Power is purchased and in 1914 the price paid was \$0.0268 gold per kilowatt-hour and in 1918 \$0.0183 gold per kilowatt-hour. The approximate yearly consumption in kilowatt-hour during 1919 was 59,000,000.

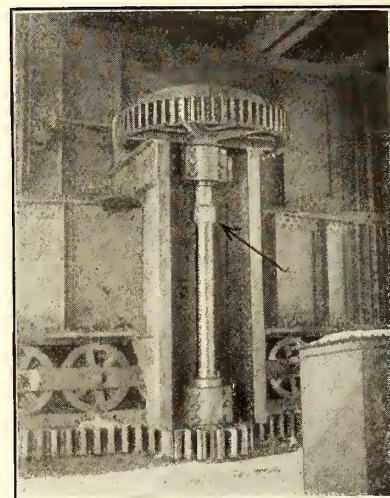
Emergency Welding on a Railway Bridge

A SERIOUS traffic tie-up of considerable duration was recently averted when an emergency thermit welding repair was made on a broken 6-in. main turning shaft of a drawbridge located at North Chelsea, Mass., and over which the Eastern Massachusetts Street Railway operates about 600 cars per day.

When the shaft broke the entire load of turning the drawbridge was thrown upon a companion shaft, which it was feared would not be strong enough to stand the overload. The breaking of the companion shaft would have suspended operation of the drawbridge and the traffic over it for a week before a new shaft could be supplied and machined. In order, therefore, to avoid running this risk an emergency call was made to have it repaired by welding.

When the shaft was removed from its operating position it was found that the break was located 6 in. from the end and between a 12-in. bearing box and a large cast gear wheel. A weld made at this point would have required machining before the shaft could be replaced in the bearing. To avoid this weakening of the weld, it was decided to cut an additional piece from the shaft and weld on an entire new billet to the end.

By 3 p.m. on the day of the accident the repair operator had arrived from New York and secured the necessary molding materials. The shaft was then lined up, a mold was built around the part to be welded, the mold was preheated and the molten steel was poured into the mold at 10:30 that night. In making the weld 125 lb. of thermit was used. The following day the mold was stripped, the billet was machined and the shaft returned to operation. An accompanying illustration was taken after the shaft had been back in operation for about a month.



BROKEN SHAFT ON DRAWBRIDGE OF THE EASTERN MASSACHUSETTS STREET RAILWAY REPAIRED BY THERMIT WELD

Immigration Increases Slowly

THE agricultural and industrial demands for skilled labor, which are so evident throughout the country, have in no way been satisfied by the apparent increase in immigration to the United States during the past few months, according to a recent bulletin of the Inter-Racial Council, despite the fact that the total number of persons admitted is now greater than the total number departed. During the last half of 1919 the total number admitted was 162,883 and departed 166,212, a net loss of 3,329. In the same six months of 1913 (the last year of our normal immigration) the total number admitted was 734,869 and departed 153,790, a net gain of 581,079. During the first five months of 1920 the preliminary figures for the port of New York (which usually handles about 80 per cent of the total

immigration and emigration for the country) show admitted 153,241 and departed 114,953.

It appears, however, that practically all of those who left the United States during these five months were able-bodied male wage earners, while of those who entered about half were women and children and a large part of the balance were natives of Italy and returning reservists. Many of the men admitted had previously been in the United States and practically all of them had definite destinations and knew exactly where they wanted to go. Comparatively few new able-bodied aliens are arriving, as a number of the European countries do not yet permit men of military age to leave their borders. Other causes given are our strict passport regulations and the enforcement of the literacy test.

Johannesburg Builds Own Car Bodies

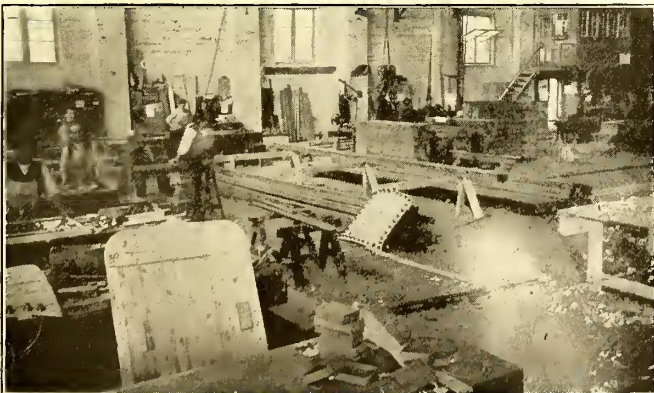
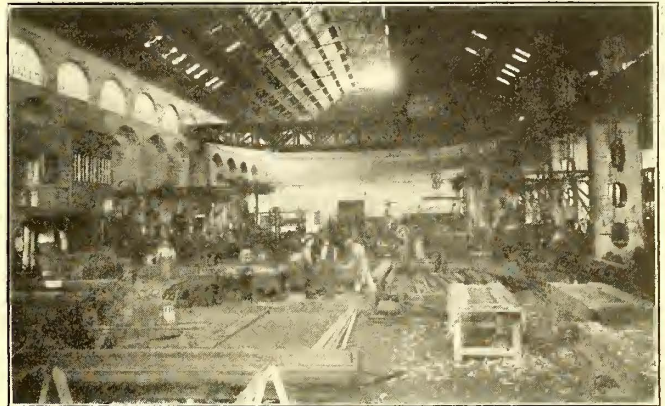
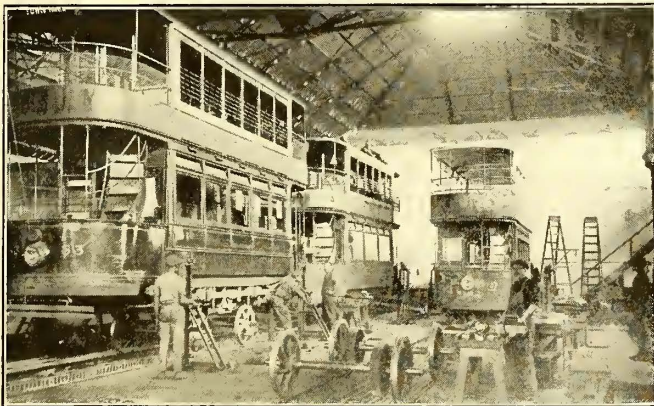
THE Johannesburg Municipality was unable to obtain electric cars for its system during the war period. At its close, however, it ordered trucks sufficient for forty cars from the United States and is now building the bodies of these cars in its own shops. These cars will be of double-deck construction, the upper deck being entirely inclosed. The seating capacity will be about eighty passengers. These cars will be fitted with Westinghouse brakes and General Electric control equipment. In addition to these forty cars, five single-truck cars are also being built in the shops especially for natives (blacks). The accompanying illustrations show the general arrangement of the shops at Johannesburg, as well as the type of cars and trucks that are used. The municipality now owns 120 passenger cars, and the rapid growth of the service makes it evident that extensive additions will be needed shortly.

Screw Thread Commission Reports

THE National Screw Thread Commission, first authorized by Congress in July, 1918, has reported to the Secretaries of War, the Navy and Commerce and recommends for approval six series of threads. The aim of the commission has been to eliminate all unnecessary sizes, and in addition to utilize present predominating sizes as far as possible. While from certain standpoints it would have been desirable to make simplifications in the thread systems and to establish consistent standards more thoroughly, it is believed that any radical change at present would be out of place, would interfere with manufacturing conditions, and would involve great economic loss.

The law provides that when the report is thus approved, it is binding upon all the departments in question and also must be used by other federal departments whenever possible.

The recommendations include a coarse-thread series, which is the present United States standard thread, supplemented below $\frac{1}{4}$ in. by the standard established by the American Society of Mechanical Engineers; a fine-thread series consisting of sizes taken from the standards of the Society of Automotive Engineers and the fine-thread series of the American Society of Mechanical Engineers. The committee also recommends the adoption in practically its present state of the American Briggs standard pipe thread sizes, as recommended by the American Society of Mechanical Engineers, and the fire-hose coupling sizes as established by the National Fire Protection Association. The report includes specifications, form of thread, gages, classification and tolerances. The full text of the report will be presented and will be available for distribution in a few months.



UPPER LEFT, SINGLE-TRUCK CARS BEING REPAIRED. UPPER RIGHT, GENERAL VIEW OF REPAIR SHOP. LOWER LEFT, THE WOODWORK DEPARTMENT FOR BUILDING ELECTRIC CARS. LOWER RIGHT, ONE OF THE STEAM HAMMERS IN THE MUNICIPAL TRAMWORKS

Employment Bureau for Trainmen

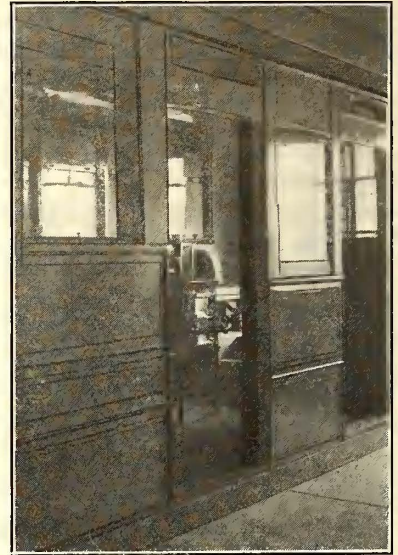
**Cleveland Railway Creates New Department to Hire Men and Give Preliminary Training—
New Building and Equipment**

THE Cleveland Railway Company has created a bureau of employment, with H. W. Palmer as superintendent, for the purpose of concentrating the responsibility of hiring trainmen and giving them their preliminary training as motormen and conductors. About fifty men a week are taken on and put through the three days' preliminary training at the bureau of employment and then turned over to the several division superintendents to complete their ten-day instruction period. Before they are actually put on the pay roll they are sent back to Mr. Palmer, who thus has another opportunity for a final catechism and lecture. During the first three days those in charge of the course make every effort to win the interest of the men by explaining rules and equipment in great detail to them and answering all questions, carefully avoiding any appearance of bullying or attempting to embarrass the new men.

A new one-story six-room brick office building to house the bureau of employment was built on a piece of land included in the tract on which are located the Harvard shops and Harvard track storage yard. A man applying for a job is received in the superintendent's office at the front of the building. If he looks like

operated doors, signals, selective lighting switch, etc. Taking turns, each man in the class acts as conductor and the rest of the class as passengers, and they give each other experience in handling tickets, change and transfers, and in the general duties of a conductor. This part of the equipment of the bureau of employment is of course primarily for conductors.

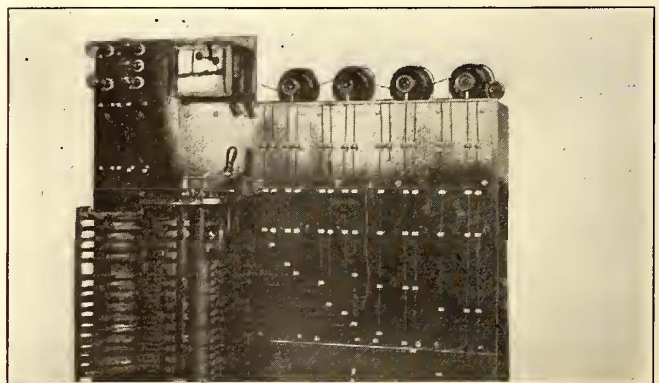
In a glass covered cabinet extending along two sides of this room are posted the schedules for all the city runs. From these the men are required to copy the running time for various assigned runs and to make out the full schedule for the runs, including the time points.



SECTION OF CAR FOR DEMONSTRATING CONDUCTOR'S DUTIES

The sixth room of the building is equipped primarily for the motormen. Four 0.3-hp. series motors, belted together and to a flywheel for load, are connected up with open wiring to a standard K controller. The circuit includes a standard circuit breaker fitted with a glass case, lamps in series with the resistance notches on the controller, and plug type switches in the armature and field circuit of each motor. Speeding up the controller too rapidly will throw the circuit breaker, thus demonstrating proper feeding. The interior mechanism of the circuit breaker can also be observed. With the lamps lighting on the resistance notches and going out on the running notches the student will readily see where he should and should not leave his controller standing, and why. The plug switches make it readily possible to create an open or short circuit in the armature or field circuit of any motor and then demonstrate to the student how to cut out this trouble.

The other equipment of this room includes a standard controller, hand-brake and air-brake equipment connected up to a standard truck fully equipped with motors and brake rigging. A circuit breaker, resistance grids, air compressor, governor, etc., are also connected up to



STANDARD CONTROLLER AND CIRCUIT BREAKER CONNECTED UP TO FOUR SMALL MOTORS TO DEMONSTRATE STEPS IN CONTROL AND ELIMINATION OF TROUBLE



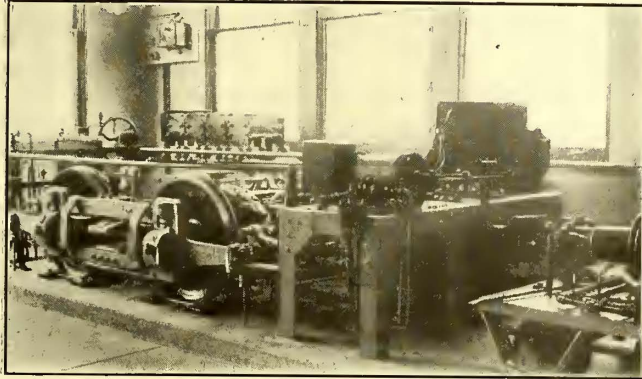
OFFICE BUILDING FOR THE NEW BUREAU OF EMPLOYMENT, CLEVELAND

good material he is sent into the adjacent room, where there are tables and facilities for filling out an application. When this is completed he is sent into the adjoining room, where there is a full equipment for making the physical examination and taking a photograph. From this point on, if a man qualifies, he is taken through the three-day preliminary training school in a class of perhaps ten men. After completing the physical examination, he is told to report the next day at a certain time to attend the class.

Upon reporting the students assemble in the lecture room, which is equipped with standard side-arm classroom benches. They start with a course of instruction and practice in filling out accident reports, trip sheets, turn-in envelopes, shop reports, witness blanks for accidents, etc. This is followed or accompanied by a thorough lecture on accidents, wherein the principal points are emphasized and an effort made to fix them in the trainmen's minds by the use of a number of posters fastened on the wall across the front of the lecture room.

In the room adjacent to the lecture room there has been installed the central section of a standard Cleveland street car. This is equipped with fare box, air-

represent the working parts of a car. There is also a small truck representing a trailer, which is equipped with the full air-brake equipment and an automatic coupler. This truck is moved up to the coupler on the rear end of what represents the motor car by means of an air cylinder installed underneath. This makes it possible to demonstrate the process of coupling and



STANDARD TRUCK WITH FULL MOTOR AND AIR-BRAKE EQUIPMENT, INCLUDING TRAILER AIR-BRAKE EQUIPMENT AS SEEN AT EXTREME RIGHT

thereafter the action of the brake mechanism on motor car and trailer combined.

In giving a class of men their first lesson on this equipment Mr. Palmer first operates the controller and air brakes, showing the action of the large motors and change of speed with the different controller positions, the trucks being supported so that the wheels are free to revolve. After a lecture explaining the function and operation of each part each man in the class is told to operate the controller and air brakes. Mr. Palmer says that he can practically tell by the way a man steps up to the controller whether he will make a good motorman.

Seeing the various parts of a car close up, and having the complete operation and inter-relation of parts fully explained and demonstrated, the officials believe the student is in a much better position to profit by his experience on the platform of a car, for he then has some notion of what is going on underneath the car in response to his own control.

Well-Designed Oil Houses

IN A recent bulletin, No. 34, of the National Safety Council some desirable construction details for oil houses are given. This states that an oil house should preferably be a separate detached building of fire-resisting construction. A well-designed oil house would properly have the walls made of brick, stone or concrete, the roof of concrete without exposed metal and the floor of concrete drained to one point to a sewer through properly designed traps or oil separators. The door sill should be raised about 6 in. and the door should be metal covered and hung on an angle iron frame. The windows should have metal frames and wire glass and a drain pipe should extend from the floor through the roof.

If there is sufficient space a satisfactory oil house may have walls and roof made of corrugated iron or steel on steel or timber frames. Containers should not be placed on wooden racks, but upon the cement floor or upon concrete, metal or other fire-resisting racks or shelves.

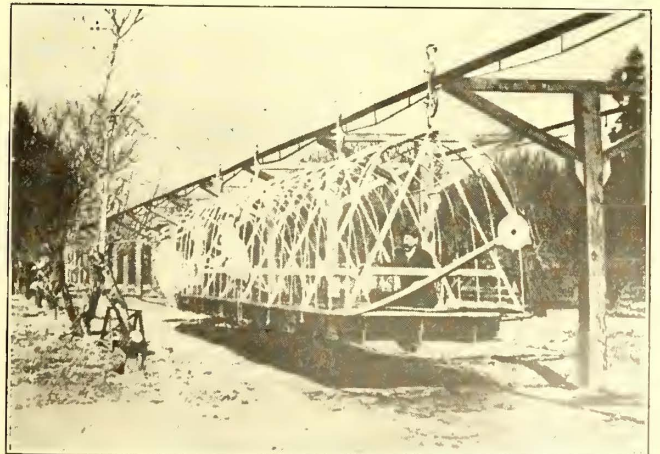
Under certain conditions it may be necessary or desirable to provide an oil room inside a building for the storage of limited quantities of inflammable liquids.

Inside oil rooms should have the walls, floor and ceiling made of brick or concrete 8 in. thick, or of reinforced concrete 4 in. thick. All openings into the room should be provided with automatically closing fire doors; windows should be of wired glass in metallic sash and frames. To prevent the accumulation of vapors in pits and other confined places inside, oil rooms should not be below the grade lines nor immediately above a cellar or basement. Door openings should have sills raised 6 in. The floor should be waterproof and continued up the side walls about 3 in., making rounded corners that can be easily washed and cleaned. The floors should pitch to a drain pipe leading outside to a catch basin or terminating at a point where proper precautions have been taken so that surrounding property will not be in danger. No drain pipe should be made direct to sewer.

Proper ventilation should be provided for inside oil rooms. There is no system of ventilation that is applicable in all cases. The method adopted necessarily varies with the nature of the gas or vapor to be removed and depends upon whether it is heavier or lighter than air. Ventilation may be secured by arranging suitably screened openings near the floor or near the ceiling or both. It may be necessary to provide a similar system for exhaust ventilation by installing screw propeller fans at windows or at other openings in the wall. In such cases care must be exercised to prevent the exhausted gases or vapors from returning into the room or from entering any other place where their presence would be objectionable or dangerous. Fans should be driven by explosion proof motors or by belt and shafting. An exhaust system, with hoods which catch the gas or vapor at the point of origin, is likely to be more satisfactory than general room ventilation.

A Fine Car for a Warm Day

AN INVENTION which is being tried out in Durbeck, Col., is a street car body which has been fitted with a propeller and its driving motor. No surface rails are employed, the car being hung from an overhead trolley bar. The inventor is said to be contemplating the addition of a second propeller for use in case the original one is disabled. Information is not available as to the hopes of the inventor of this novel transportation unit in regard to the field which it might occupy, that is, whether he expects it to depose the standard car or merely to serve as a coin-getter in parks and the like.



Photograph from "World-Wide Photos"
NOT A BIRD CAGE, BUT A CAR WITH AIR
PROPELLER DRIVE

Pacific Electric's Automatic Flagman

An Automatic Flagman of the Magnetic Type with the Warning Disk Swinging Downward Is Giving Excellent Results

BY CLIFFORD A. ELLIOTT

Cost Engineer Pacific Electric Railway, Los Angeles, Cal.

In a previous article published in the August 11, 1917, issue of the *ELECTRIC RAILWAY JOURNAL* an automatic flagman then in use on the Pacific Electric Railway's lines was described, together with some experiences in the developing of an electrically operated device of this character. Since that time further improvements have been made. The former magnetic type was designed so that the warning disk was elevated above the magnetic control box, and when set in motion the movement of the disk was in a horizontal direction. In the improved type the disk on the apparatus hangs and swings downward when placed in operation.

This flagman has no motors or gears, but is controlled by two sets of magnets, which when energized pull an armature from one side to the other, causing the warning disk to swing and a gong to sound.



AT LEFT, SUPERSEDED TYPE OF MAGNETIC-AUTOMATIC FLAGMAN. AT RIGHT, LATEST IMPROVED TYPE OF AUTOMATIC FLAGMAN USED ON THE PACIFIC ELECTRIC RAILWAY

For operating and controlling the flagman a contactor brush is placed on the trolley wire at a distance of approximately 1,500 ft. from the crossing protected. When the trolley wheels of an approaching train or car engage this brush it closes a circuit between it and the trolley wire and current is transmitted over the signal line to the relay signal. The operation of this relay closes the local circuit to the bell and sets the warning signal in motion. Another brush placed upon the trolley wire beyond the crossing causes the bell to come to rest when the trolley wheel of a passing car or train engages it. All lines are provided with intermediate and second intermediate contactors, which operate the relay in case trains are traveling close together, thereby preventing trains from crossing on a dead signal. The line wire used is No. 12 weatherproof iron wire, which was the same for the former magnetic type. The trunking and cable now used is No. 12 Kerite insulated wire.

The Pacific Electric Railway has 250 of these devices.

Features of South Water Street, Chicago, Improvement

Proposed Plan of Constructing Two-Level Marginal Thoroughfare Would Greatly Relieve Traffic Congestion in Loop District

J. ROWLAND BIBBINS, supervising engineer, the J. Arnold Company, Chicago, has made a report to the Chicago Plan Commission in connection with the improvement of the riverfront, which has a very direct bearing on the general traffic conditions in Chicago's Loop District. The South Water Street commission merchants are expected to remove their business center to some more logical point and the space now occupied by their buildings and the street, according to the plan, would be occupied by a two-level thoroughfare extending west and south along the river from the new Michigan Boulevard two-level bridge recently completed.

The principal features of the project are summed up as being to provide a new trunk highway or broad marginal street around the Loop boundaries; a distributing road from the great Michigan Boulevard which will greatly reduce the cross traffic interference in the Loop; traffic segregation, freight vehicles below, fast vehicles above; an upper level equalized with the level of the river bridges and a lower level equalized with the dock level; continuous dockage along the riverfront; a clear by-pass route between the north and west sides of the city, avoiding traversing the Loop streets; unobstructed motor by-pass routes between freight streets; increased use of the Chicago freight tunnel system; union freight station facilities, convenient to both the Loop and the docks; relief of the central business district streets from freight traffic, and a number of other advantages.

One of the controlling considerations in developing the proposed plan was the enormous increase in the number of motor vehicles in Chicago. The January, 1920, registration shows a total of 74,112 passenger motor vehicles and 19,373 motor trucks within the City of Chicago. This is an increase of 100 per cent in four years. The construction of the two-level riverfront road would greatly facilitate the movement of these vehicles through its by-pass and distributing advantages. Thus the principal accomplishment of the proposed plan would be the elimination in very large measure of the trucking of freight which now takes place on the Loop streets.

The principal group of freight terminals is now and will be for many years located in a pocket at the northwest corner of the Loop District, necessitating a great volume of trucking across the Loop. The next important group, in the Twelfth Street district, also requires much trucking across the Loop at present, both transfer and consigned freight. The development of by-pass trucking routes such as would be provided by this new construction would therefore seem to be the most important need of the present situation, as it would tend materially to lessen the economic loss imposed by the various cumulative delays resulting from increasing railway and street congestion and extra man-handling. Perhaps the greatest sufferers of this character of delay are the surface street railway companies.

The report points out that Chicago's greatest need

is a terminal delivery which will quietly fit into the rail terminal operations and effect the delivery and transfer of tonnage with as little encroachment as possible upon the capacity of downtown streets, whose total capacity is required for retail and general business. Of the possibilities for meeting this need, the report states that the Chicago freight tunnel, already in existence, is of greatest value. The Chicago tunnel has developed unobtrusively a downtown network of 65 miles of freight tunnels connected by elevators with all the freight stations and with most of the large business houses. This tunnel could readily handle from 70 to 95 per cent of all the l.c.l. freight tendered in most cases. It makes use of 5-ton cars drawn in trains by electric locomotives. But for various reasons the tunnel is being used to less than one-fifth of its capacity of perhaps 10,000 tons per day. To move 10,000 tons per day by truck would require somewhere in the neighborhood of 4,000 motor trucks a day, the report estimates, thus indicating what must be the result from a traffic standpoint of continuing to handle this business district freight by trucks. It is pointed out that the Chicago freight tunnel is the only instance in this country where a complete duplicate sub-level street system has been provided for freight haulage. As such, it must be regarded as an important element in local freight transportation and one to be conserved, if for no other reason than to contribute to the relief of street congestion. From the standpoint of the City of Chicago, no transportation agency could be more effective in solving the problem of existing street capacity and no effort should be spared to make this institution one of permanent success.

In justifying the marginal street plan to relieve congestion in the Loop, the report points out that "there is only one general solution to the problem of street capacity in downtown Chicago, namely, by double-decking, either by elevating the streets for fast vehicles or pedestrians or depressing the car lines below the present streets. The first alternative seems problematical, at least until far in the future. Passenger subways are of course practicable, but offer an available solution only if the city can be prevailed upon to act promptly. But even with all this possible increase in effective capacity, there still remains the fact that the efficiency and usefulness of all the Loop streets as distributors could be vastly improved by means of unobstructed clearing or marginal thoroughfares. Such a system of marginal clearing streets is introduced by the South Water Street improvement."

Association News

ATLANTIC CITY CONVENTION, OCT. 11 TO 15

Many Committee Meetings

THE last few weeks have been busy ones at Association headquarters, with many committee meetings scheduled, to complete reports due for the October meeting.

During the week ended July 31 three committees held meetings, namely, those on merchandising transportation, collection and registration of fares and entertainment. During the current week a meeting was held of the

committee on code of traffic principles, and as this paper is going to press a two days' meeting is being held of the standards committee of the Engineering Association.

Statistics Recently Compiled

THE Bureau of Information and Service of the American Electric Railway Association announces the completion during July, 1920, of the following special compilations and reports. These are available to member companies on request.

"A Series of Charts Showing Effects of Increases in Rates or Fares on Operating Revenues and Passengers Carried, for a Number of Typical Companies."

"A Bulletin on Wages and Working Conditions of Street Railway Employees Other than Trainmen." This covers employees in the engineering department, shops, carhouses, substations, power houses, overhead lines, maintenance of way and transportation departments.

"Claims Statistics." This is a summary of the replies of companies to Data Sheet 207, showing classified expenditures by the claims department of various companies and the number and cost of various kinds of accidents.

"Summary of Electric Railway Strikes for the Years 1918, 1919 and 1920 to Date." This contains a brief account of each individual strike.

"Legal Requirements Covering the Carrying of Jacks on Cars." This compilation is based on replies to the circular letter issued by the bureau and dated June 11, 1920.

In addition to the above, the bulletins on wages of trainmen, cost of living studies, bulletins on the fare situation, covering all cities having increased rates and those in which fares have not been increased; and regulations covering restrictions of jitney operation, have all been brought up to date.

Letter to the Editors

Standardize Motor Bearings

NEWPORT NEWS AND HAMPTON RAILWAY,
GAS & ELECTRIC COMPANY

HAMPTON, VA., Aug. 4, 1920.

To the Editors:

In its July 10 issue ELECTRIC RAILWAY JOURNAL published an article by R. H. Dalglish entitled "Let's Dig Ourselves Out." One point brought out in this article appeals strongly to me and I believe it well worth consideration by electric railway engineers. It is the standardization of wearing parts of equipment. I agree with Mr. Dalglish that interchangeability of parts is desirable and feel that much good would be accomplished if the matter were given serious consideration.

For illustration, why not start with motor bearings. Surely different makes of motors of the same horsepower could be designed to use the same size bearings and not hinder the development of new motors.

I would like to see the matter referred to the standards committee of the Engineering Association for discussion and recommendation.

N. E. DREXLER,
Chief Engineer.

Recent Happenings in Great Britain

Difficulties of London County Council in Getting Right for Extensions—Through Municipal Bus Service Delayed

From Our Regular Correspondent

A fine example of how man proposes but the gods dispose is to be found in the fate of the bill promoted in Parliament by the London County Council to authorize it to construct additional tramways and to run motor omnibuses as linking routes to and extensions of the tramways. Man in this case is the County Council and the gods are the London borough councils and Parliament. When any of the other great municipalities in England promote a parliamentary bill for the purpose of extending tramways or running omnibuses there is usually not much difficulty in obtaining the powers desired. But when London County Council tries the same game a veritable hornet's nest of local interests is stirred up against them, and Parliament is so influenced that little success is obtainable. The borough councils under their power of veto choked off the tramway proposals.

As to the powers for omnibuses, the County Council has tried to get these before without success, though other municipalities get them almost as a matter of course. A committee of the House of Commons heard evidence and arguments at great length during June for and against the Council's omnibus proposals, and on July 1 it decided to grant the Council power to run omnibuses in a considerable area of Central London, for the purpose of linking together central tramway termini, but it refused to assent to other proposals to enable the Council to work omnibuses to connect tramway routes in the suburbs and to serve housing schemes either within or without the county of London. The monopolistic hold which the London General Omnibus Company has with regard to omnibuses all over the London area is no doubt a factor in this decision. The committee also stated that the County Council would have to satisfy the Ministry of Transport that the proposed services were for linking together tramway routes and were not general roving services.

BUS PLAN OUTLINED

Some little time before the decision of the committee was given, an important agreement was reached between three county councils in the adjoining metropolitan area in regard to the running of omnibuses. Though the agreement was subject to the passing by Parliament of certain bills, and though the London bill has for the most part been rejected, the principle involved in the agreement is of much importance as pointing the line of future development in the working of municipal omnibus services. The proposed scheme, now of course in abeyance, may accordingly be outlined. The London County Council proposal was to run omnibuses not only in the county of London but in the parts of the metropolitan police district which extend into the counties of Middlesex and Hertford. The councils of these two counties petitioned against the London Council's proposal, but at the same time they were promoting bills to enable them to run omnibuses within the metropolitan police district where they would be in competition with other local omnibus companies.

It was arranged that clauses should be inserted in the three bills of a kind already approved by the Minister of Transport in the case of several bills promoted by provincial local authorities in which it is proposed to enable the local authority to work omnibuses outside its own district. The main provision is that each county council running omnibuses outside its own county shall pay to the appropriate road authority for road maintenance such sum per bus-mile as may be agreed, or, failing agreement, as determined by the Minister of Transport. Provision is also made for similar agreement or determination as to payment toward the cost of any necessary adaptation or reconstruction of roads for the omnibus traffic.

Now that the London County Council's proposals as regards the outer areas have been rejected the matter is once more in the melting pot. There are only two possible satisfactory solutions. One is the constitution by act of Parliament of the proposed London Traffic Authority with full powers over the whole of the metropolitan police district (which extends far beyond London proper). The other is to give the whole control to a special department of the Ministry of Transport. The main difficulty in the way is the multitude of conflicting interests, both of local authorities and of companies. These will have to be overcome if chaos is to be removed.

MINISTRY OF TRANSPORT ATTACKED

There was a good deal of Parliamentary excitement and of outside interest in the end of June and the beginning of July over the first annual estimates of the Ministry of Transport, which, it may be recalled, was established in August of last year. The Parliamentary opposition averred that the Ministry was of no use and should be abolished, while its supporters pointed to good work done and to the absurdity of expecting large results in such a short time. The debates were confined almost entirely to the steam railway aspects of the subject. Meantime the Ministry of Transport has issued an official memorandum advising the amalgamation of all the main railway

companies of the country into half a dozen great groups for the purposes of consolidation, co-ordination and economy of working. In order to carry out such a scheme new legislation will be required, and that can hardly come this year. There promises to be great opposition to it. The main electric traction interest in the proposal is the suggestion that one of the groups should consist of the London local railways.

GLASGOW LINES SHOW DEFICIT

For the first time on record the accounts of the Glasgow Corporation Tramways show a deficit. This, it may be recalled, is the undertaking which has enjoyed such a career of prosperity that some two years ago it completed the repayment of its capital, so that interest and sinking fund charges ceased to exist. In spite of this, the net profit a year ago had, owing to the continual rise in working expenses, fallen to £14,772. The accounts for the year ended May 31 last bring out a loss of £108,531. It is fair to say, however, that this result is arrived at after setting aside to renewal and depreciation funds a sum of £186,242. Apart from this there would have been a credit balance.

At a meeting of the Glasgow Town Council on July 8 Mr. Kelly, the chairman of the tramways committee, said that the increased revenue they had received since the fares were raised on June 1, which date was the beginning of the new financial year, was most satisfactory, and if the increase was continued they would have an additional revenue at the end of the financial year of between £400,000 and £500,000.

The accounts issued a year ago of London County Council tramways showed that they were just about making ends meet without allowing for renewals and depreciation fund. The accounts issued on July 3 for the year ended March 31 last show a much worse state of things, for they bring out a deficiency of £100,722. This will be increased to £161,511 if the government decides that all renewals must be met out of revenue. The last increase in fares did not come in time to affect these accounts, but on the other hand neither did the last large increase in wages. The revised estimates for the year now current show a deficit of £749,442, which will be increased to £929,512 if the government does not agree to half the cost of renewals being charged to capital, and to no less than £1,038,512 if a proposal to repay the capital debt on the annuity system be not approved. The last mentioned sum is equal to a rate of 6d. in the £1 on all ratable property in the county of London. It is proposed to apply to the Ministry of Transport to sanction an increase of fares above the statutory maximum of 1d. per mile. The general condition of the London County Council tramways is acute and apparently the only relief for the bad financial condition can be expected through increased fares.

News of the Electric Railways

FINANCIAL AND CORPORATE • TRAFFIC AND TRANSPORTATION

PERSONAL MENTION

Governor to Decide

New York Board Hears Buffalo Wage Case—Company Stands Pat on Open Shop

Governor Alfred E. Smith of New York must take the next step in the wage controversy between union platform employees and the International Railway, Buffalo. The State Labor Board, which heard evidence presented by the employees and the company, adjourned on July 30 without any concessions being made on either side. At the outset of the hearing Herbert G. Tulley, president of the company, filed a formal statement declaring that the company will stand pat on the open shop question and will not consent to make retroactive the wage award which might be agreed upon.

CLOSED SHOP A FAILURE

The Labor Board was told by President Tulley that the management of the company has been unsuccessful since its relations with the Amalgamated, both in a financial way and in its relations with the public. The board was told that the company desires to establish more direct contact with its employees and will enter into no further contract which does not recognize and assure uninterrupted continuance of the open shop principle.

President Tulley said the International remains ready to accept a third arbitrator appointed by Governor Smith, for the reason that the State will then have the power, through its arbitrator, to determine the rate of wages to be paid, and the State also will have power concurrently to determine and authorize, through the Public Service Commission, the amount of increased fare necessary to make the payment of such increased wages possible.

Questioned regarding the decision of the company not to make retroactive to May 1 any increase in the wage scale which might be agreed upon by the board of arbitration, President Tulley said the wage award could not be made retroactive because of the depleted condition of the company's finances and added that all of the money received by the company in the form of additional revenue from the 7-cent fare had been paid to the employees in higher wages.

RETROACTIVE PAY OPPOSED

Representatives of the carmen agreed to leave the entire matter in the hands of the arbitrators. James H. Vahey, of Boston, the employees' representative on the board of arbitration, said

the open shop is not the bone of contention. He said the men are willing to leave that question also for the arbitrators to decide. Henry W. Killen, of counsel for the International, contended the question of an open shop is not subject to arbitration.

CHARGES UNION VIOLENCE

Charges of violence on the part of union representatives to intimidate non-union employees of the company were made at the hearing by Mr. Killen, who presented the company's side of the case.

For the present at least the men have given up the idea of a strike. They resolved on this course in compliance with the wishes of the union leaders.

Duluth Men Urge Fare Referendum

Employees of the Duluth (Minn.) Street Railway recently have placed in circulation petitions for a second referendum vote on the 6-cent fare ordinance, defeated at the municipal election on June 21 by a vote of 5,963 to 7,286. Following the rejection of the measure the men asked for an increase in wages. The company refused on the ground that it was unable to pay higher wages from its present revenue. On July 20 the employees struck and car service was suspended for one day. It was agreed that the men should return to work and a new ordinance should be placed before the voters.

The city charter requires that the referendum petition contain the names of 20 per cent of the voters at the last general election. The employees expect to obtain 3,500 names, more than enough to place the ordinance before the people again. The date for the election will be between forty and fifty days after the petition has been accepted by the City Council.

City Attorney John E. Samuelson gave an opinion to the Council that it could not legally pass the fare ordinance at this time because the franchise under which the company is operating and which was granted by the Legislature in 1881 provides that the fare can only be changed at five-year periods. This would tie the Council's hands until 1921, he said. The ordinance which has now been proposed differs from the one submitted last June in that it provides for an increase of 10 per cent in the wages of employees. It is also stipulated that the company shall pay the employees "an amount not less than one-half of the gross passenger revenue received as fares."

Small Road Strike-Ridden

Review of Fare and Wage Vicissitudes of Small Canadian Line—Wages and Fares Raised

The Levis (Que.) County Railway has been the victim recently of a one-day strike and a semi-strike, so to speak. Most of the circumstances attending upon these happenings have however, been brushed away and the company is now operating at an advance in fares and the employees are working at an advance in pay.

COMPANY IN A QUANDARY

The Public Service Commission inquired on May 25 into the finance of the company and the cause of the strike on the part of the employees. Judgment was reserved so far as the motion of the city of Levis and Bienville was concerned. The commission, however, issued an order to the company to operate its cars in the Town of Lauzon upholding the contract in one sense, but ignoring it in regard to a clause in the contract covering force majeure and strikes, by which the company is exempt from operation.

The company was unable to obey this order, as the employees refused to operate the cars in the limits of the Town of Lauzon, so the situation remained unchanged in spite of the order from the commission. The company being unable to pay the increased wages the employees refused to operate in Lauzon and also advised the company that should it obtain men to operate the cars in the town of Lauzon there would be a strike on the rest of the system.

NEW APPEAL TO COMMISSION

On June 8 the town of Lauzon again asked the commission to force the company to find money to pay the increased wages, so that the cars would operate. Judgment was rendered on June 9. In the case of Lauzon the commission refused to entertain the motion or force the company to run its cars by borrowing money, and it would not entertain any further motions of the town of Lauzon with the object of forcing the company to run under the conditions that existed. Further the commission would not accept any motion on the subject until all four municipalities agreed to revise the franchises or submit the matter to the Public Service Commission.

With regard to the city of Levis and Bienville, the commission stated that as the other two municipalities would not apply to the commission for investigation and decision the commis-

sion was unable to give any definite decision in regards to Levis and Bienville. Had, however, the other two municipalities shown their good faith and submitted the matter to the commission the commission would have issued a judgment. Therefore, until all four municipalities agree to go before the commission, the commission could not give any decision in regards to the fares, etc.

On June 10 all the employees went out on strike. The Mayor of Levis,

on behalf of Levis and Bienville, met the company, and guaranteed to readjust the passenger fares to enable the company to pay its employees increased wages. The employees started operations again on June 11 in Levis and Bienville only. The city of Levis arranged to grant the following tariff: Cash fare to remain at 10 cents; regular tickets, four for 30 cents or fifty for \$3.50; school tickets, at the rate of fifty for \$2; children's ticket, ten for 25 cents.

awarded by an arbitration board on March 18, 1920, and that wages higher than the present 58-cent scale, would therefore require a fare in excess of 7 cents.

Anticipating that radical action might be taken by the union the company had previously made all preparations which the short time interval permitted. The public was assured that the cars would be operated and normal service resumed as soon as it is humanly possible to do so.

Notice was served on the union officials by the city authorities that the full police and military power of the city would be used to protect the men employed by the company to maintain service, and also to protect the public against any acts of violence which might be attempted or perpetrated. The city authorities also announced that they would proceed against the union, basing their action upon the order of District Judge Whitford in which the men were forbidden to strike.

Denver Cars Tied Up

Men Walk Out in Violation of Court Order — Rioters Wreck Cars — Two Persons Killed, Many Hurt

Service on the lines of the Denver (Col.) Tramway was completely suspended at 5 a.m. on Sunday, Aug. 1, through a strike of the members of the local branch of the Amalgamated Association. This action was taken by the union in the effort to enforce its demands for an increase in the wage scale of trainmen to a minimum of 70 and a maximum of 75 cents an hour, with corresponding increases for the employees in the other departments. A new working agreement was also asked for. As demanded by the union the proposed contract is to be patterned along the lines of the agreement which expired by limitation on June 1, but with the elimination of certain clauses objectionable to the men and the inclusion of additional provisions relative to working conditions.

SERIOUS rioting broke out on Aug. 5 between the strikers and their sympathizers and strike-breakers employed by the company. Two men were killed in the fighting and thirty-five others, including the chief of police and a dozen patrolmen, were wounded. Five electric cars were wrecked and the plant of the Denver Post was damaged by the crowd. Early in the day fighting became general and continued for hours in various parts of the city. It was announced that troops would be rushed from Fort Logan to take possession of the city and to restore order.

UNION CONTROL DEMANDED

In addition to asking for higher pay, the strikers presented the following demands:

No employee to be discharged by the company until approved by the union.

No person who is eligible for membership in the union to be put to work until he has secured a working card from the union.

The company to suspend union members who do not pay all union dues and fines.

No motorman who makes a coasting record of 25 per cent or better to be censured by the company.

Union members who have been in continuous service for one year or more to receive fourteen days' vacation each year with full pay, payable in advance.

No member of the union to be listed in the superannuated class until it has been proven to the satisfaction of the union that he is not able to do a day's work.

Numerous meetings between the company and union representatives during the past week resulted in a deadlock, as the employees insisted upon a provision in the agreement that the higher wage question be arbitrated after Oct. 15 and that it be made retroactive to July 1, 1920. While not adverse to the principles of arbitration, General Manager Hild very flatly and finally refused to agree to any arbitration which did not take into consideration the company's ability to pay, and

further stated that under no circumstances would the company agree to any wage settlement on a retroactive basis.

Under the present wage scales the payrolls of the company show that the trainmen who are willing to work twenty-six days a month are earning from \$150 to \$200 a month. The company therefore considers that the trainmen are now receiving an adequate wage and feels that if there is to be any increase in fare a good portion of the additional revenues derived from such increase should be expended in the interest of the public for bettering service. With this stand the company firmly believes the public is in hearty accord.

COMPANY SUGGESTS COMPROMISE

Three proposals were made by Mr. Hild which the union representatives declined even to consider. These provided for:

A reasonable and simple bonus system under which the trainmen, through savings in operating costs, would be able to earn increased compensation of 2½ cents an hour, provided a 7-cent fare be authorized by the rate-regulating authority.

A co-operative plan for settling and determining industrial relations with full participation by the union and formed along the lines of the National War Labor Board.

Arbitration by the Colorado Industrial Commission of any questions or disputes which may arise and which cannot be settled by the company and the association. Such arbitration to take full cognizance of all related facts, including the right of the public to "good, adequate and convenient service," the right of the employees to just compensation and good working conditions, and the right of the company's investors to a secure and reasonable return upon their investment as represented by the fair value of the property.

The company's position, which has been sustained on two recent occasions by the Colorado Industrial Commission, is that the revenues from the present 6-cent fare are inadequate to pay the present wage scales, which were

Opposes Akron Grant

Councilman Files Suit to Restrain Company from Collecting Straight Five-Cent Fare in City

Gus Kasch, the only member of the Akron (Ohio) Council who did not vote for an increase of fare for the city lines of the Northern Ohio Traction & Light Company, applied to Judge H. C. Spicer of the Common Pleas Court on July 29 for an injunction to restrain the company from collecting a straight 5-cent fare and, further, to restrain it from refusing to sell six tickets for 25 cents or twenty-five tickets for \$1. Judge Spicer directed that notice of the application be given the company officials.

The petition alleges that in collecting a flat rate of 5 cents the company is violating the contract entered into with the city in 1889 and that the action of the Council in granting it the right to collect this rate of fare is invalid because no consideration is named whereby the company is obligated to do anything for the city in return for the increased fare. It is also alleged that under the charter, which has been in force since Jan. 1, 1920, no ordinance affecting the rates to be charged by public service corporations can be enacted as an emergency measure, all such ordinances being subject to a referendum vote.

Should an injunction be granted, the only result would be to force the City Council to re-enact the ordinance in the regular way. This would require three separate readings and then it could not go into effect for thirty days and would be subject to a referendum should a sufficient number of voters sign petitions requesting its submission.

Mr. Kasch filed the suit in behalf of himself and as a member of the Car Riders' League. It is reported that this organization adopted a resolution instructing him to take action in the matter.

New Orleans Men Return

Service Restored After Tieup Lasting Three Weeks—Arbitrators to Pass on Wages and Fares

Twenty-three days after they had gone on strike, demanding higher pay and union recognition, the carmen employed by the New Orleans Railway & Light Company, New Orleans, La., voted to return to work pending settlement of the questions at issue by a board of arbitration. Service was resumed on July 25 and 26, ending the longest strike in the city's history. It is announced that if the men are awarded a pay increase the fares must be raised. A 7-cent fare is considered insufficient to meet the company's needs, and a fare of 8 or even 9 cents is a probability.

INTervention by Mayor Behrman played an important part in bringing the tieup of the city's transportation system to an end. On July 20 the Mayor filed in the Federal District Court a petition asking permission of Judge Rufus E. Foster for the city to inject itself into the receivership proceedings. The judge was also asked to consent to a modification of the court order in which J. D. O'Keefe, receiver of the railway, was forbidden to contract with the men through the Amalgamated Association of Street & Electric Railway Employees. To the concession asked by the Mayor, Judge Foster consented.

TERMS OF AGREEMENT

The agreement reached by the Mayor, Receiver O'Keefe and James Rodgers, representing the carmen, provided that three arbitrators should be selected by them, acceptable to the federal court, who should investigate the various questions pertaining to the controversy and report their findings to the court, subject to its approval or disapproval.

The carmen were to return to work at once, at the same wage rate and under the same working conditions that obtained before the strike. It was understood that if an increase in wages was allowed the carmen the increase should be retroactive to the time the men resumed work.

No reference was made to the Amalgamated Association, whose recognition was the bone of contention between the railway and the men, although the hope was expressed by the representatives of the carmen that the arbitrators would recommend that the Amalgamated Association be recognized by the receiver. The report was to be submitted within three weeks.

ARBITRATORS BEGIN WORK

The informal committee, composed of Mayor Behrman, Receiver O'Keefe and Mr. Rodgers, lost no time in selecting the board of arbitration. The board, as approved by Judge Foster, consists of Charles J. Theard, George H. Terribery and J. P. O'Leary. Besides fixing carmen's wages the arbitrators are to determine to what extent, if any, fares must be increased. The matters to be determined by them were outlined as follows:

1. The capital charges properly to be earned by the utility under existing conditions.
2. The terms and conditions under which labor should work and the return therefor which the labor should receive under existing conditions.

3. The fare necessary for the company to receive in order to meet the just charges upon capital, labor and management.

4. A program whereby the utility might be assured the fare, labor and capital their return, and the progress of the utility through receivership and into the hands of the competent owners be expedited.

When this report is rendered the attorneys of the parties at interest will appear in court for argument and presentation of testimony and argument upon any issue remaining.

When and if the report is approved by Judge Foster, the parties at interest, in their several capacities, are to perform their respective functions as promptly as possible.

ASKED \$150 A MONTH

In their original demands the men asked a wage of at least \$150 a month for platform men, an eight-hour day and a six-day week. They struck after refusing an appeal of commercial bodies and labor organizations that they remain at work until the pending difficulties could be looked into and measures of relief put forward by the city's business men.

Jersey's Problems Analyzed

Expert for Cities Addresses Governor Edwards on State's Electric Railway Needs—Situation Grave

Delos F. Wilcox has laid before Governor Edwards of New Jersey a review of local transportation issues in that state. Dr. Wilcox was the chief expert for the New Jersey State League of Municipalities in its original fight before the Board of Public Utility Commissioners against the 7-cent fare on the Public Service Railway lines two years ago. Again last year he represented the Associated Municipalities in the zone-fare case, which finally developed into the valuation and rate proceeding still pending before the commission.

The memorandum covers eighty-three mimeographed pages. Dr. Wilcox takes up in four separate sections: (1) the Public Service Railway's attack on the jitneys; (2) the present crisis in public control over public services; (3) the results of conflicting theories of valuation, and (4) the need for a definite and constructive State policy.

Dr. Wilcox says that regulation should be effective before monopoly is granted. Local transportation service should be developed in an orderly and economical way. Jitneys ought not to be permitted to destroy the electric railway when they are unable to take its place. Common carrier service by motor buses should be developed as an auxiliary to the street car, not as a

competitor to it. Nevertheless, says Dr. Wilcox, a private monopoly upon which a great community is dependent for an essential public service, when such a monopoly has maneuvered itself into a position where it cannot be effectively regulated is intolerable.

In conclusion Dr. Wilcox says that the big things upon which definite light is needed include (1) the whole matter of jitney service in its relations to trolley traffic, trolley revenue and trolley fares; (2) the ability of the Public Service Railway to render adequate service without the help of the jitneys; (3) the value of the railway company's property devoted to public use; (4) the rate of return which the railway company should be allowed to earn on its property; (5) the extent to which the cost of railway service could be reduced by improved operating methods; and (6) the extent to which public co-operation is possible and necessary in reducing the cost of transportation service.

Urges Salary Increases for Engineers

The Engineering Council recently addressed a letter on classification and compensation of engineers to State governors, mayors of the leading cities, directing heads of Federal bureaus having jurisdiction over engineering work, and civil service commissioners. Engineering heads under these various officials were also addressed. The letter first calls attention to the serious hardship to all branches of the engineering profession during the past three years, from the great decrease in the buying power of the dollar. It then gives the Council's standard classification of grading for engineering service, with a tentative schedule of standard rates of compensation in each of the proposed grades. This list follows:

Adopted Grades	(Tentative) Compensation Schedule
Junior Aid	\$1,080 to \$1,560
Aid	\$1,680 to \$2,400
Senior aid	\$2,520 to \$3,240
Junior assistant engineer	\$1,620 to \$2,580
Assistant engineer	\$2,700 to \$4,140
Senior assistant engineer	\$4,320 to \$5,760
Engineer	\$5,940 and upward
Chief engineer	\$8,100 and upward

In conclusion, the letter solicits the views of the recipient as to the feasibility of adopting Engineering Council's schedule of grading and compensation and offers to furnish any information desired on special problems.

Sixty Cents for Albany Men

Employees of the Albany and Troy divisions of the United Traction Company, Albany, N. Y., have accepted the company's offer of an increase in pay of 15 cents an hour and a four months' contract from July 1, 1920. The acceptance of the offer ends a series of conferences that had been under way for a month and does away with the possibility of a strike. The men were receiving 41 and 45 cents an hour; under the new scale they will receive from July 1 56 and 60 cents an hour.

City's Appeal Wins

Circuit Court of Appeals Holds Toledo Vote Legal, Overruling Judge Killits—Issue to People

The people of Toledo may yet have the opportunity to vote on the \$7,000,000 bond ordinances to provide a municipal transportation system. Prosecuting Attorney Allen Seney, on behalf of the election board, filed an eleventh hour appeal with the Circuit Court of Appeals for the sixth federal circuit at Grand Rapids, Mich., and that body heard arguments on Tuesday and Wednesday of this week. The court thereupon suspended the injunction barring the referendum, holding the restraining order to be illegal under the city charter. In the ordinary practice the case would have gone to Cincinnati to be heard there by the same court but there would have been such delay that the election of Aug. 10 would have been impossible.

AFTER Judge Killits issued his order restraining the board of elections at Toledo from permitting the bond ordinances to be placed on the ballot, the members of the municipal ownership commission and the city authorities declared that they would not ask any appeal but rather would lend their efforts to perfecting the ordinances by repassage in accordance with the city charter and in time for the November election.

FORCES COURT ACTION

The prosecuting attorney took matters into his own hands and forced a fight before the higher court. He fought the order on the grounds of lack of jurisdiction, arguing that Judge Killits did not have the right to interfere with a political action.

Granting that the ordinances are illegal, Mr. Seney declared that the Toledo Traction, Light & Power Company, a holding company, could not sue because it has another legal remedy and the present issue is too remote. Mr. Seney stated the city's side of the case as follows:

The merits of the municipal ownership or service-at-cost plans of settlement of the traction issue are not at issue. That makes no difference now. The principle at issue is whether a federal court can enjoin the city from holding an election. That is more important than whether I walk or ride, and street cars are a necessity to me.

The court decided it would hear the case on Mr. Seney's request and a bond of \$300 was filed by the prosecuting attorney. The traction company interests are represented by George D. Welles, who argued the case before Judge Killits. He has introduced several new angles into the dispute.

In his motion for dismissal of the appeal, Mr. Welles declared that voting in Toledo is in progress under the "absent voters'" law, and that many have already been deprived of right to vote on the bond ordinances, so that there can be no complete expression of the will of the voters of Toledo.

TECHNICAL ERRORS ALLEGED

He also alleged that the city clerk failed to send each voter a copy of the ordinances as is required by the charter; that the bond issue ballots ordered by the election board had been destroyed by the printer, and that new ballots can be printed only after ten days' advertising for bids, which would throw the matter beyond Aug. 10. He also put in an argument to the ef-

fect that a better municipal ownership ordinance would result if the voters were to wait till the November elections or until some still later date.

It is doubtful whether the twin ordinances would be adopted if they came to a vote on Aug. 10. The municipal ownership campaign has gone forward since the injunction appeal was taken to the higher court, but the commo-

n raised at the hearing before Judge Killits has almost crushed the chances of the municipal ownership plan. No concerted campaign has been carried on in behalf of the cost-of-service plan since it was ratified by Mr. Doherty. As soon as the measure receives the approval of the City Council, which is practically guaranteed by the terms of the ordinance under which the cars were brought back from Michigan last fall, the combined strength of four business men's clubs and the Chamber of Commerce will be thrown into the campaign.

Providence Considers Jitney Regulation

At a recent meeting of the ordinance committee of the City Council of Providence, R. I., it was voted unanimously that there would be no public hearing on the jitney problem. According to Chairman William Hughes, the members feel they can best get at the heart of the matter by calling, individually, representatives of the jitney men and the Rhode Island Company. The committee, it was said, will not start drawing up regulative legislation for jitneys until both sides have had an ample opportunity to explain their stands.

A petition, signed by officers of the banks, trust companies and savings institutions in the city asks that the electric railways be granted some relief by "enacting such ordinances as will place the jitneys and other motor vehicles operated for hire more nearly upon an equality with the railways and thus, to some extent, remove this unfair competition without depriving the public of whatever benefit a properly regulated jitney service may afford where it is necessary." The petition says:

The loss to the electric railways through this unregulated and unfair competition is estimated by the receivers, after careful observation, at not less than \$750,000 per year and is probably much more.

Unless some regulation is enacted we see no hope of reorganizing the electric rail-

way service or of keeping it in operation. The money required for reorganization cannot be obtained.

We do not feel that we are justified in permitting the capital of the people for whom we are trustees to be any longer used in the public service without any return. Much less do we feel that we can call upon them to advance more capital upon which there is no prospect that they will ever receive a return.

We feel that we might properly ask for a removal of the ruinous competition to which the electric railways are subjected, on the ground that it is unfair to those whose savings are invested in the railway properties which have so long served the community. But aside from these investors, we believe that the whole public is vitally interested in the preservation of the electric railway system, and that your honorable body, as the representatives of the public interests, should not permit it to be destroyed.

The system of competition which may destroy the electric railways does not and cannot pretend that it will supply the public needs for transportation when once the destruction is accomplished. That it cannot do so has been the verdict of the public utility commissions throughout the country which have studied the subject.

Rapid Transit Lines for Staten Island

Several proposed methods for connecting the Borough of Richmond by tunnel with other sections of New York City were submitted to the Board of Estimate & Apportionment of the City of New York recently by Transit Construction Commissioner John H. Delaney. The report, which was prepared in response to resolutions adopted by the Board of Estimate, gives details and estimates of costs for six tunnel schemes, and for a great bridge spanning the Narrows that would have capacity for rapid transit, freight and through passenger service, as well as for vehicular traffic between Staten Island and Brooklyn.

The cost of carrying out the various schemes ranges from \$6,000,000 to \$100,000,000. Two of the schemes analyzed, which have been advanced by residents of Staten Island, involve a combination tunnel and viaduct along the New Jersey shore of the bay, extending from St. George, Staten Island, to the Battery in Manhattan.

A Kind Word for the Manager

The Roanoke Times recently contained an editorial "The Street Car Service," reproduced substantially in full:

It is quite the custom here, as in other American cities, to growl about the street car service. It is a typically American habit and doesn't really mean anything. The street car company, the ice company and the local newspapers are looked upon as fair game and it doesn't do at all to take seriously everything said about them.

More or less extended observation has convinced us that the street car service here compares favorably from many standpoints with that of a number of other places. The schedule is all that could reasonably be asked, the rolling stock is in good condition, the employees are courteous and obliging—and the fare is only 5 cents. Aside from a street car ride, what can be named offhand that sells today for exactly the same price it brought before the war?

Roanoke people, who go away from home and submit without grumbling to the higher prices charged elsewhere, rarely have a good word to say for the local service. It might be better in some respects, of course. But it averages up pretty well as compared to other places and most of the "knocking" is unjustified. Manager Hancock is thoroughly reasonable and approachable, and a legitimate kick is always sure of attentive consideration, something that cannot be said everywhere.

Nation Stands to Lose

Mr. Porter Says Financing of Public Utilities Is Country's Biggest Job
—Appeals for Square Deal

H. H. Porter, vice-president and general manager of the Brooklyn City Railroad, in a recent statement to the press of New York, attributes the present plight of the traction companies basically to war's dislocation of industry; abnormal increase in wages and in cost of all materials, including coal; the heavy burden of direct taxation, as well as indirect taxation costs, embracing paving systems, etc.; the necessity of giving longer rides and more transfers, without additional compensation; operation of non-paying extensions and employment of improved facilities, coupled in many instances with decreased riding, due both to jitneys and private competition of automobiles.

FINANCING GREATEST PROBLEM

Mr. Porter illustrated the unfavorable situation by stating that a total of about 7,000 miles of track, representing almost 16 per cent of the entire track mileage of the electric railroads of the country, was in the hands of receivers or had been abandoned or junked. He sees signs of a more encouraging viewpoint in the regulatory authority, and cites particularly the attitude of the State of California as expressed by Edwin O. Edgerton, president of the Railroad Commission. Mr. Edgerton declares that the greatest single problem faced by both California and the nation is the job of financing public utility enterprises. California alone, it is estimated, will need at least \$50,000,000 for this purpose in the next decade. These figures are quoted by Mr. Porter to indicate the huge sums which must be devoted to the similar tasks which confront New York.

Mr. Edgerton stressed the need of recognizing the human factor. He insisted that punishment was not the way to promote efficiency in public utility corporations any more than in men and women. He urged California to apply that principle "to the fellow who has money to invest," recognizing, he said, that "we cannot get money out here from the East into California by threat, by argument, by any form of punishment, by any suggestion that because of investment already made they cannot quit. I recognize that the money must come by inducement and, in my judgment, it can be induced without paying exorbitant and unreasonable prices for it."

INCENTIVE OF REWARD IMPORTANT

Mr. Edgerton holds that having begun to take care of the investor and having produced a situation where his investment is safe and intact, his return regular and sure, then the organization of the company itself should be stimulated by offer of reward.

This general statement, according to Mr. Porter, is applicable to the transportation situation in New York and Brooklyn. Thus the Brooklyn City Rail-

road is largely a Brooklyn enterprise, a great number of its shareholders being Brooklyn men and women. Of a total stock list of 1,472 holders, representing 1,200,000 shares of the par value of \$12,000,000, 391,951 shares of a par value of \$3,919,510 are held by 742 women. Trustees, administrators, executors, guardians, life insurance companies, charitable institutions and colleges numbered 208 holders and held 407,799 shares of a par value of \$4,077,990. Other corporations, individuals and others, to the number of 522, hold 394,250 shares of a par value of \$3,942,500.

Mr. Porter cited these figures to show the character and diversity of the interests which must be protected under any equitable plan of readjustment.

Holland Commission Arrives to Study American Electrification Conditions

A commission made up of railway experts to study American methods of electrification has been sent by the Government of the Netherlands to this country. The party is headed by L. M. Barnet Lyon, member of the Board of Control of the Netherlands Railways. J. J. W. Van Loenen Martinet is secretary of the commission. Other members of the party are H. J. Van Lessen, H. Doyer and W. J. Burgersdijk, the latter being manager of the Holland Interurban Railway. The first government line in Holland to be equipped will be that between Amsterdam and Rotterdam, a distance of about fifty-five miles. Other electrifications will follow. A superpower system is also proposed. The equipment will be largely multiple-unit, though locomotive operation will also be required.

The commission will make a thorough study of American electrifications and will remain in this country for some two months. Visits have previously been made to Sweden and Switzerland to inspect the electric lines.

Appeal from Paving Order Sustained

The Public Utilities Commission of Maine has ruled upon the appeal of the Cumberland County Power & Light Company from the order of the municipal officers of Portland in relation to paving and resurfacing certain sections of certain streets and relocating tracks of the Portland Railroad, which it operates under lease. The appeal is sustained, the decision being signed by all three commissioners.

There are certain points, such as the percentage of cost of work, upon which the company and the city must come to an agreement. The commission holds the case open until such agreement is reached and the commission further orders that a report of such agreement be made to the body. When all the evidence has been submitted in this case, together with the arguments of counsel, the commission will determine the questions raised by the appeal and apportion the expenses involved in the matter submitted.

Freight Rates Advanced

Electric Railways Enjoy the Same Advance as Steam Roads Under I. C. C. Decision

In its opinion authorizing increased railroad rates, made public Aug. 1, the Interstate Commerce Commission has the following to say with regard to freight rates on electric lines:

Petitions have been filed in this proceeding by a national organization of electric lines, seeking permission to increase their rates in the same proportion as the rates of trunk lines are advanced. The operating costs of these lines have, on the whole, increased in approximately the same ratio as those of steam railroads. In some instances there is competition between the electric lines and the steam railroads. We conclude that the freight rates of electric lines may be increased by the same percentages as are approved herein for trunk lines in the same territory. This is not to be construed as an expression of disapproval of increases, made or proposed in the regular manner, in the passenger fares of electric lines.

Athletic Park for Rail Workers

"Tramway Park," the new athletic field provided and equipped by the Kansas City (Mo.) Railways for its employees, was opened recently with a game between the "Tramways" and another team in the Inter-City League of Greater Kansas City. Although the grounds were intended primarily for the use of employees, indications point to the park, becoming an important factor in the stimulation of athletics in the city. A factor particularly helpful to the success of the park is *The Railway Athlete*, the weekly paper of sports published and financed by railway employees. The scores and reports of games in the semi-pro leagues are published by *The Railway Athlete*. It is becoming the official organ of amateur baseball; and is building a large circulation among employees of business institutions which have ball teams in the local leagues. The availability of Tramway Park, where games may be played with convenient arrangements for charging admission, offers opportunity for many more games to be scheduled than could be done before.

Philadelphia Chamber on Labor

With the purpose of protecting the public from industrial warfare, an industrial relations committee has been established by the Chamber of Commerce of Philadelphia. It declares for the open shop, for the recognition by employer and employee of their full responsibility and for the faithful performance by them of the agreements or contracts into which they enter. It calls for the highest efficiency and production in industry consistent with the health and welfare of workers, and opportunity for the worker to develop his fullest earning capacity and command his maximum wage. These and other principles are summed up in eleven paragraphs, of which the one relating to utility operation follows:

The paramount interest of the public in the operation of the agencies of transportation and other branches of public utility service must be asserted and maintained against any attempt to bring about an interruption in the service of any public utility in furtherance of any private purpose or interest.

Bus Plan Attacked

Chamber of Commerce Condemns New York Bus Scheme—Analyzes City's Transit Situation

A proposed solution of the transportation difficulties of New York City is contained in a report of the transit committee of the Brooklyn Chamber of Commerce, presented at a public hearing of the Board of Estimate of New York City on July 28. This report declares that while the motor bus has recently proved its worth in urban transportation sufficiently to justify the conclusion that it is here to stay, its usefulness will not be found as a separate and independent system but rather as a feeder to existing trolley and rapid transit lines. The experience in various cities in this country and particularly abroad is quoted to justify this position.

The establishment of an independent bus system in New York, operated by the city or by private corporations, it is said, would mean a revival of the old principle of competition as a means of regulating this public utility service, a principle which was discarded years ago, when public utilities were made subject to State regulations. Such a competitive enterprise, in the opinion of the committee, would only tend further to disorganize the transportation service and result in added discomfort and inconvenience to the traveling public.

It is also pointed out that if the recent New York municipal bus lines had not taken only the cream of the service they would have been unable to operate on a 5-cent fare.

\$50,000,000 NEEDED

The report estimates the cost of installing a comprehensive bus system in New York and estimates that to do the work of the present surface cars it should consist of from 5,000 to 6,000 buses at \$8,000 apiece, which, with shops, garages, etc., would mean an initial investment of from \$50,000,000 to \$60,000,000. This system, it says, would naturally compete with the \$250,000,000 investment which the city now has in the present subway systems. Finally, the buses would add greatly to the street congestion, which is one of the tasks before the city to reduce. In commenting on the need for a settlement of the New York transit situation, the report says in part:

Neither party to the contract under which our transit systems are operated has yet given evidence of that spirit which is so essential to a just and equitable settlement of our transit difficulties. The companies merely ask for an increase in fare. The city administration in reply proposes municipal ownership and operation of existing lines or the establishment of city owned and operated bus lines. The companies, obligated under their contracts to give service at a 5-cent fare, ask the city to surrender this advantage without evincing any willingness to surrender to the city any of the advantages which they secured under their franchises and contracts. The city, on the other hand, tries to ignore the partnership relation existing between the companies and the city and is apparently seeking a complete disintegration of the service.

The Brooklyn Chamber of Commerce for a year and a half has been urging the companies to consent (1) to the abandon-

ment of the preferentials granted in existing contracts, (2) to the elimination of the outstanding perpetual franchises, (3) to the abolition of the numerous holding companies and the endless maze of subsidiary companies, and to a proper readjustment of their capitalization, in exchange for a fair consideration of their financial needs; but in all of the communications issued by the officials of the companies or the receivers appointed by the courts calling the attention of the public to the seriousness of their financial condition and the dire need of financial relief, there has not been a single hint or suggestion that the companies are willing to meet the public half way and, in return for concessions which they ask the city to make, to surrender any of the unfair advantages which the public believes the companies secured when they drove a hard bargain in the framing of the original contracts and franchises.

CITY FAILS TO CO-OPERATE

On the other hand, the uncompromising and hostile attitude of the city administration toward the companies gives the public no more encouragement for an early and constructive solution of the problem than does the unyielding attitude of the companies. When the companies appear before the Board of Estimate and Apportionment to present and defend their case they are not met with open-minded consideration. No constructive plan can be developed in such an atmosphere of hostility and suspicion. The city administration might find justification for its present attitude if it were intended as a preliminary to securing an advantageous position in negotiating a constructive plan of readjustment; but this hostile attitude has been maintained so long that the public has come to believe that the administration has no constructive plan, but that its policy is one of more obstruction, which, of course, leads nowhere.

If the Mayor is seeking a constructive solution of the transit problem in the interest of the public and if the companies are really desirous of arriving at a working agreement with the city and the public there is nothing to hinder the simple but customary procedure of the parties to the agreement meeting about the conference table, adopting the policy of absolute frankness and fair dealing, laying all their cards on the table, face up, and each evincing a willingness to make concessions in the interest of the larger public which they both serve.

If the Mayor and the board will give their attention to this simple and fair method of procedure they will move much more rapidly toward a solution of the transit problem than they will by suggesting and discussing a city-wide bus system, which would result only in freezing out or starving to death the existing transit companies—a result disastrous not only to the stockholders but to the entire traveling public, which is so fully dependent upon existing transit facilities.

News Notes

Wage Offer Rejected.—Platform men in the employ of the Berkshire Street Railway, Pittsfield, Mass., have rejected the offer of a 15 per cent flat increase made by General Manager C. Q. Richmond of the company in answer to the union's request for a 40 per cent increase. The union voted to hold out for the full 40 per cent increase.

More Pay for Oklahoma Men.—The Oklahoma Railway, Oklahoma City, Okla., has increased the wages of its platform men 3 cents an hour. The pay award is retroactive to June 1. The company has announced that it will grant a further increase of 3 cents an hour to take effect on Oct. 1. The company has an application pending for an increase in fare from 5 cents to 7 cents before the City Commission.

Dayton Arbitrators Named.—Thomas Elliot, consulting engineer of the Cincinnati Traction Company, has been selected by the electric railways operating in Dayton, Ohio, as their representative on the board of arbitration which is to determine a permanent wage plan for the Dayton carmen. J. Ernest Duncan will represent the men. It is proposed to consolidate the several local unions.

Men Reject Winnipeg Award.—Carmen in the employ of the Winnipeg (Man.) Electric Railway on July 19 voted by a small majority to reject the 10 per cent wage increase awarded them by the Myers board of arbitration. The company had previously announced that it would accept the findings of the board, although they would entail an additional expense of \$300,000 annually. The men demanded an increase amounting to practically 50 per cent. It was proposed to take a second vote later on the question of calling a strike to enforce these demands. At a hearing before the Manitoba Public Utilities Commission on July 20 counsel for the shareholders of the company appealed for an 8-cent fare on the Winnipeg lines.

Citizens Plan Des Moines Campaign.—Citizens' organizations plan to take an active part in settling the traction difficulties of Des Moines, Iowa. Tentative plans have been made to call a meeting of all the presidents and secretaries of local improvement leagues to form a city-wide organization to intervene in the controversy between the city and the Des Moines City Railway. It is proposed to seek the co-operation of all commercial and civic organizations so that the new federation will be entirely representative. O. M. Brockett, legal adviser for the Des Moines Chamber of Commerce, who was chairman of the franchise committee of the citizens' general committee which last year sought to work out the Des Moines railway problem, has written a letter to Mayor Barton proposing a service-at-cost basis.

Safety First With a Vengeance.—The Japanese equivalent to "ca'canny," says the *Electrical Railway & Tramway Journal*, London, was exemplified in a recent strike on the Tokio tramways, where the employees on that system brought a "Go slow" strike to a successful conclusion in one day. Their method, states the *Globe*, was to discover defects in the mechanism of the cars and then run them into the depots for repairs. As the cars are not exactly new, there are few of them on which this game cannot be successfully worked. But after being conceded an increase in wages, the men who had declined to break the regulations by driving unsafe cars were soon rattling them over the streets at the old break-neck speed. The municipality surrendered in the afternoon. The men were conceded a minimum wage of 5d. an hour, with an eight-hour working day, a bonus of six weeks' wages twice yearly and pensions at the end of service.

Financial and Corporate

Revenue Increases \$250,000

\$42,000 Deficit of Utah Light & Traction Company Changed to Profit of \$29,350

After paying all interest charges, including \$801,000 bond interest, and after placing \$150,000 in its depreciation fund, the Utah Light & Traction Company had profits for the year ended Dec. 31, 1919, of \$29,355. This compares with a net loss to the company

power bill decreased \$4,000, due to the skip-stop system and less frequent schedules on some lines.

TRAFFIC INCREASING

The total number of revenue passengers carried during 1919 was 33,908,484, of whom some 5,500,000 used transfers. The total passengers carried increased 3,346,520, or 9.3 per cent over 1918. Each passenger paid an average fare of 5.37 cents. The revenue per

\$47,035,000 St. Louis Value

Commission Appraises Property of United Railways—Has Used \$50,000,000 as Rate Basis

The Missouri Public Service Commission made public on July 27 its audit of the United Railways of St. Louis. The valuation of the entire property of the company is fixed by the commission at \$47,035,120. The appraisal of the property by engineers for the commission has not been completed, but the engineers worked in conjunction with the accountants and the valuations are expected to be about the same. The book value of the property as shown by the records of the company is \$101,436,776 and the outstanding indebtedness \$121,000,000.

The audit of the company's books reveals a continuous policy of pyramiding inflated values. Original values of the properties of the companies taken over in the consolidation of the various lines are shown to have been multiplied by many times their actual cost.

COMPANY'S ESTIMATES CUT

As carried on the books of the company the property is divided into two classes, namely, property purchased from original companies and new construction and equipment. The company's books carry purchased property at a value of \$83,740,813 and that of new construction and equipment at \$17,695,963, making the total of \$101,436,776. The company's figures for new construction and equipment were accepted at almost face value, but the

INCOME STATEMENT—UTAH LIGHT & TRACTION COMPANY

Year Ended Dec. 31:	1919	1918	Percentage Change Over 1918
Total railway operating revenue.....	\$1,855,281	\$1,602,000	15.8
Total railway operating expenses, including taxes.....	1,245,752	1,142,893	9.0
Operating income.....	\$609,529	\$459,107	37.7
Non-operating income.....	382,988	364,437	5.1
Gross income.....	\$992,517	\$823,544	20.5
Deductions from gross income:			
Interest on bonds.....	\$800,869	\$786,317	1.9
Other interest and deductions.....	12,293	54,095	-77.4
Depreciation.....	150,000	25,000	500.0
Total deductions from gross income.....	\$963,162	\$865,412	11.3
Net income transferred to profit and loss.....	\$29,355	\$41,868*	+170.0

* Deficit.

for the previous year of \$41,868 and makes an increase of 170 per cent.

The total railway operating revenue for 1919 was \$1,855,281, as compared with \$1,602,000 in 1918. This was an increase of \$253,281, or 15.8 per cent. On the other hand, the operating expenses increased only \$130,000, being practically \$1,138,000 in 1919. The net revenue from operations was about \$718,000, or an increase of approximately \$123,000 over 1918. Due to a reduction of \$37,000 in the income tax paid, the amount of taxes paid in 1919 decreased \$28,000 over 1918. For 1919 the operating income increased to \$609,529. This was an increase over 1918 of \$150,422, or about 38 per cent.

Non-operating income was made up chiefly from the Utah Power & Light Company for the rental of power plants. The gross income was \$992,517 for 1919. In comparison with 1918, this was an increase of \$168,973, or 20.5 per cent. From this gross income, interests on bonds of \$801,000, depreciation of \$150,000 and other interests of \$12,000 were deducted, leaving the net profit at \$29,355, or an increase of \$71,000 over 1918.

The traction company has 92.1 miles of main line track, of which 71.11 miles are in Salt Lake City, and 52.70 miles of second track, of which 49.05 miles are in the city. Of the total operating revenue given \$1,820,000 is in passenger revenue and about \$20,000 in freight revenue. Passenger conductors and motormen were paid \$466,000 during the year of 1919, or \$43,000 more than in 1918. In spite of heavier traffic, the

car-mile was 35 cents, while the expenses per car-mile were 23.5 cents. Operating revenue per car-hour was \$3.53, and the operating expenses per

STATISTICAL INFORMATION—UTAH LIGHT & TRACTION COMPANY

Year Ended Dec. 31:	1919	1918	Percentage Change
Miles of single track.....	146	146	0.0
Car hours.....	5,303,783	5,466,576	-3.0
Car house.....	525,216	544,084	-3.4
Ratio C.M. to C.H. (speed m.p.h.).....	10.09	10.02	0.7
Total passengers carried.....	39,521,505	36,174,985	9.3
Average number of cars operated.....	80	83	3.6
Statistics per car-mile:			
Operating revenue (cents).....	35.0	29.4	19.0
Operating expenses (cents).....	23.5	20.9	12.4
Net income (cents).....	0.55	0.77	-28.6
Number of passengers.....	7.45	6.62	12.5
Car-miles per passenger carried.....	0.134	0.151	-11.3
Statistics per car-hour:			
Operating revenue.....	\$3.53	\$2.95	19.6
Operating expenses.....	\$2.57	\$2.10	22.4
Net income (cents).....	5.6	7.7	-27.3
Number of passengers.....	75.3	66.4	13.4
Operating ratio, per cent.....	67.2	71.3	-5.6

car-hour were \$2.57. The operating ratio decreased from 71.3 per cent in 1918 to 67.2 per cent in 1919.

Railway Properties Run at Loss

The Northern Ohio Traction & Light Company, Akron, Ohio, has issued income statements for its railway lines in Canton, Massillon and Akron. All three lines have large deficits after providing for depreciation of property, and allowing for a return of 10 per cent per annum on an estimated investment. The lines in Canton, however, were operated at a small profit, if the allowances for depreciation and for a return on the investment in the property are disregarded.

total value of original property purchased was cut from \$83,740,813 to \$30,939,847, a reduction of approximately \$53,000,000.

The items which were deducted from the valuation by the commission consisted principally of franchise values, promotion expense, commissions and other items which do not represent physical property. In many instances these items amounted to from 50 to 75 per cent of the original book value of separate lines.

Pending the results of the valuation the Public Service Commission has been using a tentative value on the property of \$50,000,000 in fixing the rate of passenger fares. The company will shortly ask a fare increase.

Shore Line Sold

Portion of Road on Which Service Was Abandoned Last Year Will Be Junked

Fifty miles of line belonging to the Shore Line Electric Railway, Norwich, Conn., have been sold to the United States Rail & Equipment Company, Memphis, Tenn. The purchaser proposes immediately to dismantle the entire line and to dispose of the material and equipment. The sale has been approved by Judge George E. Hinman of the Superior Court and papers in the transaction have been signed. The sale involved \$340,000. Practically all of the stock in the line sold is owned by the estate of the late Commodore Morton Plant.

COURT APPROVES SALE

Robert W. Perkins, as receiver of the Shore Line, obtained an order from the Superior Court on June 15 authorizing him to dispose of the line at public or private sale, subject to approval by the court. The property to be removed comprises trackage, turnouts, sidings and materials, starting from State and Ferry Streets in New Haven and extending to Old Saybrook, Chester, Guilford, Stony Creek, Branford, Flanders Corner and East Lyme. The portion of the road sold has not been in use for about a year, operations having ceased when the employees went on

day of the month there was cash on hand amounting to \$10,511. The cash receipts for the month were \$53,540. Cash disbursements for the month of May were \$47,812, leaving a cash balance on June 1 of \$5,728. Total cash on hand at that time amounted to \$16,239.

Suburban Line Improves

Advance in Zone Fare and Addition of Zone Increases Net, but Do Not Permit Dividends

The annual report for the year ended Dec. 31, 1919, of the New Bedford & Onset Street Railway, New Bedford, Mass., indicates that the net income increased about \$10,000 over the previous year. This is due largely to the recent increases in the zone fares. The first advance was in August, 1918, when the rate per zone was increased from 6 cents to 7 cents and reduced rate tickets which were sold at 14.3 per cent discount were made universally valid instead of being accepted only on certain portions of the line. The second increase was made on Feb. 11, 1919, when the unit zone fares were increased from 7 cents to 8 cents. Ticket rates were increased also 1 cent per zone. The change in fares apparently produced a 26 per cent increase in passenger revenues and a 2.5 per cent increase in the number of revenue zone passengers carried, due not to an increase in traffic, but to the increase in the num-

Argentine Lines Do Well

Report Net Income of \$448,000 for 1919 — Expenditures 78 Per Cent of Gross Receipts

For the year ended Dec. 31, 1919, the Anglo-Argentine Tramways, Ltd., Buenos Aires, Argentina, reports a net income of \$448,000 in spite of labor troubles and a great increase in operating expenses. The gross receipts were about \$16,000,000. The total expenditures for the year amounted to \$12,480,000, this being an increase of \$962,000, or 8.35 per cent, over the working costs in 1918. Traffic expenses, in which the chief item is wages and salaries, were \$4,100,000, an advance of about \$500,000, or 13.9 per cent. This advance was mainly represented by increased wages of \$281,500 and strike expenses of \$173,250.

BUILDING OWN CARS

Under the head of maintenance, \$1,342,000 was expended, principally on rolling stock, as against \$1,180,000 in 1918, an increase of \$162,000, or about 13.7 per cent. There are now in the service 1,684 motors and 869 trailers. In view of the delays and difficulties in obtaining deliveries of new rolling stock from Europe, cars are being constructed in the company's own workshop from native woods. General rates and taxes, at \$1,513,000, showed an increase of \$123,500, or 8.9 per cent, over 1918. The new capital expenditure during the year was \$677,000.

The net profit for the year, \$448,000, was arrived at after providing \$470,000 transferred to renewal reserve, \$342,000 as rent of leased lines and interest amounting to \$2,680,000 on the three series of debenture stocks. Other amounts charged before arriving at the net profit were, for the redemption of preference and ordinary share capital, \$33,950, and for the redemption of debenture stock, \$235,500. The total stock redeemed and canceled in this way is \$2,065,000 to date. The sinking fund for the redemption of the share capital is \$410,000. To the year's profit of \$448,000 there is to be added an undistributed balance of \$402,500 from previous years, making a total profit for the year's operation of \$850,500.

TRAFFIC RECEIPTS INCREASE

The redeeming feature of the year's operation was the continued and steady increase in the traffic receipts, notwithstanding an estimated loss of about \$348,500 due to labor troubles. This indicates a great revival of business activity in Buenos Aires. The number of passengers reached the record total of 370,734,985, an increase of 6.14 per cent over 1918, although at the same time the car mileage increased only 1 per cent. The population of the city being 1,658,269, it follows that the inhabitants were carried 224 times over in the year.

The company has 387 miles of single track surface lines and 8½ miles of single track subways.

STATISTICAL INFORMATION, NEW BEDFORD AND ONSET STREET RAILWAY

Year Ended Dec. 31	1919	1918	Per Cent Change + Inc. — Dec.
Mileage—first main track (miles of line)	37.59	37.59	.....
Total—all track	44.00	44.00	.....
Average total miles operated	40.00	40.00	.....
Revenue zone passengers	1,922,502	1,875,718	+ 2.50
Revenue car miles	(a) 430,642	(b) 492,870	(c) -11.15
Car mile statistics—			
Operating revenue* (cents)	38.85	37.40	+ 3.90
Operating expenses* (cents)	25.10	21.72	+15.60
Net income (cents)	2.68	0.295	.....
Passenger traffic	4.47	3.81	+17.40
Passenger car miles per revenue zone passenger	0.223	0.255	-12.55
Mileage statistics—			
Operating revenue per mile of line	\$4,450	\$3,590	+24.0
Zone passengers per mile of line	51,200	49,900	+ 2.6
Number of persons employed—Dec. 31	50		.....

*Exclusive of power sold.

(a) Passenger car miles only.

(b) Passenger car miles 478,699 only.

(c) Decrease is for passenger car miles

strike in July, 1919. The New London division, formerly operated by the Shore Line, under lease from the Connecticut Company, was returned to the latter recently by court order, through abrogation of the lease.

A statement of assets and liabilities of the portions of the Shore Line still being operated for eight months ended May 31, 1920, filed with the clerk of the Superior Court, shows a deficit of \$83,198.

By months, the deficit is made up as follows:

October, 1919	\$21,851
November, 1919	3,571
December, 1919	4,405
January, 1920	9,853
February, 1920	26,346
March, 1920	12,043
April, 1920	2,693
May, 1920	2,436

\$83,198

The report of operation for the month of May shows that on the first

number of fare zones on the line. In reality, the traffic fell off during the year, and the number of car miles operated decreased 9.75 per cent.

The above table shows in detail the income and traffic handled during the past year as compared to the year 1918.

Dallas Deficit Grows

The total deficit of the Dallas (Tex.) Railway for the thirty-three months during which the company has been operating under the present franchise now amounts to \$547,223, according to the statement of operating results for June. During June the company earned \$36,584, or \$15,114 less than the amount necessary to yield a 7 per cent return on the agreed-on valuation of \$8,862,685. The gross income for the month amounted to \$254,123.

Financial News Notes

Rumor of Merger.—The Princeton (W. Va.) Power Company is said to have been approached with the proposition to take over from the Appalachian Power Company the electric railway system in Bluefield and make it one with the interurban and Princeton system.

Will Meet Bond Payment.—The International Railway, Buffalo, N. Y., has notified holders of its refunding and improvement 5 per cent gold mortgage bonds that on presentation to the Bankers' Trust Company, New York City, all interest coupons due May 1, 1920, will be paid together with all interest due on the bonds up July 12.

Railway Sold at Auction.—The property of the Plymouth & Sandwich Street Railway, Plymouth, Mass., was sold at public auction on July 27, to Louis Zuensky of Cambridge for \$55,200. The sale included all of the real estate and personal property of the company. The sale covered 17.8 miles of track and overhead and the carhouses in Sagamore and Plymouth. Operation of the line ceased April 1, 1918, and the sale was the result of a decree of the Supreme Court. The road is expected to be junked, although there is some talk of operating a portion of the line.

Sale Halted Pending Hearing.—T. S. Riley recently appeared before Judge J. C. Pritchard, of the federal court, in behalf of the Grafton Light & Power Company, the Grafton Traction Company and the Grafton Gas & Electric Company, Grafton, W. Va., in bankruptcy. He requested an order of stay in sales of the property of the companies. An order was issued postponing the sale until the matters in the case can be heard. T. F. Lanham, trustee, was ordered to proceed no further with the sale until further order of the court.

Borrows for Jacksonville Lines.—E. J. Triay, receiver for the Jacksonville (Fla.) Traction Company, has received permission from the United States District Court to borrow \$143,690 and to issue certificates of indebtedness to cover this amount. The receiver asked for the funds to meet the cost of street paving and to pay State and county taxes. The receiver in his petition showed that the income from the operation of the lines, under the present rate of fare, has continued to be less than the expenses of operation; also that it has been impossible to accumulate or set aside any amount to meet more than the current expenses.

City-Owned Line Going Into Debt.—On July 22 the board of directors of the Norton, Taunton & Attleboro Street

Railway, Norton, Mass., met and discussed the report of the company. The report was complete only to May 31 and showed that the system had been conducted at a loss since the taking over of the lines by the cities of Norton, Taunton and Attleboro. The operating expenses were \$42,218, while the operating revenues amounted to \$35,600. There are also more than \$17,000 in vouchers payable. The road was to have been abandoned because the return on the investment was inadequate. In order to retain the service the line was purchased by the cities concerned.

Allows 6 Per Cent Return.—Justice Charles E. Nichols of the State Supreme Court has rendered an opinion in the case of the Municipal Gas Company (Albany, N. Y.) vs. the State Public Service Commission, in which he holds in effect that the company may charge a sufficient rate to secure a 6 per cent profit on the capital invested, over and above the actual cost of production, "until such time as the expenses of production shall decline to where they were previous to 1918." The commission had refused to permit the company to charge more than \$1 per 1,000 cu.ft., in compliance with the terms of a State law fixing the rate for gas at not more than this amount.

Utilities Bear Tax Burden.—Public utilities operating in the State of Ohio are bearing the burden of taxation in that State, according to an address made by Clarence Dalton, tax representative for the Toledo Railways & Light Company, before the Ohio Electric Light Association. Mr. Dalton pointed out that in its report for 1917 the State Tax Commission stated that "public utilities in Ohio today are paying taxes on a valuation more than 4.63 times greater than the 1910 value, and the increased amount of taxes that are paid into the counties and their subdivisions are in proportion to the increased valuation." This figure has been increased in many instances since 1917.

Trust Issue Approved.—The New Jersey Public Service Commission has approved an equipment trust agreement between the Public Service Railway, Newark, and the Osgood Bradley Car Company under which \$1,820,000 of trust certificates will be issued. The certificates will bear interest at the rate of 7½ per cent a year and will be used to purchase 200 one-man safety cars, 100 center exit trailer cars, fifteen double-truck snowplows and fifteen single-truck sweepers. The commission has also approved an application by the company for permission to issue \$410,000 in promissory notes to yield 7½ per cent. Of the total, \$205,000 is payable in two years and the remainder in three years.

Offer Car Trust Certificates.—The Northern Ohio Traction & Light Company, Akron, Ohio, through Cassatt & Company, Philadelphia and New York, is offering for subscription \$1,000,000 in 8 per cent gold certificates at 100 and interest, to yield 8 per cent. The cer-

tificates are issued under the Philadelphia plan in denominations of \$1,000. The Fidelity Trust Company of Philadelphia is trustee. The certificates are dated Aug. 1, 1920, and are due serially \$100,000 Feb. 1 and Aug. 1, from 1921 to 1925. They are secured by twenty steel interurban passenger cars, fifty-six Peter Witt city passenger cars and ten Cleveland type trailers, costing more than \$1,340,000. The company is now paying dividends on \$5,451,000 preferred stock and 7 per cent dividends on \$9,100,000 common stock.

Bonds Exempt from Taxation.—Judge Louis B. Ewbank, sitting in the Circuit Court at Indianapolis, Ind., has ruled that bonds issued by the Indianapolis Street Railway and the Indianapolis Traction & Terminal Company and later bought up by the companies and put into the sinking fund are not taxable. The ruling was in a suit brought by the State for collection of \$313,413 in taxes said to be due on the bonds for the years from 1904 to 1918. Of this sum \$192,653 has been placed on the tax duplicate on alleged valuations of the bonds from \$38,104 in 1904 to \$1,138,310 in 1918. The taxes were placed on the tax duplicate after a report was made by W. F. Charters, a tax expert, that the bonds were being withheld from tax returns. The companies appealed the case to the Circuit Court. In announcing his ruling, Judge Ewbank said that he was unable to see how he could increase his wealth by writing checks to himself, or by keeping a promissory note which he had given and redeemed.

Toronto Railway Seeks City's Help.—The Toronto (Ont.) Railway finds itself with extraordinary charges to meet. Among them the payroll of the company will be about \$2,000,000 more for the year commencing July 1 than it was for the previous year. In consequence the company has asked the city for permission to defer for the present current payments to the city. Under its agreement with the city the company pays the city a graded scale of percentage on its gross earnings in monthly installments. The company now finds that under the present rates of fare it cannot meet its obligations promptly and pay the percentages monthly as in the past, and has requested the indulgence of the city to allow the payments, or such part of them as the company may require, to be deferred until the end of the franchise, so as to enable the company to meet the payrolls, ordinary expenses of the company and other obligations, on the understanding that the accumulated percentages owing to the city will be a first charge on the assets of the company, to be deducted out of the award of the arbitrators when the property is taken over by the city on Sept. 1, 1921. The company has suggested that it would simplify the proposition were the company to meet its monthly obligations by giving promissory notes, payable at such dates as would be agreeable to the city.

Traffic and Transportation

Bridgeport Still Trolleyless

City Authorities Fail to Move for Return of Electric Cars—Company Stands Pat

Bridgeport's electric cars are still on vacation. Although more than a week has passed since the Connecticut Company halted service on its Bridgeport city lines there is little prospect of immediate resumption of operation. The city authorities have taken no steps to end the trolley-jitney deadlock which resulted when Judge Banks on July 22 refused to dissolve a temporary injunction restraining the city from enforcing the terms of an ordinance which proposed to halt this competition with the railway lines.

Judge Banks, while ruling that the measure as passed by the City Council was illegal, pointed out that the city had the power to regulate the buses. He also indicated what steps should be taken by the Council to secure this end. Nevertheless, the Council has taken no action looking to passage of a new anti-jitney law. Latest indications, according to newspaper reports, are that the Council is ready to legislate if the cars will come back.

BUSES STILL POPULAR

Buses are still the Bridgeporters' chief means of conveyance. Several hundreds of the vehicles are still operating through the streets formerly occupied by the trolleys. Apparently the total number of buses operating remains about constant. They are giving a service which is handling the traffic which is offered to the satisfaction of a large part of the people who are using the buses.

Some interesting sidelights on the situation of a trolleyless city are beginning to show up. While the traffic offered is being handled, the records of the merchants of the city are in many cases indicating that the traffic that used to exist does so no longer. In other words, some of the larger stores are finding that their sales are much below normal, and they attribute this to the fact that large numbers of their better customers are not coming in on buses, whereas they used to come in on the electric cars.

Individual traffic officers say that their problems at the corners are not changing much, but viewing the city as a whole it has been found necessary to add about sixteen more officers to place on additional corners which have never had traffic officers before, and to double up on some of the busier corners. This is apparently to give greater protection to pedestrians, with a larger number of units passing at a somewhat higher speed.

There is still present the cream-skimming jitney owner of the type who owns a little store and leaves it under the care of other members of the family while he operates his bus on profitable routes in the busy morning, noon and evening hours. While this assists in handling the rush-hour problem, it reduces the total number of available buses for steady work, and some parts of the town are experiencing service headways three to four times as long as under the electric car operation.

SENTIMENT FAVORS TROLLIES

There is a changing sentiment in the press and public opinion which might be characterized as the result of the novelty of the situation having worn off. Criticisms of the bus service are commencing to appear in greater numbers.

Fair weather has continued to assist the jitneys and buses in the transportation problem without the trolleys.

Memphis Needs Higher Fare

T. H. Tutwiler and Frank S. Elgin, receivers of the Memphis (Tenn.) Street Railway, have filed with the federal court at Memphis a report of the results of the service-at-cost plan, in force on the company's lines for the past three months. While no direct request for an increase in the rate of fare from 6 to 7 cents is included in the report, the receivers show that the company is now operating at a loss. The report shows a detailed deficit of \$7,936 in the past three months.

Under the original order issued three months ago a full report was to be made to the court by the receivers showing the earnings of the company and the expenditures for a three months' period. The court is to be the judge of whether any increase in fare is justified.

The report shows expenditures for the three months April 1 to June 30, inclusive, of \$831,854, with revenues of \$823,918. In addition to the deficit of \$7,936 the report shows a deficit in the "fare index" fund of \$42,524 for the six months from Jan. 1 to June 30, 1920, while for the entire year from July 1, 1919, to June 30, 1920, the deficit in this fund is \$54,872. This fund was set aside to stabilize the fare. The court decreed the fund should reach the sum of \$60,000 before the company would be entitled to an increase on the 6½ per cent allowed as a fair return on the investment of the stockholders. The deficit in the operation of the system as well as the deficit in the fare index fund must come out of the revenue in addition to the operating expenses, according to the report.

"Safeties" in Los Angeles

Forty-five One-Man Cars Soon to Be in Service—Rerouting Results Satisfy

With the introduction of one-man safety car service on July 9, the Los Angeles (Cal.) Railway entered the final phase of a thorough reorganization of the system which began with the rerouting of all lines on May 9. Forty-five Birney safety cars are to be placed in operation, twenty-two having been received up to the present time. The company proposes to have 100 of the cars in service eventually.

Operation of the safety cars was started on two lines. One, known as the Vermont Heights line, is a shuttle which serves an outlying district and connects with the terminal of two lines that run through the main business section of Los Angeles. Two cars are operated in the morning and evening rush hours and one at other times. The second line on which safety cars are operated is the East Jefferson-Thirty-eighth Street run. It traverses a cross-town street approximately three miles south of the main business district and connects ten lines running to the business district. Two of the cars are operated throughout both the day and night.

REROUTING RESULTS SATISFACTORY

While preparations were being made for introduction of the safety cars the Los Angeles Railway and the Los Angeles Board of Public Utilities co-operated in making an exhaustive check of results from the rerouting of the company's lines. The company furnished the men necessary for the check and co-operated in every way. Conductors issued to passengers a small card with these questions:

1. Your destination?
(If in business district state cross streets.)
2. Will you transfer?
3. Are you satisfied with the route of this car from the RESIDENTIAL district to the BUSINESS district?

Added to this saving in time for passengers and an increase in the feeling of good will toward the company, there has been a saving of 700 car miles daily, with proportionate reduction in power consumption, depreciation, etc. The daily mileage total for all lines under the old system was 84,804 car miles. With the rerouting this has been reduced to 84,095 car miles. The average number of cars in service daily is 753.

In advising the public of the rerouting changes, considerable newspaper advertising space was used for several days before the contemplated changes. The advertisements carried the detailed routing under the new plan. Folders containing this information, together with the signs and schedules, were placed on the cars and distributed through public organizations. Cards showing on what streets to get cars in the downtown district were attached to lamp-posts in the business district by special permission of the civic authorities.

Ten Cents Cash on Chicago "L"

Four Tickets for 35 Cents—New Temporary Order Became Effective on Aug. 4—Ruling on Valuation

In response to the petition of the Chicago (Ill.) Elevated Railways filed on June 24 last, for authority to place in effect a 10-cent cash fare in order to enable the company to meet the increases in operating expenses incurred since the commission authorized a rate of 8 cents cash and two tickets for 15 cents, the Illinois Public Utilities Commission on July 31 authorized a new temporary rate of 10 cents cash with four tickets for 35 cents within the city limits. Between any two stations north of Howard Street, the city limits station, the fare is made 7 cents. Through tickets between any station south of Howard Street in Chicago and any station north of Howard Street in Evanston or Wilmette will cost 13 cents, but where a through ticket is not purchased the fare is made the sum of the two local fares, or 17 cents.

THE order of the commission points out that the possible number of passengers that will be carried during the ensuing year is 190,000,000 and that by charging the rate authorized, including revenue accruing to the companies from sources other than transportation of passengers, the elevated roads will earn approximately \$17,570,000. With respect to the expense account the commission finds that the companies will be required to expend during the year for maintenance of way and structures, \$1,400,000; for maintenance of equipment, \$1,450,000; for power, \$1,360,000; for conducting transportation, \$7,575,000; for traffic, \$35,000; for general and miscellaneous expenses, \$725,000; for taxes and car licenses, \$1,070,000, and for rentals, \$330,000; or a total of \$13,645,000.

Deducting this amount from the estimated total revenue there remains available for depreciation and return upon the investment, the sum of \$3,625,000, which is equivalent to a rate of return of 5.1 per cent upon the value of \$70,943,000, fixed in an ordinance passed by the Chicago City Council on Aug. 14, 1918. The commission points out that this return would be substantially reduced if adequate allowances were made for the depreciation constantly accruing on the properties.

EXPECT MORE TICKET SALES

With the ticket rate of two tickets for 15 cents, which has just been superseded, the number of ticket fares collected was approximately 74 per cent of the total. With the new ticket rate of four tickets for 35 cents, which makes a greater differential in favor of the ticket fare, it is logical to assume that there will be a higher percentage of ticket fares to total fares collected.

Effective June 1, 1920, the wages of all employees of the Elevated Lines were substantially increased, adding to the operating expenses an estimated sum of \$1,756,000 annually. This formed the controlling consideration in the decision of the commission to grant a temporary order at this time, the companies having been unable to meet the increased wages. In this connection the employees have been very considerate of the position of the company, and have acquiesced in the necessity to defer payment of the increases

until the company should find itself in position to pay them through increased fares.

COMPANIES' NEED URGENT

With reference to the justice of the temporary orders increasing the fares, the commission has this to say:

That the petitioners are entitled to the financial relief hereinafter authorized is beyond question. At the time the fares were increased from 5 cents to 6 cents, an advance made necessary by the action of the National War Labor Board in increasing wages, it was thought by many that the close of the great war would cause a quick return to normal conditions, and that higher fares would be in effect only a comparatively short time. But the prophesies of these persons have not been realized.

Results of operation under the increased fares heretofore authorized by the commission clearly show that the relief then granted has been the minimum that could escape a judgment of confiscation in our courts. In no case have the advanced fares thus authorized produced a rate of return which any court would consider reasonable on the least possible value which could be assigned to the properties, but we have been of the opinion that these rates would enable the companies to operate without serious injury to their financial condition or the services they provide until the value of the property and other factors vital in a rate-making proceeding could be placed in evidence. But the recent large wage increase is a burden greater than the companies can bear without assistance, and it seems plain that they could not reasonably be asked to wait for further relief until such time as the issues in this case have been finally decided. Believing thus, we are of the opinion that the relief which is provided by the rate hereinafter authorized cannot justly be deferred until the final determination of the questions involved in this case.

HISTORY OF FARE CASE

The rate situation of the elevated roads first came before the Public Utilities Commission on Sept. 2, 1918, when the companies filed schedules which proposed to advance the passenger fares from the flat rate of 5 cents to one of 7 cents on all lines within the city limits. On Nov. 19, 1918, the commission entered a temporary order authorizing the companies to increase the rates from 5 cents to 6 cents. The application was admittedly of an emergency nature, and no attempt was made by the companies to place in evidence all the elements that were necessary to enable the commission to determine the fair rate-making value of the properties.

Subsequent developments in the case were as follows:

On Aug. 4, 1919, the companies applied for a further increase in rates made necessary by the increase in wages of \$2,435,515 per annum which became effective Aug. 1, 1919. This petition also stated that the deficiency in net earnings while operating under the 6-cent fare between Dec. 1, 1918, and July 1, 1919, amounted to \$588,889.

On Aug. 6, 1919, therefore, the commission entered an order authorizing an increase in rates from 6 cents to 8 cents. On Feb. 1, 1920, the commission issued a supplementary order authorizing a cash fare of 8 cents, or two tickets for 15 cents, within the city limits, and a cash fare of 6 cents north of Howard Street and a through-ticket rate from Evanston to Chicago of 12 cents. This order was to remain in effect until July 31, 1920, on which day it was superseded by the order authorizing the rates of fare set forth in the first paragraph.

VALUATION CASE NEAR END

As to the valuation proceedings in the elevated case, the commission has ruled that the city of Chicago must complete its evidence prior to Sept. 20, 1920, after which the companies will have ten days to cross examine witnesses for the city or to present such rebuttal evidence as they desire. The companies have already placed before the commission voluminous evidence concerning the original cost of the properties, their cost to reproduce using prices prevailing (1) in 1916, and (2) at the time of valuation in 1919, with these costs depreciated to correspond with the physical condition of the units.

Investigation of this evidence submitted by the companies has been carried forward so that the commission has reached conclusions on part of the evidence. From this investigation the commission takes exception to a portion of the maintenance expense, to the replacement reserve, the expense of making the valuation submitted to the commission, and the federal income tax deduction which the company made. In reference to maintenance the commission states that evidence clearly shows that during the past year the companies have spent much more for maintenance of road and equipment than the average in the eight years prior to 1918. After making due allowances for increased costs of labor and materials the commission holds that it is obvious that in the past year a larger volume of work than usual has been done. It is pointed out, however, that it is not to be concluded that the work done by the companies is unnecessary.

Referring to the "replacement reserve" the commission states that beginning Oct. 1, 1919, the companies opened an account designated under this heading, to which has since been charged \$65,113 each month, or a total of \$586,017 in the nine months ended June 30, 1920. It is pointed out that other than indicated by its name, the purpose of this fund is not made clear by the evidence and that the amounts charged to this account form merely an additional burden upon operating expenses, and one which evidence thus far adduced fails to justify. The commission makes it very clear, however, that it does not in any way question the right or the desirability of the creation by the companies of a fund that will adequately care for the replacement of various articles when they shall have come to the end of their useful life, and states that in subsequent orders due consideration will be given this matter.

Connecticut Fares Up

Commission Grants Company 7-Cent Basic Rate to Meet Emergency
—Permanent Order Later

The Connecticut Public Utilities Commission on July 30 granted the petition of the Connecticut Company, New Haven, for a 7-cent basic fare on all its lines except the New London division. The commission limited the time of operation of the new fare to the period ending Sept. 30, when it will reopen the fare question. The mileage-basis zone system put in effect by the company on Nov. 2, 1919, and which was upset and superseded by the commission's substitute zone system on May 9 of this year will give way on Aug. 8 to the new system, which approximates that obtaining when the company charged an initial fare of 6 cents. The initial fare will allow a person to travel to any point within three miles of the traffic centers of cities and two miles from the traffic centers of towns, with a cost of approximately 3 cents a mile for all distance traveled thereafter. All transfers are to be free.

EMERGENCY RELIEF NEEDED

Because of the urgent nature of the situation, the commission states that an emergency plan of relief is needed. It is not certain, however, that the 7-cent basic fare plan is best calculated to meet the needs of the company and the public. It therefore makes the new rates temporary. Monthly commutation tickets are to be sold by the company at the rate of 2½ cents a mile. These are to be issued for use between the traffic center of any incorporated city or borough having a population of 25,000 or more and points more than five miles distant therefrom.

The commission's order says in part:

It is hereby ordered that the rates now in force under commission's order dated March 30, 1920, issued under docket No. 3243, be and the same are hereby suspended from on and after Saturday, August 7, 1920, and the petitioner, the said Connecticut company, is hereby authorized and permitted until further order of the commission in the premises, to put into effect on August 8, 1920, a flat rate system of fares, so-called with an initial fare of 7 cents for the first zone and 6 cents per zone thereafter; the zones in cities to be approximately three miles in length, radiating from traffic centers, and corresponding substantially to the present three one-mile zones; and all other zones to be substantially two miles in length, corresponding approximately in length to, and including two of the present mile zones; with free transfers at all transfer points.

The company shall issue commutation tickets, good for round trip daily between the traffic center of any incorporated city or borough having a population of 25,000 or more, according to the latest authenticated census, and points more than five miles distant therefrom, on all lines radiating from such traffic centers, for the number of days in any month less Sundays and legal holidays; said commutation tickets to be sold at the rate of 2½ cents per mile; to be issued to the individual commuter; to be non-transferable, and to expire at the end of each month. School tickets shall be issued at one-half regular rates.

On account of uncertainty of zone limitations in the 7-cent zone plan submitted by the company, and the creation of new fare limits thereby, it was deemed advisable to establish a 6-cent zone for areas already substantially determined under the present mile zone system, but retaining 7 cents as the initial fare.

The commission is not satisfied that the temporary rate herein authorized is a

proper rate or that it will produce the revenues needed and expected by the company, but it is permitted on the urgent request of the company as a temporary and an emergency rate. * * *

The commission is of opinion that if there is to be a return to the flat rate system, the general public would be better satisfied with a return to substantially the old flat rate zones or fare limits, but it is now claimed by officers of the company that a flat rate of 7 cents on the old flat rate areas would not produce sufficient revenue to allow the company to continue operation. * * *

The new 7-cent fare limits are within the limits of the old 5-cent and 6-cent flat fares which the Connecticut Company formerly used. Also under the former 5-cent and 6-cent basis the suburban zones were from 2½ to 2¾ miles in length; with the present zone markers set approximately a mile apart it occasioned much less difficulty to install two mile zones at 6 cents than to reinstate the former zones at 7 cents, which was suggested.

COLLECTION PLANS VARY

There will be several methods of fare collection. On the whole the fare collection scheme will be based on the pay-as-you-enter principle, on all of the two-man cars equipped for that purpose. On cars running outside of the 7-cent zones, pay-within collection will be used for the additional zones. An exception will be made in the case of the through interurbans, in which the interurban tickets described in the issue of March 6, 1920, page 480, will be used. A few old-type cars for city service will operate entirely on the pay-within principle, whereas all the one-man cars being operated entirely within the 7-cent fare limit will be operated pay-as-you-enter approaching traffic centers, and pay-as-you-leave outbound from traffic centers.

The metal tokens which the Connecticut Company introduced under the 6-cent fare regime will be reinstated as 7-cent tokens. A few of these are still out, and those which cannot be located will of course have to be accepted for 7 cents.

Interurban Handles Freight in Strike

The Galveston-Houston Interurban Railway, running from Galveston to Houston, Tex., has recently entered the lists of freight carriers. With the tie-up at Galveston resulting from the strike of longshoremen, and the urgent demand by merchants and others for freight tied-up in steamer holds or in waterfront warehouses, an agreement has been reached under which merchants of Houston and other points are receiving their merchandise at ship-side and are re-shipping to destination. This step was decided on when the authorities at Galveston promised armed protection to such merchants in their unloading freight from steamers and transporting it from waterfront to freight depot. Hauling out of Galveston is being done by the interurban, a rate of 35 cents a hundred pounds from Galveston to Houston being put into effect for such shipments, exclusive of drayage.

Discipline by Bonus

Pacific Electric Railway Tries Out Merit System in Transportation Department—Extra Pay Allowed

A system of discipline based on a plan of merits and demerits is now in operation in the transportation department of the Pacific Electric Railway, Los Angeles, Cal. The new regulations apply to motormen, conductors, brakemen, yardmen and gatemen. Employees having no demerits marked against their names will receive at the end of the year \$5 in the form of a bonus for each month worked.

ACCESS TO RECORDS

An individual record is kept of each employee to which the employee is permitted access at any time. An accumulation of seventy-five demerits results automatically in discharge from service. If extenuating circumstances exist and under proper authority reinstatement is approved it will be with fifty demerits against the employee's record. A second accumulation of seventy-five demerits will result in permanent dismissal.

Credits are allowed for commendable acts, deeds of heroism and loyalty and good judgment in emergencies. For meritorious service avoiding accident, or unusual assistance in crisis, or any commendable act out of the strict line of duty, ten merits are credited, subject to the approval of the head of the department. A clear record for six months brings fifteen credits and if fraudulent transportation is detected five merits will be granted.

Demerits are issued for a number of causes. Among these are reporting late to work or missing runs, discourteous acts toward passengers, smoking or reading on duty, inattention to duty, careless handling of equipment, disregarding signals, laxity in flagging, leaving switch locks open, general neglect in reporting accidents, lack of neatness, careless conducting of transportation in its various forms, and for various other causes.

\$5 MONTHLY BONUS

The company is setting aside a fund equivalent to \$5 a month beginning April 1, 1920, for each employee in the above classes. This will be credited to the record of the individual on Dec. 1 of each year, but on Nov. 30 of each year there will be deducted \$1 for each demerit received during the period. The balance will be paid to the employees who have been continuously in service for the period since the last payment. The fund accumulated by these deductions will be set aside by the company for hospital or other relief purposes for its employees as it may elect.

Employees laid off on account of reduction in force, through no fault of their own, will be entitled to receive bonus pro rata for the period worked. With this exception no one not in the employ of the company on Nov. 30 of each year will participate in the bonus.

Transportation News Notes

Will Abandon Freight Service.—Effective Aug. 9, the freight service of the Ohio Valley Electric Railway, Huntington, W. Va., will be discontinued. Following a recent fire the company was ordered by the State fire marshal to tear down the freight station at Third Avenue and Seventh Street.

Six Cents Despite Mayor.—The City Council at Canton, Ohio, has passed an ordinance over the veto of Mayor Herman R. Witter, giving the Northern Ohio Traction & Light Company the right to a rate of fare of 6 cents or seventeen tickets for \$1. The measure was first passed by the Council on July 2.

Higher Fare in Gary.—The Indiana Public Service Commission has authorized an 8-cent car fare for the Gary & Interurban Railroad, Gary, which operates in and between Gary, Hammond and East Chicago. The commission also fixed a price of \$1 for a book of fourteen tickets. It permitted no change in transfer privileges.

Conductor Dies in Rear-End Smash.—A conductor in the employ of the Toledo Railways & Light Company, Toledo, Ohio, was killed on July 27, when a car of the Toledo, Fostoria & Findlay Railway crashed into the vestibule of his city car. Eight persons were injured. This is the second rear-end collision between interurbans and city cars in Toledo within the present year. Failure of brakes has been given as cause in both instances.

Fare Increase Asked.—The Columbus, Delaware & Marion Electric Company, Columbus, Ohio, has introduced an ordinance in the Marion City Council granting a fare of 6 cents cash or five tickets for 25 cents and free transfers on its lines in that city. The company addressed a communication to the Council explaining that the increased cost of labor, power and material made an increase necessary and showed comparative statistics of fares in other cities.

Fare Action Deferred.—Because of lack of a quorum at the meeting of the City Council of Lima, Ohio, July 30, no action was taken on the proposed increase of fare from 5 to 6 cents on the city line of the Ohio Electric Railway. J. H. McClure, vice-president of the company, stated that the wage demands of the 1,100 employees cannot be met unless Lima, Newark and Zanesville grant the company relief before Aug. 10, when a conference with the men is to be held.

Safety Platforms in Fort Worth.—The City Commission of Fort Worth, Tex., has announced that platforms will be built as markers of the safety zones

established for persons boarding or leaving electric cars. These platforms will be 1 ft. wide and twenty-four feet long and raised about four inches from the level of the street. Iron cones that now mark the safety zones will be placed at the ends of the platforms as protection against automobiles and other vehicles.

Would Charge 7 Cents.—At a hearing before the State Public Service Commission on an application of the Charleston (W. Va.) Interurban Railroad to increase city fares to 7 cents the company stated it had lost \$13,398 during the last six months after allowing for interest payments and depreciation. Since the 6-cent rate went into effect four months ago the company has lost \$5,600. There has been no diminution in the number of passengers because of the 6-cent fare.

Eight Cents in Port Arthur.—The City Commission of Port Arthur, Tex., has granted the Port Arthur Traction Company authority to install an 8-cent fare. The new rate was put into effect on July 27. The fare ordinance provides that tickets shall be sold at the rate of fifteen for \$1. This action was taken by the city authorities on application of the company officials, who contended that service would have to be suspended unless higher fares were charged.

Ten Cents in Portland, Me.—The Maine Public Utilities Commission has authorized the Cumberland County Power & Light Company, Portland, to file a new schedule of rates on one day's notice to the public. The present ticket fare will be increased from 7 cents to 8 cents, and the present cash fare from 9 cents to 10 cents. The commission refused the company's request for a 9 cent ticket fare on the ground that through loss of patrons the company would eventually lose revenue.

Mayors Ask Higher Fare.—Resolutions recommending that the South Carolina Railroad Commission be petitioned to grant to the Charleston-Isle of Palms Traction Company, Charleston, such rates of fare and such relief as is provided by law under an act of the Legislature which was approved March 11, were adopted recently at a joint meeting of the Mayors, Aldermen, Wardens and Commissioners of Charleston, Mount Pleasant and Sullivan's Island. The company seeks to increase its fare, stating that unless a higher rate is granted it must cease operation.

Freight Service Expanded.—The Louisville & Southern Indiana Traction Company, New Albany, Ind., is now engaging in extensive freight service, hauling from eight to ten carloads of cement daily from Speeds, Ind., to Louisville, Ky. The haul is about twelve miles long. The plant of the Louisville Cement Company is located at Speeds and in past years some difficulty has been experienced in bringing an adequate supply of cement to Louisville. Louisville is said to be one

of the few cities in the United States which is getting an adequate cement supply. A carload of cement is unloaded in Louisville two hours after it has been loaded at Speeds.

Mileage Rate Proposed.—Elimination of the present blanket rate to the various beach cities in the vicinity of Los Angeles, Cal., with rates to be entirely on a mileage basis, was proposed by C. A. Smith, general passenger agent of the Pacific Electric Railway, in his testimony before the State Railroad Commission at a hearing on July 19. Mr. Smith stated that by doing away with the blanket charge the company hoped to be able to increase its revenue approximately \$266,000 over and above the \$1,750,000 deficit for which general increases in rate of 33 per cent are being asked. The commission adjourned the hearings to Aug. 12.

Fare Rate Held Illegal.—An opinion recently handed down by Judge Smith of the Federal District Court holds that the rates charged by the Charleston-Isle of Palms Traction Company, Charleston, S. C., are illegal in that they violate the terms of a State law limiting fares to 3 cents a mile. The State Railroad Commission last year authorized the company to charge a straight fare of 3 cents a mile with a minimum charge of 5 cents. The company was later ordered by the commission to cease charging these rates. The company thereupon sought an injunction to restrain the commission from interfering with it in the collection of the 3-cent rate. The court held that the company has the right to abandon operation and to liquidate its assets.

Tries Out Five-Cent Fare.—By agreement with the Barre and Montpelier city authorities the Barre & Montpelier Traction & Power Company, Montpelier, Vt., will continue to charge a 5-cent fare on its lines in these cities for a period of four months. Although previously authorized to charge a 6-cent fare the company several months ago notified the municipalities that for a period of four months it would charge a 5-cent fare with the understanding that if the revenue proved to be greater than for the same period a year ago, when a 6-cent fare was charged, the 5-cent rate would be considered in force. Owing to the fact that the company's lines were tied up for several weeks last March, as the result of a severe snowstorm, the company suggested the continuance of the trial period for another four months.

Fare Rise Unopposed.—No opposition developed at the hearing on July 29 before the Public Service Commission for the Second District on an application of the Fonda, Johnstown and Gloversville Railroad, Gloversville, N. Y., to increase its rate of fare to 8 cents in the cities through which it runs and 12 cents between Gloversville and Johnstown. The net operating revenue of the company was only \$710 for 1919. The operating revenue for 1919 was \$274,840 and the operating expense

totalled \$256,000. Taxes and other necessary expense left \$710 as net revenue. The company has been negotiating with its employees for an increase in pay which is to be retroactive to May 1, and the understanding that the company has with the municipalities was that any increase in rates that the commission might allow should go to the men as wages.

Will Fix Capacity of One-Man Car.—Rankin Johnson, president of the Trenton & Mercer County Traction Corporation, Trenton, N. J., at a hearing before the Public Utility Commission on the operation of one-man cars, said the company might have to call upon the police to limit the load of the cars to fifty adult passengers each. H. C. Eddy, of the utility board, recommended that the company paint on each car in large letters the phrase "Load Limit 50 Passengers." He suggested that the company also place on the cars a removable guard rail designed to prevent passengers from crowding upon the front platform. Mr. Eddy said that he observed as many as sixty-seven passengers on a one-man car, and that frequently the loads are greatly in excess of fifty. He said the crowded conditions interfere with the work of the operator. The commission will issue an order later.

Would Raise Springfield Rate.—P. E. O'Brien, general manager of the Springfield (Ohio) Railway, has presented to the Springfield City Commission a petition for an increase in the fare charged by the company. The present fare is 6 cents. No specific rate is asked in the petition. If the present wage scale of employees continues, Mr. O'Brien told the commission, he could meet expenses with a 7-cent cash fare and a 6½-cent ticket. If an increased wage scale is demanded by the railway employees when their contract expires Oct 1, he said it would take an 8-cent fare to meet expenses. Announcement has already been made by the employees that an increase will be sought. The increase in wages from Oct. 31, 1919, to May 1, 1920, as compared with the previous wage scale is approximately \$30,000. Under present financial conditions, there is no market for the company's securities, and its borrowing capacity is exhausted.

Wheeling Company Wants Eight Cents.—The City Railway, Wheeling, W. Va., has applied to the Public Service Commission for an increased fare to 8 cents. The hearing was set for July 29. The company also desires to be authorized to sell six tickets for 40 cents, and wants higher express rates. The Wheeling Public Service Corporation, operating between Wheeling and the Pennsylvania state line at West Alexander, Pa., a distance of 16 miles, has also applied for new rates, as follows: From Twelfth and Chapline Streets, Wheeling, to Elm Grove, a distance of 5 miles, or between intermediate points, 10 cents a passenger. Between Elm Grove and other points the

fares are to be 7 cents to Triadelphia, 14 cents to Roney's Point, 21 cents to Valley Grove, 28 cents to West Alexander. The company also asks higher rates for school children, express packages and milk transportation. The Wheeling City Council has agreed to withdraw its opposition to the proposed increase on the city lines.

Buses Jeopardize Franchises.—Unlawful jitney competition with the lines of the Public Service Railway, Newark, N. J., is jeopardizing the company's corporate existence, according to an argument by Frank Bergen, general counsel of the company, at a hearing before Vice-Chancellor Griffin in Jersey City on July 26. The company some time ago filed suits in chancery to enjoin individuals and municipalities from operating buses in competition with the railway. Mr. Bergen contended that the defendant jitney companies have no right to operate on the public highways without first complying with the provisions of the so-called Kates act passed in 1916, requiring owners of jitneys, before beginning operation, to obtain the consent of the board or body having control of the public streets in the cities where they propose to operate. It was asserted that in many cases the defendants had not obtained the consent required by the Kates act, and hence are unlawfully competing with the company.

Jitneys Lose in Court.—Pending final court decision as to whether the city of Seattle has the power to halt jitney competition with the lines of the Seattle Municipal Street Railway, buses have continued operation in that city. Judge Everett Smith of the Superior Court recently signed an order quashing an alternative writ of mandamus obtained by the jitney drivers and dismissed from court the suit brought by the jitney interests to compel Comptroller H. W. Carroll to count the names of unregistered as well as registered voters in determining the sufficiency of the jitney initiative petition. The effect of the court order is that Mr. Carroll will not be compelled to count the signatures of 11,812 persons on the initiative petition, whose names do not appear on the registration books of the city. The jitney men will have to strengthen their petition by approximately 2,000 names before the City Council can be compelled to submit to popular vote in a special election an initiative ordinance in substitution of existing jitney regulations, permitting the buses to operate.

Approves Schenectady Rise.—The Schenectady (N. Y.) Railway has been granted the authority by the Public Service Commission for the Second District to raise its fare from 6 to 7 cents in Schenectady and in outside territory where a 6-cent fare is now charged. Transfer privileges are included and the company may sell five metal tokens for 35 cents. The new fares will become effective on three days' notice to the public and the commission and will remain in force for one year unless otherwise ordered by the commission. The

new rates are controlling on the tracks of the Schenectady Railway and those of the United Traction Company, Albany, and the Hudson Valley Railroad. Increased wage payments on June 1 which will amount to \$300,000 a year was one of the main factors in seeking to increase the fare. The city of Schenectady waived a limitation of fare under its local franchise so as to allow the increase in the city. There will be no changes in the through fares on the Albany division. The through fares on the Troy and Saratoga divisions will be a combination of the zone fares.

Hope for Louisville Rise.—With two ordinances now in the course of preparation to replace the service-at-cost bill withdrawn from the City Council of Louisville, Ky., by the Louisville Railway, members of the company's executive committee express confidence that "city officials will meet the situation in a spirit of fairness and save the company from receivership." Churchill Humphrey, a director and assistant general counsel of the company, is drawing up one ordinance and William T. Baskett, assistant city attorney, is drafting the other for presentation to the Council. The company's ordinance provides a 7-cent fare until rescinded by the Council, and for the payment by the company to the city of \$168,000 annually for street repairs as long as this fare remains in force. The city's ordinance provides for the payment of a 7-cent fare for two years, with an automatic return to 5-cent fares at the end of that time, and the payment of \$168,000 annually for street repairs "every year hereafter." It also stipulates that a valuation of the entire property of the company shall be made during the two-year period.

Six-Cent Fare in Richmond.—At a meeting of the City Council of Richmond, Va., on July 28, final approval was given to a 6-cent fare on the local lines of the Virginia Railway & Power Company. The Mayor approved the ordinance the following day and it went into effect on Aug. 1. Under the new ordinance the fare is 6 cents, or five tickets for 30 cents. The only reduced fares remaining are the 2½-cent school tickets. Free transfers are continued. This increase is an emergency measure pending a complete revamping of the company's franchise, and was asked for at this time in order to increase the pay of the carmen to that received by the employees on the Norfolk division, where a 6-cent fare has been in effect for about a year. The company's petition was unanimously indorsed by all the local civic organizations. Because nearby cities have 7 and 8-cent fares, and were thus able to offer better wages, the company's men were leaving for those cities, as well as for other lines of business which offered better pay. This resulted in many cars remaining in the carhouses because the company lacked men. The railway management candidly laid the situation before the public through advertisements in the daily papers.

Personal Mention

Mr. Ogburn Resumes Law Practice

Following the submission to President Wilson of the report of the Federal Electric Railways Commission, Charlton Ogburn, executive secretary of the commission, will resume the practice of law, with offices at 67 Exchange Place, New York City. The winding up of the commission's affairs will mark the conclusion temporarily, at least, of Mr. Ogburn's connection, which began three years ago, with the electric railway industry.

Early in the war Mr. Ogburn enlisted for military service, but because of inability to meet the physical requirements he took up government work in Washington and was placed in charge of the electric railway division of the National War Labor Board. He concluded more than 100 arbitration hearings involving disputes between electric railways and their employees, preparing the report and the tentative award in each case. He also served as personal arbitrator in a number of electric railway wage cases in Massachusetts, New Hampshire, Pennsylvania and New Jersey. Out of more than 100 arbitration awards made following his recommendations, in not a single instance did either party refuse to abide by the award.

Mr. Ogburn is a native of Georgia. Since graduating from the Harvard Law School twelve years ago he has engaged in the active practice of law. During the past six years his practice has been in the East, largely as representative of southern financial institutions. He has specialized in bonds and securities generally.

E. M. Walker Heads Illinois Association

Edwin M. Walker, general manager of the Terre Haute Traction & Light Company, Terre Haute, Ind., has been elected president of the Illinois Electric Railways Association. Mr. Walker is well known to the industry through his record as an operator and through his work for the American Electric Railway Association and the state organization.

Mr. Walker has been in charge of the Terre Haute traction and lighting system for the past three years. Before going to Terre Haute he served as general manager of the Dubuque (Iowa) Electric Company. He entered public utility work shortly after his graduation from Williams College with the degree of A. B. in 1897. After serving in various capacities with gas and electric light properties, he went to Muscatine, Iowa, as general manager of the Citizens' Railway & Light Company.

He was later appointed general manager of the Union Electric Company, Dubuque, continuing in a similar capacity with its successor, the Dubuque Electric Company.

Directs Commission's Work

O. C. Merrill Appointed Executive Secretary of Water Power Commission—Drafting of Regulations Begins

Oscar C. Merrill, now chief engineer of the United States Forest Service, has been appointed by Secretary of War Baker to be executive secretary of the Federal Water Power Commission, formed under the provision of the water power act signed by the President last June. Complying with a request from Mr. Merrill, the Secre-



O. C. MERRILL

taries of War, the Interior and Agriculture, ex officio members of the commission, have designated the advisory committee to draft regulations for the granting of licenses under the act. General Crowder will represent the War Department, Herman Stabler the Interior Department and Mr. Merrill himself the Department of Agriculture.

Mr. Merrill began work for the Forest Service by making a special study of water powers in California. Soon thereafter he was designated district engineer, with headquarters in San Francisco. In the following year he was placed in charge of all water powers coming under the jurisdiction of the Forest Service. When in 1914 he was ordered to Washington to become chief engineer of the Forest Service he retained under his personal direction the matters pertaining to hydro-electric development.

Mr. Merrill was born in Manchester, near Augusta, Maine, in 1874. Following his graduation from the Massachusetts Institute of Technology in 1905, he spent one year as an instructor in the engineering department of

the University of California. He then became associated with Charles G. Hyde and began his specialization in water-power consulting work.

Obituary

James Mitchell, Traction Financier

James Mitchell, president of the Alabama Power Company, and one of the leaders in the electric railway development of South America, died at his home at St. James, Long Island, N. Y., on July 22, following a stroke of paralysis. Mr. Mitchell had not been actively engaged in business during the past year.

Mr. Mitchell was born in Pembroke, Canada, fifty-four years ago. He came to the United States when a boy and settled near Milton, Mass. As a young man he worked for the Thomson-Houston Company, afterward part of the plant of the General Electric Company, at Lynn, Mass. He went to Brazil for this company and installed the first electric cars in South America. He also made some of the first electric railway installations in this country, his first being at Denver, Col. He contributed a number of important improvements of electric cars and other electrical equipment. He was one of the founders of the Brazilian Traction, Light & Power Company.

Axel C. Ekstrom, consulting electrical engineer of the Delaware & Hudson Company, New York, N. Y., and its allied lines, died on July 1 at his home in Ballston Spa, N. Y. As consulting engineer for the Delaware & Hudson Mr. Ekstrom had an important share in the management of the United Traction Company, Albany, N. Y., one of the D. & H. subsidiaries. He was well known to the electric railway men of New York State and was a prominent figure at the conventions of the American Electric Railway Association. Mr. Ekstrom was born in Stockholm, Sweden, August 24, 1861. He came to this country more than thirty years ago. He became affiliated with the Thomson-Houston Company of Lynn, Mass., later merged with the General Electric Company. In 1904 he left the General Electric Company to go with the Delaware & Hudson Company, with office at Albany, N. Y., as consulting electrical engineer. In the year 1906 he designed and constructed the steam power plant at Mechanicville, N. Y., which, from that time, has been furnishing electrical power to the Delaware & Hudson and subsidiary companies. He was also connected as electrical engineer with the Hudson Coal Company of Scranton, Pa.; the Chateaugay Ore & Iron Company, Lyon Mountain, N. Y., and was a director of the United Traction Company and the Schenectady Railway.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER,
SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

Graphic-Recording Meter Market Growing

Raw Material Supplies Rather Low
But Shipments Can Be Made
in Four to Six Weeks

Manufacturers of graphic recording meters uniformly agree that demand today is probably greater than ever before in that line, and not only have sales for the first half of this year greatly exceeded those of last season but inquiries seem to be steadily increasing. The remarkable favor in which this instrument stands can be traced to the growing tendency of power consumers and power producers to check up their costs. According to one of the big producers of recording instruments, hardly a single electric power installation is now made without including a graphic recording meter in the equipment. This of course has made it harder to make shipments to power house users.

A survey of the field reveals very short stocks in the hands of the manufacturers, but this condition is not so alarming as at first appears, in view of the fact that most of these meters

are made to order and light stocks are usually the rule. But even so, the available supplies are rather sub-normal and the main factor promoting this condition would seem to be the rapid increase of demand, which has outstripped facilities for adequate production, even though that production at present seems to be proceeding at normal capacity, as judged by the standards of the past. Another consideration, of course, has been the freight muddle, and to some extent supplies of raw material, although this latter item was in several cases reported in pretty fair shape.

Under these conditions, deliveries in this market are considered pretty fair, although some manufacturers were much worse off than others in that respect. From four to six weeks were the best dates quoted, and other estimates ranged as long as ten or even twelve weeks. One of the producers who was among those able to make the quickest deliveries, stated that his shipments were sent only by express.

An entire absence of order cancellations is noted. Prices for graphic recording meters have remained stationary for about two months.

come better controlled. This need not mean ordering for heavy stocks, but rather advance ordering for shipment when the material is to be utilized. Anything which permits the manufacturer to plan farther ahead tends to hold costs down, if not to enable actual reductions to be realized by the buyer. There is a load factor in sales of manufacturing-plant products no less than in the utility generating station, and the aggregate purchases of smaller supplies by electric railways are a decided factor in the manufacturing program, taking it the year through. Mass production of utilities means lower costs in the long run, closer competition for business and hence lower prices.

HIGH PRICES POSTPONE BUYING OF MATERIAL

The present level of high prices tends to encourage the railway purchasing agent in postponing supply orders until the gap between his stock room and attainable deliveries becomes dangerously small. Price cuts in the leather and textile fields have unquestionably resulted in postponing many orders for electrical material which otherwise would have gone through promptly. The quotation of "price at delivery" has discouraged long-distance buying. It would seem as though an understanding might be reached between railways and manufacturers on this subject. Well-scheduled orders placed in good faith far ahead of current requirements are an asset to both sides and deserve some concession as to price.

There is little evidence yet that electrical material prices will undergo any substantial reductions during the present year. The class of material in mind here is absolutely essential to operation and must be had regardless of price, barring the development of satisfactory substitutes. In the interests of continuous and reliable service, the purchasing agent, it seems, is justified in advance ordering beyond the limits that would be the criterion of normal times. No commission can justly condemn expenditures made in good faith to safeguard the service which must be rendered, so long as electric traction is a modern transportation agency. On the other hand, it is in the long-run interest of the manufacturer to co-operate with all efforts to schedule purchases far ahead, and if a fair profit is all that is sought, it should not be difficult to make price readjustments in settling bills for material in cases where the railway purchasing agent has helped both the manufacturer and his own company by far-sighted planning and placing of orders.

Should Supply Orders Be Scheduled Far Ahead?

Systematic Methods of Advance Buying Can Help Manufacturers
and Buyers with Both Deliveries and Stocks

Purchasing agents of electric railways and other public utilities have learned to their cost since the days of pre-war deliveries that machinery and heavy apparatus cannot be had upon demand. The extension of time required in manufacture has not only enforced the placing of orders as early as possible but it has involved purchasing departments in "follow-up work" of a very expensive kind. Until materials become much more plentiful and until transportation conditions are greatly improved many of these practices will be obliged to continue, but this does not mean that economical purchasing is beyond realization, at least in connection with materials and supplies in general.

Recent observation of the purchasing agent's work emphasizes the continuing importance of applying the same systematic methods in the buying of miscellaneous supplies that have become essential in the ordering and checking of shipments of larger units of equipment such as motors, machine tools, rolling stock parts and pole line supplies. Forward ordering, should be cultivated to the maximum extent, feasible with the keeping of sufficient

stocks for current needs. The necessities of operation, however, will always result in a certain measure of rush orders or belated buying. These must be cut down to the lowest possible terms if deliveries are to be anything like satisfactory, certainly until factory and jobbers' stocks are built up sufficiently to permit a return to the old practice of ordering for immediate shipments.

Something like a budget system is needed in determining the quantities and character of material wanted over a period of six to nine months, instead of letting orders drift until the operating departments put in hurry calls for material whose shrinkage might have been recorded and foreseen with a simple loose-leaf or card-index system applied intelligently to so-called "minor" supplies as well as to the more impressive items.

If more system is used in such buying, manufacturing requirements will become known farther in advance, material can be ordered more advantageously, labor will be assigned with reduced lost motion between successive jobs and production in general will be-

Chicago Surface Lines Plans to Buy Rolling Stock

Illinois Public Utilities Commission Releases Depreciation Fund for Purchase of New Cars

The Chicago Surface Lines, Chicago, Ill., has under preparation specifications for new cars, and these will presumably be placed in the hands of the car builders for bids within the next two weeks. The plans of the company have heretofore been to purchase 200 trailers and convert an equivalent number of present motor cars for hauling them. The recent order of the Illinois Public Utilities Commission making the funds ordinarily paid to a renewal and depreciation fund in accordance with city ordinance available for the purchase of new equipment will now make possible the financing which has heretofore held back the placing of an order for new cars. The commission ordered the company some time ago to purchase 200 new cars. With this money made available, it is possible that motor cars as well as trailers will be purchased, the number of each not having as yet been determined.

New Mogul Condulets

To meet a demand for condulets having an unusually long cover opening and big wiring chamber, the Crouse-Hinds Company, Syracuse, N. Y., has developed for the market a new series of "mogul obround" condulets. These are made in eight types, each type in eight conduit sizes ranging from 1 in. to 4 in. Four sizes of composition and cast-iron covers are made, the composition covers finished blank with from one to nine holes, the iron cover finished with or without round rubber gasket.

Rolling Stock

Gary & Hobart Traction Company. Hobart, Ind., will purchase one new safety car at a cost of \$6,000. The company will pay \$1,500 in cash for the car and permission has been granted by the Public Service Commission at Indianapolis for the issuance of notes to cover most of the balance.

Harrisburg Railways Company, Harrisburg, Pa., has purchased two McGuire-Cummings snow-sweepers for fall delivery.

The City Railway Company, Dayton, Ohio, expects to buy from fifteen to twenty new street cars.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C., advises it will purchase ten new 41 ft., double end, center entrance, 2-motor, double-truck, steel passenger cars, equipped with Westinghouse 514-A motors and H. L. control. Pantasote curtains, Keystone illuminated signs, Hale & Kilburn seats, Johnson fare boxes, Pittsburgh drop brake handle and hand brake, O. B. air sanders and Ideal trolley catchers will be installed.

Mesaba Railway Company, Virginia, Minn., will purchase one or two double truck, four-motor, pay-as-you-enter safety cars.

Morris County Traction Company, Morristown, N. J., is going to purchase one sweeper.

Escañaba Power & Traction Company, Escañaba, Mich., announces it has bought one single-truck McGuire Cummings sweeper, and two McGuire Cummings 45 ft., double-truck, 40,000 lb. passenger cars, equipped with two G. E. 57 motors, one of the cars being already in operation.

Detroit United Railway, Detroit, Mich., states it has completed fifty double-truck trail cars and is now building fifty double-truck motor cars. These will be followed by fifty additional trail cars which will be completed early next year it is expected.

Track and Roadway

Mobile (Ala.) Light & Railroad Company.—The Mobile Light & Railroad Company has placed contracts for the building of 1½ miles of carhouse tracks, curves, etc. The Lorain Steel Company has the contract for thirty-five curves.

Calgary (Alta.) Municipal Railway.—Commissioner A. G. Graves has prepared an estimate of the cost of completing the Centre Street extension of the Calgary Municipal Railway. An expenditure of \$9,475 will be required exclusive of the rails.

Public Service Railway, Newark, N. J.—The Public Service Railway has laid new tracks from Camden to Moorestown to take the place of the tracks of the Burlington County Transit Company, which were removed by the latter company.

Public Service Railway, Newark, N. J.—The Public Service Railway has petitioned the Trenton City Commission for permission to run its tracks into a building on South Warren Street, Trenton, and to convert that structure into a terminal.

Hagerstown & Frederick Railway, Frederick, Md.—Plans are being worked out for the extension of the Hagerstown & Frederick Railway system from Hagerstown, Md., to Martinsburg, W. Va. Surveys are being made at the present time.

NEW YORK METAL MARKET PRICES

	July 1, 1920	August 3, 1920
Copper ingots, cents per lb.	19.00	19.00
Copper wire base, cents per lb.	22.50 to 23.00	22.50 to 23.00
Lead, cents per lb.	8.00	8.50
Nickel, cents per lb.	43.00	43.00
Zinc, cents per lb.	7.95	8.02½
Tin, cents per lb.	49.00	48.25
Aluminum, 98 to 99 per cent, cents per lb.	33.00	33.00

ELECTRIC RAILWAY MATERIAL PRICES

	July 1, 1920	August 3, 1920
Rubber-covered wire base, New York, cents per lb.	28.00	28.00
Weatherproof wire (100 lb. lots), cents per lb.	29.00	29.00
Standard Bessemer Steel Rails, per gross ton	45.00 to 63.00	45.00 to 63.00
Standard open hearth rails, per gross ton	47.00 to 65.00	47.00 to 65.00
T rail, high (Shanghai), cents per lb.	3.00	3.00
Rails, girder (grooved), cents per lb.	3.00	3.00
Wire nails, Pittsburgh, cents per lb.	4.00	3.25 to 4.50
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.85 to 4.25	4.00 to 5.75
Railroad spikes, screw, Pittsburgh base, cents per lb.	7.50 to 9.00	7.50 to 9.00
Tie plates (flat type), cents per lb.	3.00 to 4.00	4.00
Tie plates (brace type), cents per lb.	3.00 to 5.00	4.00
Tie rods, Pittsburgh base, cents per lb.	7.00	7.00
Fish plates, cents per lb.	3.75 to 4.75	3.75 to 4.75
Angle bars, cents per lb.	3.75 to 4.75	3.75 to 4.75
Rail bolts and nuts, Pittsburgh base, cents per lb.	6.00	6.00 to 7.50
Steel bars, Pittsburgh, cents per lb.	4.25 to 4.75	2.35 to 4.00
Sheet iron, black (24 gage), Pittsburgh, cents per lb.	4.20 to 6.85	4.20 to 7.85
Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb.	5.25 to 8.05	5.25 to 8.55
Galvanized barbed wire, Pittsburgh, cents per lb.	4.10 to 4.45	4.45

OLD METAL PRICES—NEW YORK

	July 1, 1920	August 3, 1920
Heavy copper, cents per lb.	15.00 to 15.50	15.50 to 16.00
Light copper, cents per lb.	13.00 to 13.50	13.50 to 13.75
Heavy brass, cents per lb.	9.00 to 10.00	9.25 to 9.50
Zinc, cents per lb.	5.00 to 5.25	5.50 to 5.75
Yellow brass, cents per lb.	7.00 to 7.25	7.25 to 7.75
Lead, heavy, cents per lb.	7.00 to 7.25	7.25 to 7.50
Steel car axles, Chicago, per net ton	32.00 to 33.00	33.50 to 34.50
Old carwheels, Chicago, per gross ton	36.00 to 37.50	36.00 to 36.50
Steel rails (scrap), Chicago, per gross ton	27.50 to 28.00	28.00 to 28.50
Steel rails (relaying), Chicago, gross ton	31.50 to 32.50	35.00 to 36.00
Machine shop turnings, Chicago, net ton	9.50 to 10.00	9.50 to 10.00

ELECTRIC RAILWAY MATERIAL PRICES

Galvanized wire, ordinary, Pittsburgh, cents per lb.	3.70 to 3.95	4.20
Car window glass (single strength), first three brackets, A quality, New York, discount*	17%	17%
Car window glass (single strength), first three brackets, B quality, New York, discount.	37%	37%
Car window glass (double strength, all sizes AA quality), New York, discount.	79%	79%
Waste, wool (according to grade), cents per lb.	21 to 24	17 to 23
Waste, cotton (100 lb. bale), cents per lb.	16	15 to 17½
Asphalt, hot (150 tons minimum), per ton delivered.		38.00
Asphalt, cold (150 tons minimum, pkgs. weighed in), per ton.		42.50
Asphalt, filler, per ton.		45.00
Cement, New York, per bbl.	4.80	5.10
Linseed oil (raw, 5 bbl. lots), New York, per gal.	1.63	1.58
Linseed oil (boiler, 5 bbl. lots), New York, per gal.	1.65	1.605
White lead (100 lb. keg), New York, cents per lb.	15½	15½
Turpentine (bbl. lots), New York, cents per gal.	1.75	1.65

*These prices are f.o.b. works, with boxing charges extra.

Mesaba Railway, Virginia, Minn.—The Mesaba Railway expects shortly to purchase line material for 8 miles of track. The grade has been completed and the steel purchased.

Durham (N. C.) Traction Company.—The Durham Traction Company expects to build 1½ miles of new track, including an extension of ¼ mile.

International Railway, Buffalo, New York.—Plans for the immediate expenditure of \$570,000 by the International Railway, are being made, according to Edgar J. Dickson, vice-president of the company. This money will be used for relaying tracks and improving the roadbed in many streets in all parts of the city.

Hamilton (Ont.) Street Railway.—The Hamilton Street Railway proposes to construct a line from Margaret Street to Paradise Road and from Paradise Road west to the Dundas line.

Portland Railway, Light & Power Company, Portland, Ore.—Plans and specifications have been adopted by the Public Dock Commission for the extension of the St. Johns line of the Portland Railway, Light & Power Company to municipal terminal No. 4. Engineer G. B. Hegardt has been directed to advertise for bids for the work. The dock commission will furnish the rails, fastenings and specials, and bids will be asked for these.

Philadelphia (Pa.) Rapid Transit Company.—The Council's committee on transportation has considered favorably the petition of the Philadelphia Rapid Transit Company to construct an extension of its Sixtieth and Spruce Streets line to Overbrook.

Quebec Railway, Light, Heat & Power Company, Quebec, Que.—Application has been made by the Quebec Railway, Light, Heat & Power Company to the Railway Commission in Ottawa for permission to extend its lines in Belvedere Ward to St. Malo.

Dallas (Tex.) Railway.—The laying of a track on Masten Street has been started and the finishing of the work will be a matter of four or five months.

Texas Electric Railway, Dallas, Tex.—J. F. Strickland, president of the Texas Electric Railway, has inspected the three routes of the Dallas-Wichita Falls interurban line and in his opinion no definite route can be decided upon without further consideration.

Memphis (Tenn.) Street Railway.—The tracks on Main Street will be re-laid. Work on Beale Street and several suburban streets is also in progress, the former being about completed.

Monongahela Valley Traction Company, Fairmont, W. Va.—The Monongahela Valley Traction Company proposes to install at Farmington, W. Va., a siding that will give the Mannington line of the company a connection with the Baltimore & Ohio Railroad tracks at that point.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—The Puget Sound Traction, Light & Power Company will build a double track from

Champion Street to Kentucky on Cornwall Avenue, in Bellingham. The work will include the laying of 7,100 feet of steel and will cost approximately \$40,000.

Power Houses, Shops and Buildings

Regina, Sask.—The City Commissioners will construct a spur line to the new power house at the Parliament buildings. The cost will be \$4,000.

Mesaba Railway, Virginia, Minn.—The Mesaba Railway expects to build within the next few months a substation near Hibbing, Minn.

Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga.—The Fairburn & Atlanta Railway & Electric Company expects to complete an office building within the next two weeks.

Morris County Traction Company, Morristown, N. J.—The Morris County Traction Company expects to build within the next four weeks a repair shop extension and a station and office.

Eastern Pennsylvania Railways, Pottsville, Pa.—The Eastern Pennsylvania Railways has purchased one 3,000-kw. steam turbo-generator set and four new Coxie stokers.

Mobile (Ala.) Light & Railroad Company.—The Mobile Light & Railroad Company has purchased and is now installing one 578-hp., 200-lb. pressure Sterling boiler. The company has purchased one 1,000-kw., Westinghouse, 600-volt geared turbo-generator.

Mobile (Ala.) Light & Railroad Company.—The Mobile Light & Railroad Company is building one steel carhouse, 100 ft. by 192 ft., with pits. There will also be open tracks outside for the storage of cars after inspection.

Los Angeles (Cal.) Railway.—At a substation of the Los Angeles Railway new facilities are being installed to tap the Southern California Edison Company's transmission line. At present the power is carried to a point near the downtown district and back to this substation. Another item of \$15,000 expenditure is the installation of new feeders.

Trade Notes

The Pacific Car Building Company has contracted for a \$150,000 factory in Woodland, Yolo County, Cal.

The Alhaduct Company, 136 Cator Avenue, Jersey City, N. J., has filed plans for an extension to its plant at 33-35 New Street.

The Electric Storage Battery Company, Philadelphia, Pa., has increased its capital stock from \$18,000,000 to \$30,000,000.

S. F. Bowser & Company, Inc., Fort Wayne, Ind., held its annual sales convention June 28 to July 2; it was the largest convention ever held by the company.

The Welch Armature Company, Welch, W. Va., manufacturer of electrical equipment, etc., has awarded contract for the erection of a three-story building, 63 ft. x 65 ft., to cost about \$25,000.

The Delta-Star Electric Company, 2437 Fulton Street, Chicago, is having plans prepared for the erection of an addition to its plant, one and two stories, 100 ft. x 110 ft., to cost about \$40,000.

The Spencer Turbine Company, 484 New Park Avenue, Hartford, Conn., manufacturer of blowers, etc., contemplates building an addition to its plant, 60 ft. x 125 ft., to cost about \$45,000.

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., announces the appointment of G. B. Kirker as manager of the railway division of the Los Angeles district office.

The National Association of Purchasing Agents will hold a convention in Chicago on Oct. 11, 12 and 13. A committee is working on a standardized invoice form which is attracting widespread interest because of its possibilities.

Willis H. Gilbert is now established at 710 Conway Building, Chicago, Ill. Mr. Gilbert is producing and selling Southern white cedar poles. He has opened distributing points at Atlanta, Washington, Birmingham, Cleveland, New Orleans and other points throughout the South and East.

Autocashier Company of America, 111 Broadway, New York, N. Y., has been incorporated under the laws of Delaware with an authorized capital stock of \$5,000,000, to manufacture money-handling machines for use on street cars. The "autocashier" is electrically operated, handles coins of any denomination, retains and registers fares and automatically returns the exact change to the passenger. First deliveries of 10,000 machines are expected about October 1.

New Advertising Literature

Oil Separator.—Bulletin No. 1130, describing its Bundy oil separator, is being circulated by the Griscom-Russell Company, 90 West Street, New York City.

Electric Tools, Carbon Brushes, Etc.—Gilfillian Brothers Smelting & Refining Company, Los Angeles, Cal., is circulating catalog No. 7 on its electric tools, carbon brushes and ignition parts.

Brushes for Electrical Machinery.—The Morganite Brush Company, 519 West Thirty-eighth Street, New York City, has issued bulletin M.B.C. No. 1, in which it describes its different types of Morganite brushes for electrical machinery.

The Duff Manufacturing Company, Pittsburgh, Pa., has issued bulletin No. 304, describing a new automatic lowering jack of 15-ton capacity, suitable for use in the electric railway field.