

Electric Railway Journal

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True Thrift in Fuel Conservation

THE dominant factors in electric railway management at the present time are the need for an increased fare, the adoption of operating economies, labor shortage and fuel conservation. Fuel conservation is too often considered purely from the viewpoint of the balance between the money-saving from any proposed method of reducing power consumption and the financial outlay necessary to accomplish the desired result. In the last analysis such a policy is short sighted because it leads to the depletion of our national resources for an immediate profit although these resources ultimately would have a greatly enhanced value. A policy which would conserve fuel and other natural riches can be designated as one of real, far-sighted thrift.

That we have been a nation of spendthrifts with regard to our natural resources has become a truism, and the time has now come when thrift, in its truest sense, is being forced upon us. We should recognize this fact and prepare for it even though it requires us to better matters from a different standpoint from that to which we have become accustomed by long experience and association.

The conservation of fuel is vital to our national welfare, not only in these war times but constantly. The reason for this is that even if the interest rate of the return on the investment for additional or improved apparatus is not sufficient in itself to make the venture attractive from a purely financial standpoint the necessity for true thrift still remains. That it is not possible to overturn well-established investment principles is of course obvious. On the other hand, it is well to recognize that thrift of the nation as a whole has become a factor of such importance as to affect individual choice.

A Good Time to Disarm All Criticism

THE electric railways of the country are seeking popular support these days for many of their requests. This is as it should be, and there are evidences on all sides that the people from the President of the United States down are in sympathy with their contentions. Appreciation of these conditions must be shown while the public is in this mood, and if there are localities where the people are still hostile because of lack of information on company policy, steps should be taken to educate them.

The complaint department of a company is a good place to gage the public temper. True, the people who take the trouble to make a complaint or suggestion may be a small proportion of the patrons of the line. At

the same time they may be the very people to approach with conciliatory replies. It might also be a good idea to adopt the plan of a certain large Eastern company and send with each acknowledgment a copy of any literature which may be available setting forth the policy and aims of the management. When answers are made by mail the potentialities of a well-written letter should be kept in mind. The complainant should not be antagonized even if it is necessary to tell him that he is wrong. Experience of a Middle West property of considerable size has shown that 98 per cent of the complainants have been put in a more friendly attitude through correspondence and have frequently become outspoken advocates on the side of the management. The possibilities of making friends through this channel must not be overlooked. Patrons who sympathize with the attitude of the company are valuable at all times, and it is undoubtedly true that direct correspondence of the character indicated appeals to the public.

Labor Conditions Largely Control Selection of Shop and Way Tools

THE munitions works, shipbuilding yards and other necessary war industries are requiring thousands of men trained in the mechanical and electrical trades. In addition to these demands of a civilian nature, the government is needing several hundred thousand more such men to take care of the intricate machinery which forms such an important part of the equipment of a modern army. As far as the labor problem is concerned, the old law of supply and demand is giving way to the equally aged one of military necessity. And labor conditions will become even more tense as the war continues. The present needs, great though they now seem, are but a mere bagatelle to those that will exist before the war is over.

There is only one source of supply of trained men, namely, the technical industries. Electric railways belong to this class, and they with others are beginning to feel the pinch in the labor situation. The shortage is particularly noticeable in the shop and way departments. The work of the railways will have to be done with fewer employees. Both necessity and good patriotism will require it to be so.

But in order that it may maintain its going status, a railway must lay a certain number of ties, place a certain number of bonds, set a certain number of poles, repair a certain number of car equipments, etc., each year. Under the circumstances tools must take the place of men. Obviously, skill and care should be used in the selection of these tools. Ordinarily we would say that, other things being equal, that tool is best which for a given annual output has the lowest annual

charges. The old economic law involved in this idea takes into proper account the cost of labor. Unfortunately, however, it does not take into account the non-existence of a labor supply. It may well be, therefore, that under existing conditions economy and even quality of output may become subordinate to the labor factor. At any rate, the matter of available labor, present and future, should receive much weight in decisions relative to the selection of new shop and way tools.

Electrical Night at the New York Railroad Club

AMONG the significant technical gatherings held during the course of a year the annual electrical meeting of the New York Railroad Club occupies a unique place. The club is primarily a railroad organization quite distinct from electric railway associations, and its attitude toward electrification is therefore conservative although entirely friendly. Under the auspices of its electrical committee, always composed of men prominently identified with electrification matters, the club has been able to secure each year the authoritative presentation of the very latest information on heavy electric traction. The meeting furnishes an unusually good occasion for the electrical men who know what is what in this field to get their data and their ideas forcibly before their brethren of the steam persuasion.

At the 1918 "Electrical Night" meeting attention centered on four distinctive locomotive designs. These were the latest New York Central bi-polar, direct-current, low-voltage machine, the enlarged New Haven alternating-current type for use on the New York Connecting Railroad, and the two direct-current, high-voltage types of locomotives, of each of which a number are under construction for the St. Paul Railway. Among these types there are sufficient variety and enough elements of novelty to give a decided technical news value to papers describing them. Hence we print elsewhere a rather extended abstract of the proceedings of "Electrical Night." Much of the information given has not heretofore appeared in print.

On the mechanical side these four locomotives divide themselves into two groups; two having bi-polar motors with gearless drive, the others twin multipolar motors with quill and gear drive. Simplicity is the prime desideratum in the first group, flexibility of support and high center of gravity are conspicuous in the second. One group happens to be the product of one manufacturer, the other of a second. As far as the St. Paul road is concerned the engineers are obviously convinced that both will be satisfactory in their respective fields on this property. The New York Central is well satisfied with the gearless and the New Haven with the geared quill drive (although its first locomotives were gearless).

Electrically the four machines differ widely in principle and in detail and again divide into two groups of two locomotives each, although the grouping is not the same as along mechanical lines. The two machines in one of these groups have regenerative control because they are to operate on heavy grades where regenerative braking is conducive to economy and safety. The others are non-regenerative, because the profile of the track in each case does not make regeneration neces-

sary; one also, if another reason is desired, because not inherently adapted to it. In the St. Paul locomotives the large number of motors is utilized in providing a speed and accelerating control involving small rheostatic losses. On the other hand, in the New York Central locomotive and in the New Haven locomotive, when operating on direct current, there is not as great an opportunity for energy saving. Numerous other electrical distinctions will suggest themselves and should be borne in mind when these machines are compared.

The questions that naturally arise perennially as the progress of electrification is viewed on these "Electrical Nights" are: Why doesn't the electric locomotive show some tendency toward standardization? and which of these existing types is the best all-round one? By way of answer it is possible at this time only to say that each new problem put up to the electric locomotive designers seems to involve new requirements which many times dominate. Again the development stage of any art is marked by change, but when closely examined the electric locomotive will be seen to be following certain rather definite and logical lines of evolution. After all, the electric locomotive is only emulating its steam predecessor's example in passing through these mutations, for the number of steam locomotive types which have appeared is legion.

Knowledge of Advantages of Spreading Peak Becoming General

FOR several years past various committees of the American Electric Railway Association have been trying to impress on member companies an appreciation of the acuteness of the rush-hour problems. The committee on standards for car loading and the bureau of fare research gave much time to the subject, and the committee on cost of rush-hour service continued the investigation and made a report on the subject at the 1916 convention. "The fact that rush-hour service is not necessarily profitable because a substantial proportion of the receipts are taken during that period is not generally known," the report said. Agitation for "daylight saving" and "spread of closing hours" was recommended. This week the daylight saving plan becomes law and the month of April should witness the effect of its operation in lowering and widening the peaks. Manufacturers, merchants and others, also, are showing some evidence of an appreciation of what they can do to help.

War conditions have served to influence the public on such matters so that now, through publicity given by the War Board and other agencies, the question of "lowering the peak" has become one of real importance. Various public service commissions also have learned to appreciate what the "peak" means. The Oregon commission in its order of Jan. 5 expressed this thought happily in the following statement: "Hitherto we have thought only of accommodating the service to the public, but it is possible also to vary the movements of the public to suit the service. Considerable progress has been made in the spreading of peak loads by changes in the hours of beginning and quitting work in large industrial establishments, but much remains to be done. Office employees and professional men may also vary their hours in some degree so as to avoid travel-

ing at times when the cars are crowded with those in other occupations." The passage of the "daylight saving" bill will also help to "spread the peak" as it will separate the lighting from the transportation loads on power houses. This burden will be still further lightened if the plan for staggering the opening and closing hours is more generally adopted. If all factories and stores merely move forward one hour their opening and closing hours the great mass of riders will continue to use the cars at the same time.

Employers can serve the comfort of their workers as well as make for improved service generally if they will fix their working schedules so as to fit more nearly into slack periods of transportation. Professional men, shoppers and others who have the choice of their hours of travel also would do well to bear this situation in mind. It behooves the wide-awake railway manager to give due publicity to these facts. He can serve the interests of his company as well as his patrons by doing so. Undoubtedly civic associations and employers generally will join in any such movement for increased efficiency of service.

Boston Turbine Accident Not Necessarily Discouraging

THAT great steam turbine in the Boston Elevated power plant will have wrecked itself in vain unless some valuable lessons are learned to compensate for a direct loss of possibly \$200,000 with incidental losses difficult even to estimate. There is no doubt in our minds, however, that both designers and operators will gain from the accident such technical information as will enable them to reduce if not entirely to eliminate all future risk.

From the investigations of our contemporary *Power* it is evident that the Boston accident was not the result of faulty design or of the use of defective materials. It was due apparently in the first place to the deflection of one of the cast-iron diaphragms, a circumstance which could hardly have been foreseen. It will not in the least influence confidence in the durability or reliability of the steam turbine in general or of the single-cylinder, high-capacity turbine in particular. It will, however, be a guide to designers in the future as to the materials and dimensions of parts to use in the construction of these machines.

Engineers and power plant owners generally have approved of the steam turbine as a worthy successor to the reciprocating engine. They accept it with its comparative complication because it is economical of steam, of floor space, of materials. Essentially its wheels, diaphragms, buckets, etc., must be thin and light, and the peripheral speeds, particularly in the low-pressure stages, must be enormous. At the same time the temperature and pressure ranges in the cylinder must be wide, clearances between buckets must be small, etc. The wonder of it all is that designers have made the turbine the marvellously successful machine that it is.

Aside from what the accident will teach the specialist the plainest lesson to power plant men generally is that they must understand their turbines perfectly, they must be alert to cut the machines out of service promptly if signs or sounds point to internal trouble, and they must enforce such inspection procedure as will insure the detection of incipient irregularities.

Local Rate-Making Is Contrary to Public Policy

COMMISSIONS as well as men differ in common sense. When the Public Service Commission for the First District of New York recently refused the application of the New York & North Shore Traction Company for higher fares, we criticized the commission for placing technical and legal subtleties ahead of justice. This board, it will be recalled, admitted the need of increased revenues, but asserted that the company was bound by its franchise to a 5-cent fare. The basic contention was that the New York State Constitution, in requiring municipal consent to electric railway operation, gave the city power to impose fare and other conditions for the consent.

It so happened that the New York commission in this case placed great dependence upon a "luminous" opinion interpreting the similar constitutional consent provision in Pennsylvania. The commission proceeded to argue that a city cannot be restricted in imposing conditions of consent. Of course, it said, a regulatory body can withhold approval of a new franchise, if "the city insists upon a term or condition which defeats the public convenience and necessity," but if these are served, "it cannot modify the terms of the city's consent." Hence, the New York board contended, if a commission could not modify a fare clause before approving a franchise, how could the law permit the ridiculous practice of the same body changing the fare after approving the franchise?

But is it so absurd to think that a commission can refuse to approve a franchise because of an improper fare clause? By no means. Since the New York First District Commission appreciates the luminosity of Pennsylvania thought, suppose we mention the latest decision of the Public Service Commission of that State on this point. The case is that of the Northwestern Electric Service Company, which applied for certificates of public convenience, evidencing the approval by the commission of franchises secured from several localities. Each contract contained a provision by which the company agreed that its rates for house lighting should not exceed the maxima mentioned.

Did the Pennsylvania commission think it proper to approve such provisions? Read its finding:

The Legislature has established this commission for the purpose of regulating the rates to be charged by public service companies and has delegated to the commission the exclusive power to determine what are the just and reasonable rates for service rendered by such companies at a particular time.

It is clear that it was the intention of the Legislature to place these matters exclusively within the power of the commission, and, therefore, action by local authorities which attempts to establish rates to be charged by public service companies is contrary to the public policy of the Commonwealth.

The difficulty incident to the establishment of rates in a municipal ordinance has been brought forcibly to the attention of the commission in numerous cases recently. The contracts in question fix rates for service to the public, and we are of the opinion that for this reason they are not for the best interests of the municipalities, the company or the public. The applications are, therefore, refused.

Here is a broad-minded opinion, based upon the principles of modern utility operation. There is much more common sense exhibited in this decision than in the New York one. The so-called constitutional restriction is the same in both States, but the Pennsylvania commission interprets it reasonably.

The Latest Commercial Electric Locomotives

On Its Annual "Electrical Night" the New York Railroad Club Discussed
the Newest Electric Locomotives Under Construction or in Operation
on the St. Paul, New Haven and New York Central Lines

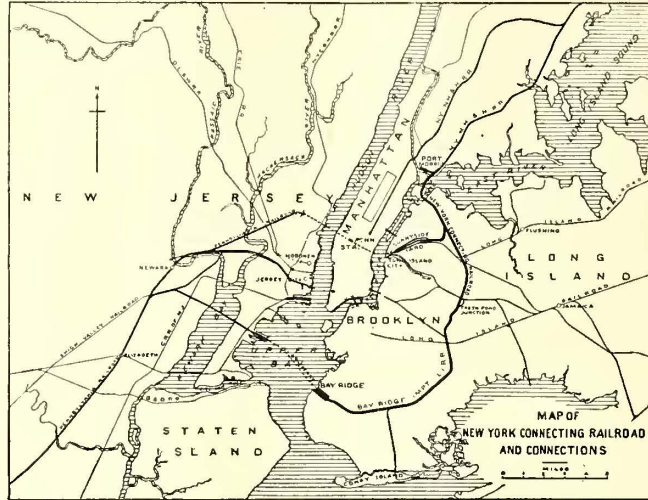
THE New York Railroad Club held its fourteenth "electrical night" on March 15, with a very large attendance. After opening the meeting C. E. Chambers, superintendent of motive power Central Railroad of New Jersey, president of the club, turned it over to E. B. Katté, chief engineer of electric traction, New York Central Railroad, chairman of the electrical committee.

Illustrated papers were presented by E. R. Hill, of Gibbs & Hill, consulting engineers, New York City; F. H. Shepard, director of heavy traction, Westinghouse Electric & Manufacturing Company, New York City; A. H. Armstrong, chairman electrification committee General Electric Company, Schenectady, N. Y., and Mr. Katté. An abstract of the papers is given below and on the following pages.

New 180-Ton Locomotives for the New Haven Railroad

By E. R. HILL

THE New York, New Haven & Hartford Railroad, as pioneer in heavy alternating-current railroad operation, opened the initial electric service to Stamford



ROUTE OF THE NEW YORK CONNECTING RAILROAD AND CONNECTIONS WITH PENNSYLVANIA AND NEW HAVEN SYSTEMS

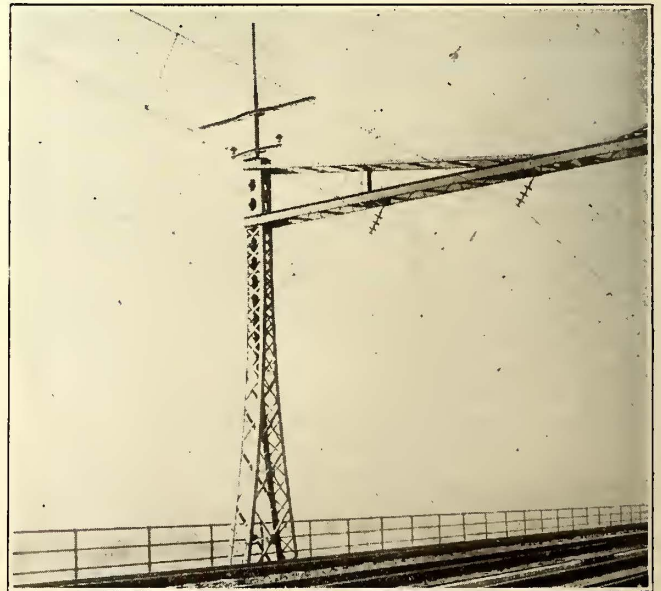
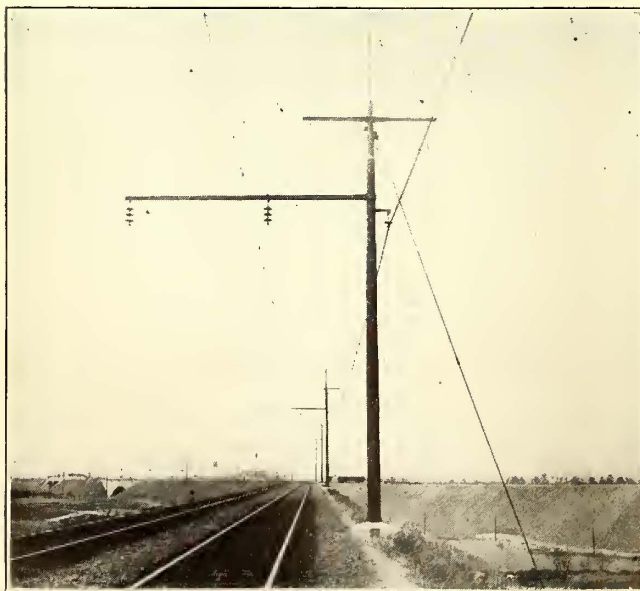
in 1907, the Harlem River branch in 1912 and the extension through to New Haven in 1914.

The extension to New Haven did not include sufficient locomotive equipment for 100 per cent electric operation of the division. For this purpose about twenty additional passenger engines, twelve freight engines and twenty-seven switchers are still required. The five new engines recently ordered and now under construction are part of the additional passenger re-

quirements. They are of the Baldwin-Westinghouse type, similar in many respects to the present locomotives, all of which were furnished by the Westinghouse Electric & Manufacturing Company.

There have been no recent additions to electrified track, but the completion of the New York Connecting Railroad over Hell Gate, the electrification of this line for passenger service via Sunnyside Yard into Pennsylvania Station, and the possibility of electrification later for freight service over this line and the Long Island Railroad to Bay Ridge have introduced some new problems.

The present New Haven electrified lines are nearly level, the maximum gradient being 0.4 per cent.



STANDARD BRACKET SUSPENSION ON NEW YORK CONNECTING RAILROAD—OVERHEAD CONSTRUCTION AT EXPANSION JOINT, LITTLE HELL GATE BRIDGE

Data on the New York Connecting Railroad are as follows.

Length of two-track passenger line—Port Morris to Sunnyside Yard	5 miles
Length of two-track freight line—Port Morris to Bay Ridge	20 miles
Maximum grade, westbound, approaching Hell Gate Bridge, 2 miles	1.2 per cent.
Maximum grade, eastbound passenger tracks, approaching Hell Gate Bridge, 1.7 miles	0.72 per cent.
Grade in Pennsylvania tunnels	1.5 per cent.
Length of four-track passenger and freight section—Port Morris to Sunnyside Junction	3.8 miles
Length of Hell Gate Bridge:	
Between abutments	977 ft.
Outside of towers	1,150 ft.
Clear height above mean high water	135 ft.
Cost of bridge	\$4,000,000
Cost of entire New York Connecting Railroad	\$30,000,000
Total cost of line, including Bay Ridge improvements of Long Island Railroad	\$40,000,000

The 0.72 and 1.2 per cent grades on the single-phase New York Connecting section and the 1.5 per cent grade on the direct-current Pennsylvania tunnel section introduced new conditions affecting the operation of New Haven electric locomotives.

Express trains operated between Grand Central Station and New Haven average eleven steel cars and weigh about 770 tons. Maximum trains of this character are of twelve steel Pullman cars and weigh from 850 to 200 tons.

These same trains must be operated between New Haven and Pennsylvania Station over the heavier grades of the New York Connecting Railroad. To meet these operating requirements it is necessary to provide heavier locomotives than now in use on the line or double-head the present locomotives, as is frequently done on the heavier trains.

Another condition limiting the New Haven's operation is the restriction imposed by the New York Central as to total weight and axle loadings of locomotives using drawbridge and viaducts on their line into Grand Central Station. The New York Central's conditions limit loads on four driving axle locomotives to 47,500 lb. per axle, and on locomotives with six driving axles to 41,000 lb. per axle. There are limitations also as to the total weight of locomotive and to the extent to which double-heading is permitted.

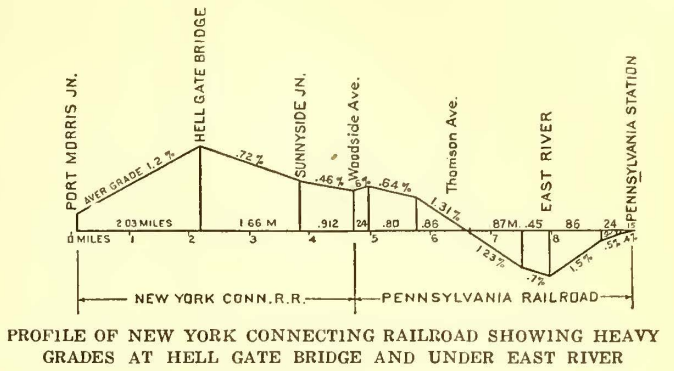
The five 180-ton engines now on order represent the maximum in weight and capacity of the a. c.-d. c. type that will not exceed the New York Central structure limitations. This, however, does not quite meet the maximum desired performance for through express trains on the New York Connecting Railroad grades.

The new engine will handle twelve-car trains on the Pennsylvania direct-current terminal grades and east-

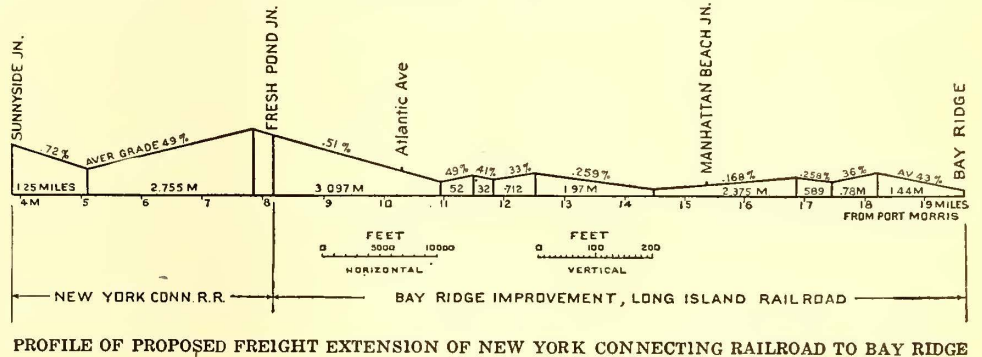
bound on the 0.72 per cent grade of the New York Connecting Railroad, but it will handle only eleven-car trains on the westbound 1.2 per cent New York Connecting Railroad grade. This latter grade is 2 miles long and it is proposed to employ electric pushers for assisting westbound trains of more than eleven cars up this grade. An alternative to this is to double-head

PRINCIPAL SERVICE DATA, NEW HAVEN ELECTRIC LOCOMOTIVES

Maximum safe speed, m.p.h.	70
Balanced speed with 770-ton average train, in miles per hour:	
On level	60
On 0.4 per cent New Haven grade	42
On 0.72 per cent Connecting Railroad grade	35
On 1.2 per cent Connecting Railroad grade	26
Schedule speed of express trains, New York-New Haven, in miles per hour:	
Without stops	43.7
With four intermediate stops	37.6
Train Weights:	
Grand Central Station service east and west:	
Maximum local train	420 tons, 6 cars
Maximum local train double-headed with gearless engine	620 tons, 9 cars
Maximum express train	900 tons, 12-13 cars
Pennsylvania Station service:	
Maximum eastbound express train	850 tons, 12 cars
Maximum westbound express train	770 tons, 11 cars



bound on the 0.72 per cent grade of the New York Connecting Railroad, but it will handle only eleven-car trains on the westbound 1.2 per cent New York Connecting Railroad grade. This latter grade is 2 miles long and it is proposed to employ electric pushers for assisting westbound trains of more than eleven cars up this grade. An alternative to this is to double-head

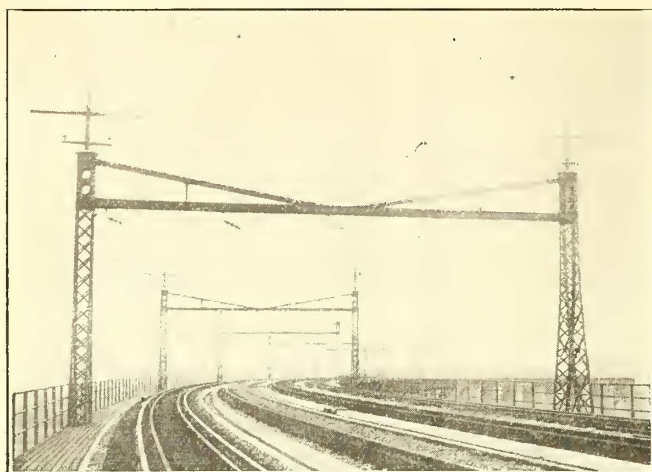


these engines with one of the old gearless-type locomotives.

Prior to the installation of the new locomotives the latest and largest type of locomotive on the New Haven road was the 2-4-4-2 engine of the 073-075 series, having four driving axles and two pony axles in two trucks, each driving axle being equipped with a pair of single reduction geared motors with quill drive.

PRINCIPAL DESIGN DATA, NEW HAVEN ELECTRIC LOCOMOTIVES

	New 180-Ton	Present 120-Ton	Present 109-Ton
Series number	073-075	01-041	
Classification	2-6-2+2-6-2	2-4+4-2	2-4+4-2
Weights:			
Mechanical parts, lbs.	187,500	123,900	105,600
Electrical and air-brake parts, pounds	161,700	115,100	112,000
Steam-heating equipment and miscellaneous, pounds	12,800		
Total pounds	362,000	239,000	217,600
On each driving axle, pounds	41,000	45,500	41,900
On each pony axle, pounds	29,000	28,500	25,000
Rigid wheelbase	14 ft. 3 in.	8 ft. 0 in.	8 ft. 0 in.
Total wheelbase	59 ft. 6 in.	40 ft. 6 in.	30 ft. 9 in.
Length over all	69 ft. 0 in.	50 ft. 0 in.	37 ft. 7 1/2 in.
Diameter of driving wheels	63 in.	63 in.	62 in.
Diameter of driving axles	8 in.	8 in.	8 in.
Size of main journals	7 in. x 13 in.	7 in. x 13 in.	7 1/4 in. x 10 in.
Size of truck wheels	36 in.	36 in.	33 in.
Size of truck journals	6 in. x 12 in.	6 in. x 12 in.	5 1/2 in. x 10 in.
Type of drive	Quill-gear	Quill-gear	Quill-gearless
Number of motors	12	8	4
Horsepower:			
One-hour	2,550	1,700	1,120
Continuous	2,025	1,350	1,125
Maximum safe speed—m.p.h.	70	55	85
Tractive Effort:			
One-hour, pounds	21,000	17,700	9,700
Continuous, pounds	14,500	12,200	6,400
Momentary maximum pounds	47,500		
Gear ratio	27:87		



SPECIAL OVERHEAD COSTRUCTION ON VIADUCT, NEW YORK CONNECTING RAILROAD

The new engines are duplicates of these present engines in all essential respects, the main differences being that there are three pairs of drivers on each truck instead of two, and pony axles are used at both ends of each truck instead of the outer ends only. In all principal respects also the details of the locomotive are identical with the thirty-four freight and heavy passenger straight single-phase locomotives built in 1911 for use in freight service.

The principal data regarding the three types of passenger locomotives of the road are given in the tables at the bottom of page 557.

The motors are connected in groups of three permanently in series, and the speed characteristics are substantially the same as those of the original gearless locomotives. The control is to be arranged for multiple-unit double-heading of locomotives of these two types. They are geared for a higher speed than the present geared-type locomotives and cannot be operated in multiple unit with them.

QUILL DRIVE INSURES FLEXIBILITY

The motors are grouped in pairs and connected by means of bearings and single-reduction gearing to a quill, which surrounds the axle, with ample radial and end clearance to prevent it coming in contact with the axle when in normal running condition. The motors, gearing and quill are supported from the truck



STANDARD SPAN CONSTRUCTION, NEW YORK CONNECTING RAILROAD

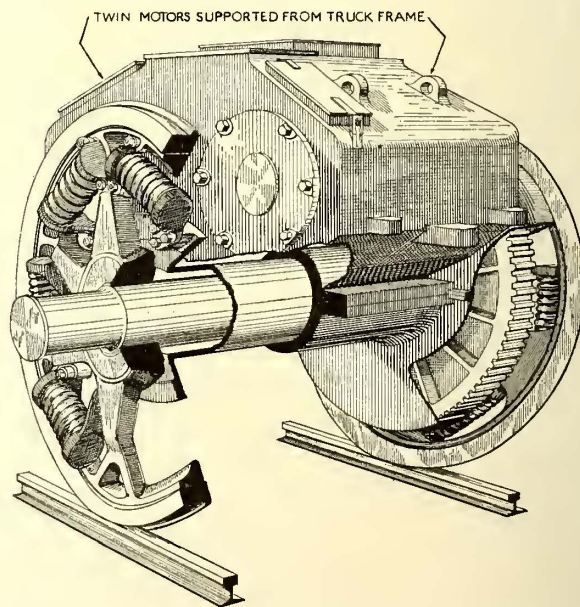
frame independent of the axle and wheels, the motors being directly above the center line of the axle. With this arrangement the weight of the motors, gearing and quill is carried on springs and the only dead weight coming directly on the track is that of the driving wheels and axle. The center of gravity is high, and good riding qualities and tracking conditions are secured.

The only connection between the motors and the driving wheels is through a group of six helical springs in each driving-wheel center, connected at one end to the spokes of the wheel and at the other end to the disk at the end of the quill. This arrangement is in use on all of the geared passenger, freight and switching locomotives of the New Haven road and has given excellent satisfaction. The motors are also identical with those used on certain of the passenger locomotives and on all of the geared freight locomotives, the total number of such motors being more than 400. By adopting this same type of motor suspension and drive, duplication and uniformity of parts is secured and saving in shop maintenance and operation is thereby effected.

The truck center pin is located between the first and second driving axles, thus making the truck unsymmetrical fore and aft of the center pin. This will tend to prevent oscillation or nosing of the trucks.

STEEL TRUCK FRAME CAST IN ONE PIECE

The drawbar pull between trucks is transmitted through a radial bar coupling and not through the cab. The weight of the cab is borne on each truck by six spring-mounted pads. The truck frames are of the integral cast-steel type, the entire frame and cross-ties



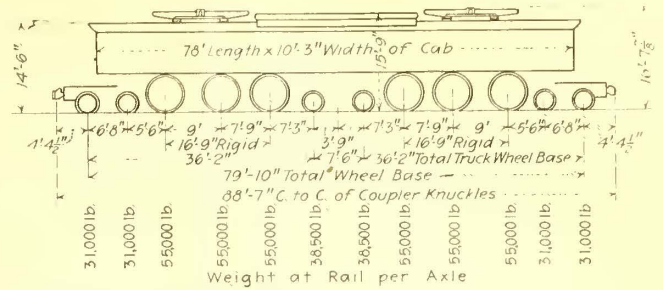
SKETCH TO SHOW THE CONSTRUCTION OF THE QUILL DRIVE

being cast in one piece. The saving in weight by the use of this type of truck frame is estimated to be 3200 lb. per locomotive. This feature is important not only because it is desirable to minimize the dead weight of the locomotives in general, but also because of the weight limitations of the bridge structures over which these engines are to operate and the guarantee which the manufacturers were required to give was that the total weight should not exceed 181 tons.

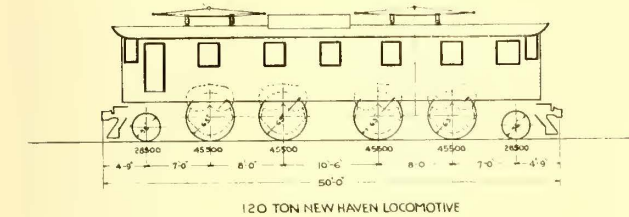
The motors and transformers are forced-ventilated

by means of two motor-driven blowers mounted in the cab. For train heating purposes the locomotives will be equipped with flash-type, kerosene-fired boilers capable of evaporating 4200 gal. of water per hour. Tanks having a capacity for 1440 gal. of water and 370 gal. of oil will be provided as part of the heating equipment of each locomotive.

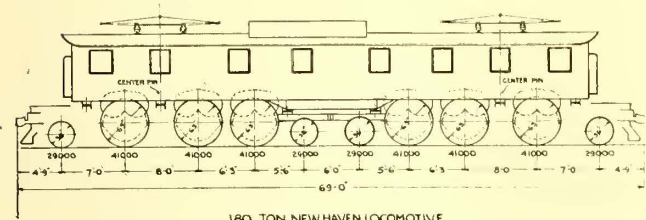
These locomotives illustrate in a general way the



WEIGHT DISTRIBUTION IN QUILL-DRIVE LOCOMOTIVES FOR THE ST. PAUL



120 TON NEW HAVEN LOCOMOTIVE



180 TON NEW HAVEN LOCOMOTIVE

ELEVATIONS OF PRESENT 120-TON AND FUTURE 180-TON NEW HAVEN LOCOMOTIVES

adaptability of electric traction in meeting the constantly increasing requirements of railroad service. In this case, without modifying the general type or any of the mechanical or electrical details and without exceeding existing weight limitations on bridge structures, a locomotive 50 per cent larger than the present one has been produced simply by the addition of a driving axle and a pair of motors to each truck with adaptation of mechanical and electrical details for the mounting and control of the additional parts.

266-Ton Locomotive for the St. Paul

By F. H. SHEPARD

THERE are under construction for the Chicago, Milwaukee & St. Paul Railway ten Baldwin-Westinghouse locomotives similar to that shown in an accompanying illustration. These will weigh 266 tons each, of which weight 121 tons will be in the electrical equipment, 118 tons in the mechanical equipment and 27 tons in the heating equipment, including water. A diagram is reproduced to show the weight distribution and wheel spacing.

The locomotive comprises two running gears, with

the Pacific-type wheel arrangement. These are coupled back to back, supporting a single cab, which contains the auxiliaries and heating apparatus. The driving wheels are 68 in. in diameter, the driving wheelbase is 16 ft. 9 in., the wheelbase for each truck is 36 ft. 2 in., the total wheelbase is 79 ft. 10 in., and the total length between knuckles is 88 ft. 7 in.

HEATING EQUIPMENT OCCUPIES LARGE SPACE IN CAB

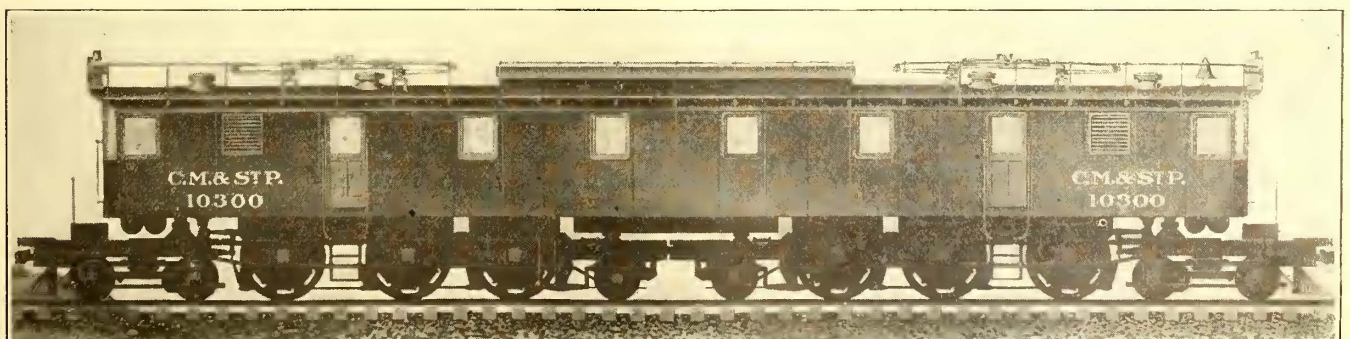
The layout of the apparatus in the cab is shown in the elevation and plan on page 560. In these it will be noted that a large part of the cab is occupied by the heating equipment. This includes boiler, water tanks and oil tanks. The rheostats are arranged above and near their controlling switches. The engine is, of course, made for double-end operation, each end having its complement of meters, air-brake valve, master controller, sanders, etc.

SCHEME FOR MINIMIZING RHEOSTATIC LOSSES

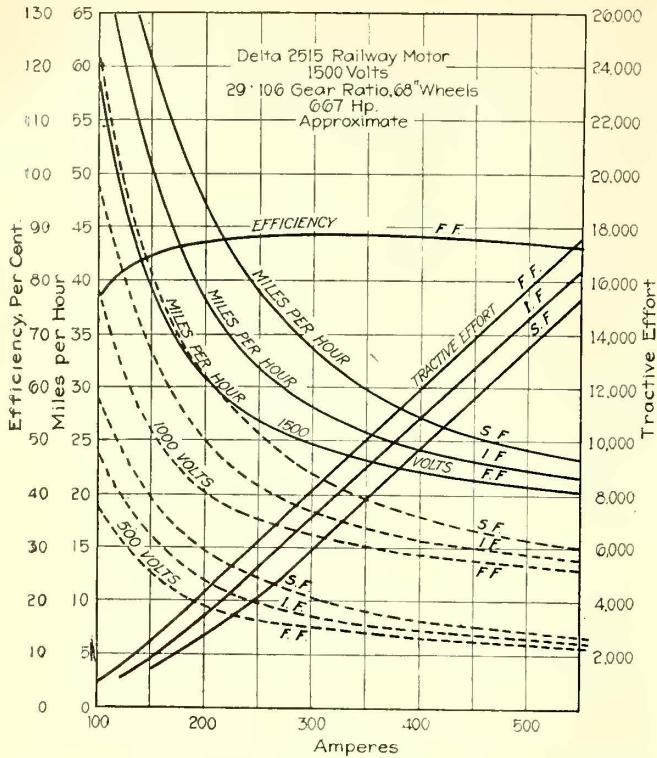
In one of the figures is a set of speed curves, showing operation on the nine running positions corresponding to one-third, two-thirds and full-speed positions, with two field-control positions on each. This provides economical operation over a wide range of speed. Regeneration from maximum speed down to 10 m.p.h. is provided for the purpose of holding trains on grades or making slowdowns. In another diagram the rheostatic losses during acceleration on a 2.2 per cent grade with a 950-ton train are indicated by shading.

The continuous capacity of the locomotive is 3200 hp., corresponding to a tractive effort of 49,000 lb. at 24.5 m.p.h. The maximum starting effort is 110,000 lb.

The motive equipment consists of six twin motors with quill drive, these being mounted above each driving axle. Each armature carries a single pinion and the two, driving a single solid gear mounted upon the quill shaft, are held in position by quill bearings. Thus a movement of the axle within the quill shaft of



NEW LOCOMOTIVE FOR THE ST. PAUL RAILWAY, WITH TWIN MOTORS, QUILL DRIVE AND SIDE RODS



CHARACTERISTIC CURVES OF MOTORS FOR ST. PAUL QUILL-DRIVE LOCOMOTIVE

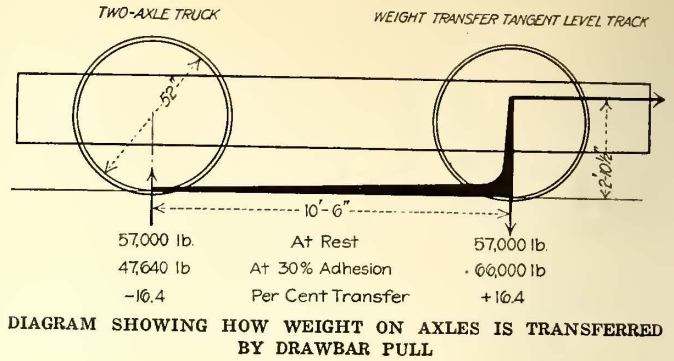
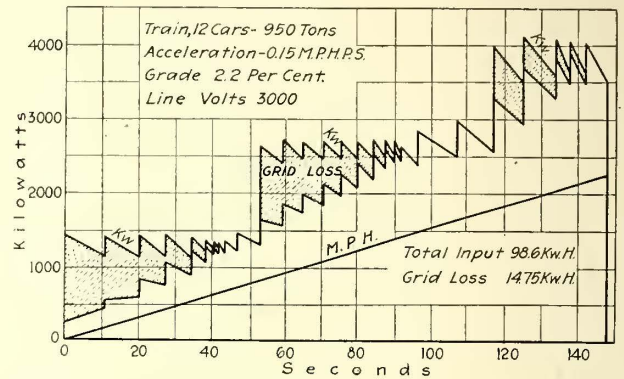


DIAGRAM SHOWING HOW WEIGHT ON AXLES IS TRANSFERRED BY DRAWBAR PULL



TYPICAL STARTING CURRENT GRAPH, ST. PAUL QUILL-DRIVE LOCOMOTIVE

1 3/4 in. from normal position is secured, providing freedom of movement of the driving axles.

This locomotive is, of course, provided with the well-known electro-pneumatic control.

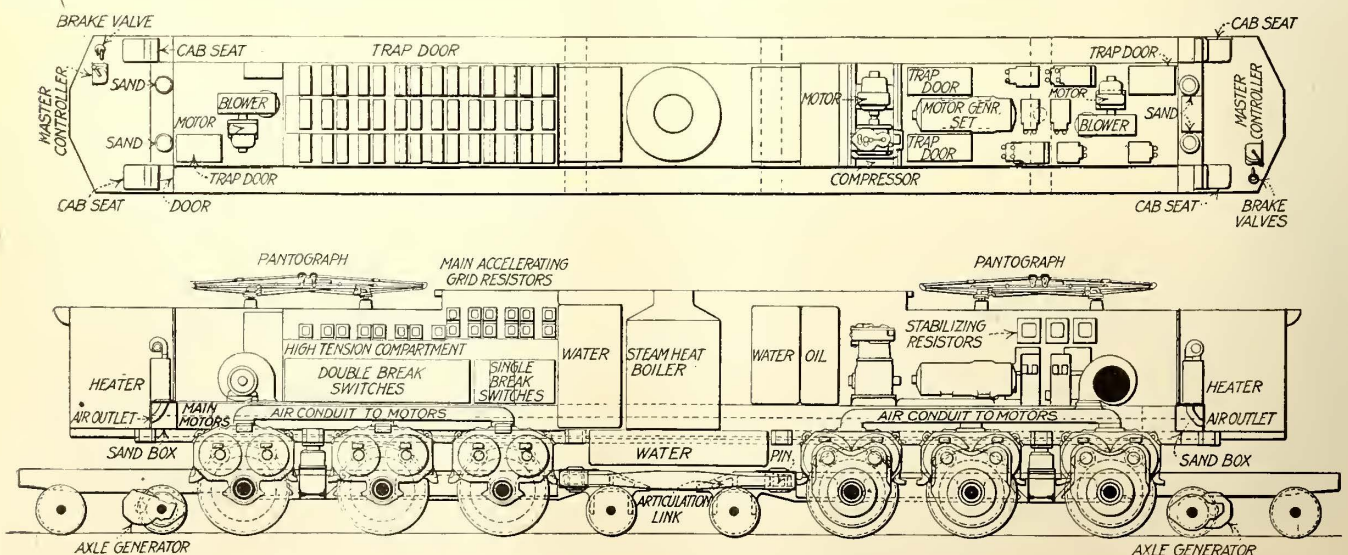
THREE SOURCES OF POWER SUPPLY FOR THE AUXILIARIES

Power for the auxiliaries is obtained from the 3000-volt contact line through a motor-generator set delivering current at approximately 80 volts. From this the train lighting is supplied, and to it a storage battery is connected. The blowers, air compressor, lights and control are all operated at 80 volts and their operation, due to the presence of the battery, is independent of line power. In addition to the motor-generator set and battery, there is a third source of low-voltage supply, which is utilized for the operation of the auxiliaries and for the excitation of the fields of the main

motors for regeneration whenever the train has acquired requisite speed. This is a pair of axle-driven exciters, each being mounted on the inside axle of the four-wheel truck. These axle-driven generators are about the size of an ordinary street car motor, and furnish current, at low voltage, for the excitation of the main motor fields when regenerating, and at other times for the operation of the blowers and air compressors, independent of the battery. Thus the locomotive is at all times independent of line power for the supply of air for the brakes.

CONSIDERATIONS FAVORING THE TWIN-MOTOR, QUILL DRIVE WITH SIDE RODS

A question naturally arises as to the considerations which led to the selection of this type of locomotive, possessing as it does certain mechanical complications as compared with certain other types. In the absence

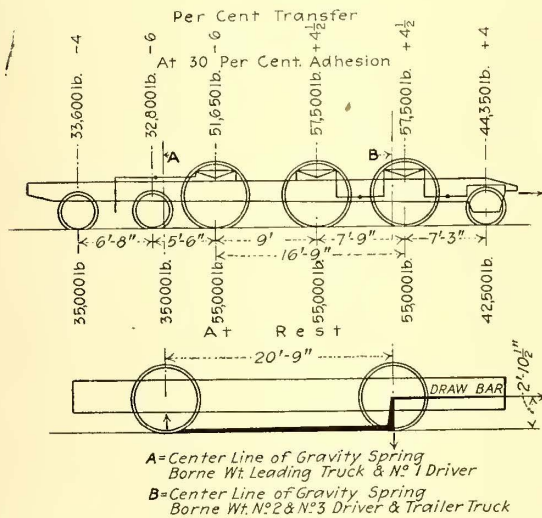


ELEVATION AND PLAN OF QUILL-DRIVE ST. PAUL LOCOMOTIVE SHOWING ARRANGEMENT OF EQUIPMENT

of service data which may be directly comparable the reasons may be classed as somewhat theoretical. In the first place it was understood that the weight on driving axles, both as to amount and disposition, in the present engines would not be accepted for additional engines for passenger service. A departure from the design of the locomotive at present in passenger service was therefore necessary. This could have been accomplished by the use of more driving wheels with smaller and lighter motors, or of very large motors with side rods. The service conditions require a minimum of six driving axles, with a weight of 55,000 lb. on each. This requirement can be very reasonably and economically met by twin motors with quill drive.

Among the advantages of this type of construction the following may be noted:

1. The limitation of voltage across any commutator



WEIGHT DISTRIBUTION AT REST AND AS MODIFIED BY DRAWBAR PULL, ON ST. PAUL QUILL-DRIVE LOCOMOTIVES

to 750 volts, thereby obtaining especially stable commutation for both motoring and regenerating.

2. The greater accessibility, lesser restriction in design, and greater freedom from injury to motors, due to their position above the axle remote from the roadbed.

3. The mounting of the motors rigidly upon the locomotive frames, thereby securing great flexibility between the roadbed and the motor mass.

4. The height of center of gravity of the running parts, which is 43½ in. above the rail.

5. The use of a minimum number of gears and the removal of the necessity for spring gears.

6. The very desirable wheel arrangement, weight distribution and equalization.

The utilization of the weight of the locomotives for adhesion is not of the same importance in passenger locomotives as in those designed for freight service. However, the relative value of wheel arrangement is affected by weight transfer, due to the tractive effort being applied at the height of the drawbar, as shown in the accompanying diagrams. Thus with 30 per cent adhesion the weight transfer of this wheel arrangement is no more than 6 per cent, while if the wheelbase were as short as 10 ft. 6 in. the weight transfer under the same condition would be 16.4 per cent. Thus for drag or heavy freight service the use of side rods has a dis-

tinct advantage, since all of the drive wheels on the truck are coupled.

The American railroad track is a cushioned, yielding structure, but unfortunately the yield of the rail due to wheel loads varies greatly, depending upon the track joints, special work, condition of ballast and sub-grade. This general condition is exaggerated, of course, by the extreme weather conditions experienced in this country.

A great deal of importance has been attached to such matters as center of gravity, wheel arrangement, size of wheels and equalization on steam locomotives, especially for passenger service. The steam locomotive, of necessity, consists of a large mass, including boiler and cylinders, carried on the locomotive frame, the driving wheels being loosely and flexibly connected thereto. Space limitations also require a relatively high center of gravity. It is a coincidence that this limitation in the design of steam locomotives automatically secures a reaction upon the roadbed which is inherently easy upon the latter. In view of the flexibility of the heavy parts of the locomotive, the individual axles are relatively free from restraint imposed by directly imposed weight. In the electric engine described these advantageous features are all retained. In the use of side rods on electric locomotives the action differs from that of steam locomotives in the entire absence of dynamic augment produced by the lack of counterbalance of reciprocating parts of the steam locomotive for all speeds. The electric locomotive with side rods is perfectly counterbalanced for all speeds, since the motion of the rods is of pure rotation only.

3000-Volt Gearless Locomotive for the St. Paul

BY A. H. ARMSTRONG

THE excellent operating results obtained during the past ten years with gearless motor locomotives on the New York Central tracks have attracted increasing attention to this form of construction. The extreme simplicity in design offered by mounting the armature directly upon the driving axle, thus eliminating all gears, quills, jack-shafts, side-rods, etc., has been reflected in great reliability and low cost of maintenance. It is, therefore, an achievement of much importance to announce the entry of the gearless locomotive in mountain grade haulage, as it can be reasonably expected that this type of construction holds promise of equally good operation in this heaviest class of railroad service.

The gearless locomotive now under construction in the General Electric shops for the Chicago, Milwaukee & St. Paul extension to Seattle is equipped with fourteen axles, twelve of which are drivers and two guiding axles. The armature is mounted directly upon the axle and, with the wheels, constitutes the only dead or non-springborne weight of the locomotive. This weight is approximately 9,500 lb. as compared with 17,000 lb. dead weight on the driving axles of the present geared locomotives now in operation on this road. The two fields are carried upon the truck springs with full freedom for vertical plan of the armature between them.

The construction of the motors throughout is practically identical with that employed upon the New York Central gearless locomotives, but the capacity of the locomotive is much increased and the wheel arrange-

ment somewhat different. The following table gives the general physical characteristics of the locomotives now under construction:

DIMENSIONS AND WEIGHTS—C. M. & ST. P. 3000-VOLT D.C. GEARLESS LOCOMOTIVE

Length inside knuckles.....	76 ft. 0 in.
Length over cab.....	68 ft. 0 in.
Total wheel base.....	67 ft. 0 in.
Rigid wheel base.....	13 ft. 11 in.
Diameter driving wheels.....	44 in.
Diameter guiding wheels.....	36 in.
Approximate height center of gravity.....	57 in.
Weight of electrical equipment, pounds.....	235,000
Weight of mechanical equipment, pounds.....	295,000
Weight of complete locomotive, pounds.....	530,000
Weight on drivers, pounds.....	48,000
Weight on guiding axle, pounds.....	36,000
Weight on each driving axle, pounds.....	9,500
Dead or non-springborne weight per axle, pounds.....	9,500

With twelve motors per locomotive available for different control combinations, there is a possibility of securing a wide range of speeds to meet the varying conditions of passenger train operation. Motors are connected three in series, giving 1000 volts per commutator for full-speed operation, but the control also permits a connection of four, six and twelve motors in series for fractional speed operation. Further provision for variable speed is made by shunting the motor fields in all combinations of motors, but it is probable that the greatest value of field shunt will be obtained with the full-speed connection of three motors in series. The following table illustrates the speed possibilities of this locomotive:

SPEED CHARACTERISTICS—C. M. & ST. P. 3000-VOLT GEARLESS LOCOMOTIVES, 960 TONS TRAILING LOAD

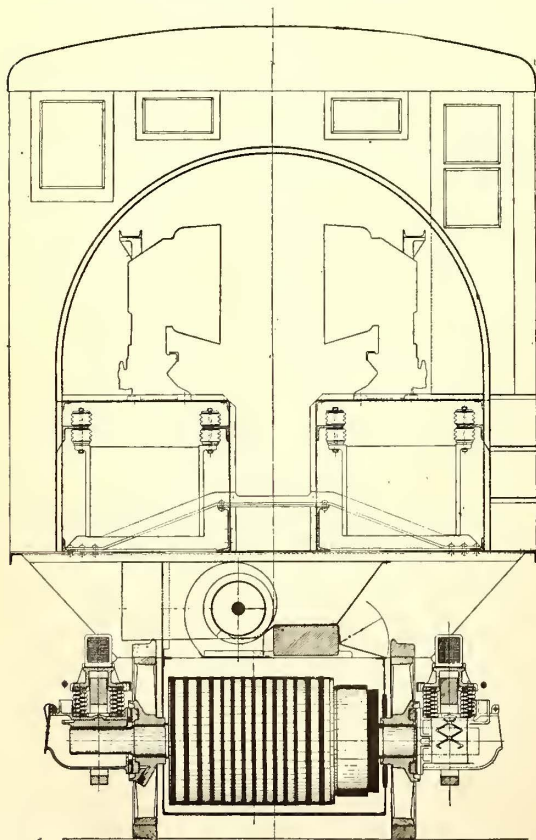
	Speed in m.p.h.			
	On Level	On 1/2 per Cent Grade	On 1 per Cent Grade	On 2 per Cent Grade
Three-motor shunt field.....	63.0	47.2	38.5	30.5
Three-motor full field.....	49.5	36.0	30.0	25.0
Four-motor full field.....	40.5	27.0	22.0	18.0
Six-motor full field.....	29.0	17.8	14.2	11.0
Twelve-motor full field.....	15.0	8.0	6.0	4.0

It is especially desirable that a passenger locomotive shall have sufficient weight on the drivers and reserve motor power to haul additional train weight on occasion, and in this respect the gearless locomotive under construction presents some attractive possibilities. The manufacturer's guarantees cover the operation of a twelve-car train weighing 960 tons against an adverse grade of two per cent at a speed of twenty-five m. p. h. Under these conditions there is a demand for 55,200 lb. tractive effort at the rim of the drivers and equivalent to twelve per cent coefficient of adhesion of the weight upon the drivers. There is, therefore, ample margin both in weight upon drivers and capacity of the motors to haul not only twelve cars but on occasion thirteen or fourteen cars, with practically no sacrifice in schedule speed and without overloading the motors or exceeding known and conservative practice as regards loading of driving wheels. For example, the gearless locomotive being built will permit the starting of a twelve-car train on a two per cent grade with a coefficient of adhesion of only twenty per cent and accelerate the train at 0.3 m. p. h. per second. The above general statements are tabulated below:

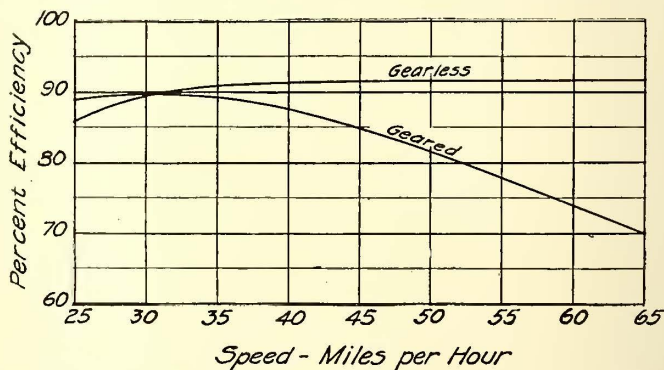
HAULING CAPACITY—C. M. & ST. P. 3000-VOLT D.C. GEARLESS LOCOMOTIVE

Number of motors.....	12
One-hour rating, horse-power.....	3240
Continuous rating, horse-power.....	2760
Tractive effort, one-hour rating, pounds.....	46,000
Tractive effort, continuous rating, pounds.....	42,000
Tractive effort, 2 per cent ruling grade with 960-ton train, pounds.....	55,200
Coefficient of adhesion ruling grade, per cent.....	12
Starting tractive effort, 20 per cent coefficient of adhesion, pounds.....	91,600
Rate of acceleration, starting, 2 per cent ruling grade, miles per hour per second.....	0.3

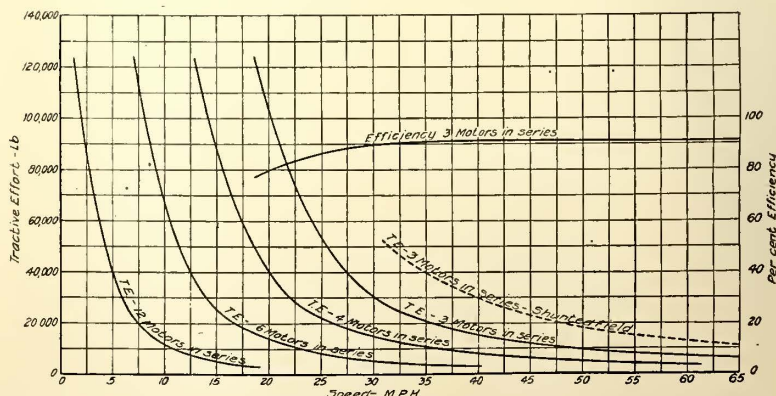
While the manufacturing guarantees are limited to 42,000 lb. tractive effort as a continuous output of this locomotive, preliminary tests upon a sample motor built



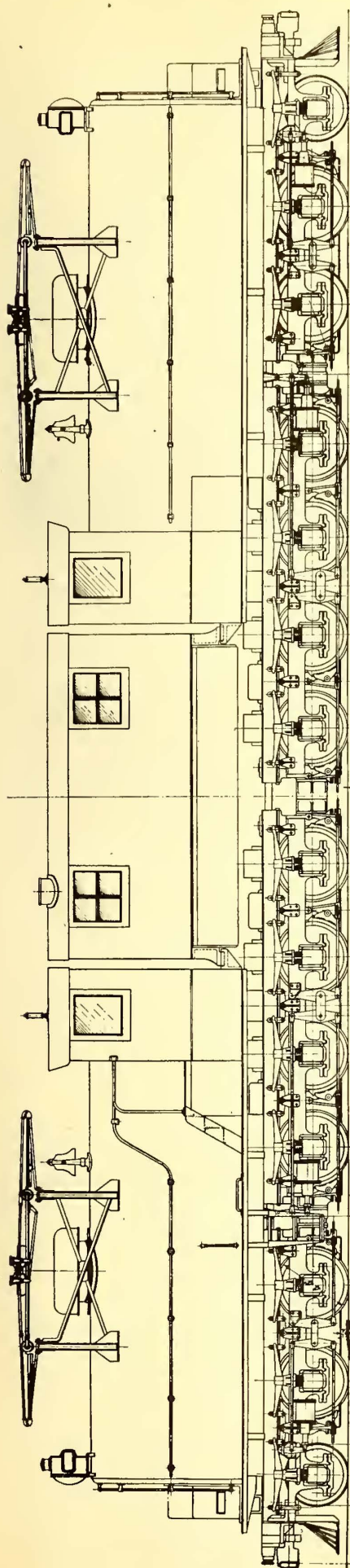
CROSS-SECTION OF NEW GEARLESS LOCOMOTIVE FOR THE ST. PAUL



EFFICIENCY CURVES OF PRESENT GEARED AND FUTURE GEARLESS ST. PAUL LOCOMOTIVES



CURVES OF TRACTIVE EFFORT AND EFFICIENCY PLOTTED AGAINST SPEED, ST. PAUL GEARLESS LOCOMOTIVES



ELEVATION OF GEARLESS LOCOMOTIVE FOR THE CHICAGO, MILWAUKEE & ST. PAUL RAILWAY

indicate that this rating is conservative and that the final tests upon a complete locomotive when finished may show values materially higher than the guarantees made. This fact is of the greatest importance and holds out wide visions of radical changes in the operation of trans-continental trains, both passenger and freight.

The total weight upon drivers of 458,000 lb. is practically the same as the driver weight of the freight locomotive now in operation on the Chicago, Milwaukee & St. Paul. If, therefore, the completed locomotive meets the expectations of the builder, it offers the possibility of using the same locomotive interchangeably for both passenger and freight service.

The considerable speed variation permitted with four motor combinations insures a means of operating the locomotive at any speed demanded by the character of service to which it is assigned. Furthermore, when operating a freight train at lower speeds it can reasonably be expected that the tractive effort rating of the locomotive will be increased, due to the lower core loss at the lower armature speeds. While not primarily designed as an interchangeable locomotive, nevertheless it is quite possible that the flexibility of this new Chicago, Milwaukee & St. Paul gearless locomotive will become increasingly apparent when it is put into operation and its fitness for freight service will be fully recognized. It is needless to forecast the operating benefits that would result from having only one class of locomotive assigned to the road movement of either passenger or freight trains. Just as the Chicago, Milwaukee & St. Paul Railway was the pioneer road in long distance electrification, utilized for the first time 3000-volt direct current and employed regenerative electric braking on down grades, so also this road may introduce radical changes in the road movement of passenger and freight trains, by reason of the great flexibility offered in the gearless motor locomotive, which will be put into operation within the year.

MOTOR-GENERATORS WILL NOT BE USED FOR EXCITATION IN REGENERATION

The control of the gearless locomotive will in many respects be a duplicate of that now in successful operation on the geared motor locomotive previously installed. Provision will be made for regenerative electric braking on down grades as the success and operating value of this method of holding trains on down grades has been fully established during the past two years of electrical operation on the Chicago, Milwaukee & St. Paul Railway. The geared locomotives now operating utilize a motor-generator set for the purpose of motor field excitation while regenerating, and the results with this combination have been excellent. Careful experiments made during the past two years have demonstrated that motor-generator field excitation is not essential and, taking advantage of the advance of the art, the control for the new gearless locomotive will dispense with this feature. This simplification of the control and reduction in weight and cost constitutes a marked improvement.

It is estimated that approximately twenty-five per cent of the 550,000,000 tons of coal mined in the United States during 1917 was consumed under the boilers of steam engines hauling our railway tonnage. One of the greatest arguments for electrification is the saving of fuel effected and therefore it is very essential that the efficiency of electric locomotives be raised as high as possible, in order to fulfill one of the claims for their introduction. In this respect the gearless locomotive under construction offers a marked improvement as compared with the geared-motor locomotive.

GEARLESS DRIVE IS MOST EFFICIENT AT HIGH SPEED

The original installation of the Chicago, Milwaukee & St. Paul was undertaken with a single type of road locomotive for both passenger and freight service, the locomotives differing only in the ratio of the gearing between the motors and drivers. The locomotives were therefore interchangeable, except as to gears, with consequent

simplification of shop repair practice. The geared locomotive operates at a high efficiency in heavy freight service where pushers are used on up grades, but accumulative gear losses result in a low all-day efficiency of a geared locomotive in passenger service, when the profile is broken and contains long stretches of practically level track. On the other hand the gearless motor operates at highest efficiency on level track or lesser grades and it is this class of service that constitutes the bulk of the all-day duty of a passenger locomotive.

A comparison of the efficiencies of the present geared locomotive of the St. Paul road and the gearless locomotive under construction is presented in the curves shown on page 562 which are plotted with speed as abscissae, instead of the usual method of plotting efficiency to ampere input. A comparison of the two curves is most instructive. The average operating speed at about 50 m.p.h. shows a gain of 10 per cent in efficiency of the gearless locomotive as compared with the geared type and in fact throughout the entire range of speed from 30 m.p.h. up the gearless locomotive will operate at over 90 per cent efficiency, as compared with drooping characteristic of the geared-motor locomotive.

Electrical apparatus is inherently so efficient in its conversion of electrical into mechanical power that there is usually little gain in going from one type of motor to the other. It is therefore proper to note that the considerable gain in efficiency resulting from the adoption of the gearless motor is due almost entirely to the elimination of the mechanical losses inherent with geared motor drive. The exclusion of mechanical parts, such as gears, quills, jack-shafts, side rods, etc., utilized to transmit the power from the motors to the drivers with some forms of locomotive construction not only results in a marked improvement in the all-day efficiency of the locomotive, but is followed by an equally attractive increase in reliability and a marked reduction in maintenance expense. It is felt, therefore, that the introduction of the gearless locomotive upon the Chicago, Milwaukee & St. Paul marks a distinct advance in electric railroading and that this type of construction now for the first time made possible for mountain service will result in a marked improvement in the method of handling both passenger and freight trains in this most difficult class of railroad service.

New York Central Well Satisfied with Its Bi-polar Motor Locomotives

BY E. B. KATTÉ

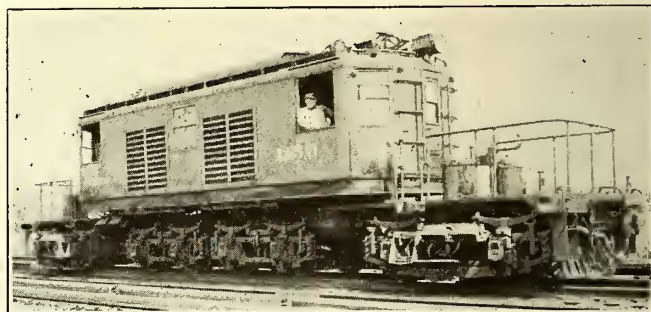
DURING the past year we have received on the New York Central Railroad nine new electric passenger locomotives of the type known as Class T-2B. The tenth locomotive will be delivered next month. These locomotives are very similar to the earlier Class T locomotives, in fact, when we asked the men in the operating department if they desired to suggest any changes, their representative held up his hands and exclaimed, "For goodness sake, don't make any changes, you will spoil them." As a matter of fact, thirty or forty minor modifications and improvements were made.

These locomotives are driven by eight motors of the bi-polar type, one on each axle. The total weight of the locomotive is 134 tons, and the drawbar pull at 25 per

cent adhesion is 66,000 lb. The load is about equally divided on all the wheels. The motors are known as GE-91-A and have a one-hour blown rating of 325 h. p., or a total of 2600 h. p. for the locomotive.

The capacity of the locomotive is the hauling of a 1200-ton train at 60 miles per hour. The maximum speed of the locomotive with lighter trains is 75 miles per hour.

As typical of regular service a Class T locomotive hauls Train No. 71, weighing 1035 tons, between the Grand Central Terminal and Harmon, a distance of 32 miles, making one stop, in 54 minutes running time.



CLASS T GEARLESS LOCOMOTIVE OF NEW YORK CENTRAL LINES

The average maximum speed is 57 m.p.h. and the current consumption has been shown to be equivalent to 21.9 watt-hours per ton-mile.

The cost of inspecting, maintaining and repairing our electric locomotive has averaged $3\frac{1}{2}$ cents per mile during the past year. The locomotives are inspected after traversing an average of 3000 miles, which is equivalent to 33 days between inspections. As a measure of reliability I can say that Class T locomotives average 32,000 miles per locomotive detention.

Some Details of the Boston Elevated Turbine Failure

ON FEB. 14 a 35,000-kw. steam turbine in the O Street power station of the Boston Elevated Railway was wrecked, the direct loss due to breakage being estimated at as much as \$200,000. This is a horizontal, 20-stage impulse turbine, representing the most advanced practice in single-cylinder machines of large capacity.

The details of the accident were reported briefly in the issue of the *ELECTRIC RAILWAY JOURNAL* for March 2, page 406. Since this was published the editors of *Power* have completed an investigation of the causes of the turbine failure. They conclude that a distorted cast-iron diaphragm in the eighteenth stage probably fouled the eighteenth wheel, breaking off the buckets. The buckets and diaphragms from this stage on to the last or twentieth, and the entire turbine casing, were destroyed.

The accident occurred just before 6 p. m., when the evening peak was coming on. Rubbing sounds from within the casing were heard and the machine was seen to vibrate. Within six minutes after the first indication of trouble the destruction was complete. Fortunately steam was promptly cut off by the tripping of the automatic throttle valve, presumably through the vibration of the turbine. Some comment upon the accident appears in the editorial pages of this issue.

Track Engineers Meet

A Digest Is Presented of Reports of Electric Railway Interest Submitted at Meeting in Chicago This Week of American Railway Engineering Association

THE nineteenth annual convention of the American Railway Engineering Association was being held at the Congress Hotel, Chicago, as this paper went to press. The annual exhibit of the National Railway Appliances Association was being held at the same time in the Coliseum. Abstracts of the reports of especial interest to electric railway men follow.

BALLAST

The report recommends three different sections of ballast for 24-in. depth under the tie. These sections apply to single track on tangent, double track on tangent and single track on curve. Each shows 12 in. of sub-ballast and 12 in. of top ballast. The committee feels that Class A track should have 24 in. of ballast under the tie, but is not ready to make general recommendations as to the proper depth of ballast of various kinds to insure uniform distribution of loads on the roadway.

Other recommendations for the Manual include seven new definitions, and matter relating to physical tests of ballast. Considerable data are presented on methods and cost of applying ballast, account being taken of organization, use and limitation of tools and ballasting by contract. Diagrams for the disposition of forces, as secured from a few roads, are shown, but the committee has thus far had meager responses to its inquiries along the line of organization. The committee interprets the consensus of opinion as being strongly against ballasting by contract in normal times, especially on an operated track.

The committee has brought up to date a general bibliography on ballast and ballasting made in 1906 in the library of the American Society of Civil Engineers. It also presents as a matter of interest the specifications for stone ballast of the Pennsylvania lines west of Pittsburgh.

ECONOMICS OF RAILWAY LABOR

This report begins with an indexed tabulation of publications on the economics of labor. A second part is on "methods of securing labor." It says that there has been a decline in late years of the classes of men engaged through labor agents or padrones and that a large part of the better class of unskilled foreign labor that formerly went directly to the railways now goes to the mills and factories. There has also been a decline in all classes of common labor available for railway work. The railways have met this condition in an unorganized and desultory fashion, adhering to their existing methods of employment and endeavoring to obtain additional labor by various practices, such as maintaining a low hourly rate, but adding for extra hours not actually worked, so that the daily wage may be increased; also by a lessening of supervisory effort on the part of the foreman. These methods are

reprehensible but continue. The committee suggests that free transportation to labor might be curtailed so that men who desire transportation would not accept work to get it and then quit; also that more attention be paid to housing facilities. A third section of the report relates to feeding and housing maintenance of way employees and includes a digest of the laws in the various states covering this subject.

ECONOMICS OF RAILWAY OPERATION

The report of this committee was accompanied by an extended bibliography, including such subjects as train resistance, car weights as affecting operating costs, economic length of train divisions, standards of maintenance of way, etc. The committee, which is a new one this year, was asked to report on the possible scope of a committee with such a title. It suggests a number of topics for future consideration, including economical speed of trains, additional main tracks and economic length of operating districts.

TIES

The report of this committee was largely on methods in use for controlling tie renewals and its usual report on trials of substitute ties. As regards the former, reports were received from 100 railways with an aggregate mileage of 223,000, showing that a majority of the roads placed the principal responsibility on the section foreman, while a considerable number placed the responsibility primarily upon an inspector working independently of the section foreman. The information on trials of steel, concrete and other substitute ties includes all installations on steam roads in America reporting to the association.

ELECTRICITY

This report recommends adoption in the Manual of a number of electrical definitions. Of these eleven are entirely new, others have been suggested by some association. The second part of the report brings up to date the company's statistics on third-rail and overhead clearances. The third section relates to "Electrolysis and Insulation." The subject considered is not electrolysis from railway return currents but the corrosion of concrete under the action of salt water. Under water power the committee calls attention to the increased cost of coal as being a factor in making hydroelectric developments attractive.

A section is also included on the proposed National Electrical Safety Code. In discussing the legal aspects of the code, the committee expresses doubt whether Part IV can be made valid law as a statute or as an administrative order. It is probable that the provisions of the code are in general reasonable, but valid objection to Part IV may be based upon the inflexible nature of the language and its interference

with the private management of business to an extent not justified in the interest of safety. Specific objection is made to a number of the requirements, generally because they are not strict enough. In general the conclusion is that the principles of the code are acceptable as tending to establish uniform electrical rules in the several states, but that the code is cumbersome, that certain of its requirements should be revised upward and its legality should be established by the opinion of an authority high in the federal government.

RAILS

The first section of this report recommends that the specifications for quenched carbon and quenched alloy steel joint bars, track bolts and nuts and for medium carbon steel track bolts and nuts, which have been held over for revision for the last two years, be adopted by the association in place of those now appearing in the Manual. The second section deals with rail failure statistics, a very comprehensive report on which appeared in the September, 1917, bulletin of the association. Failures are divided into head, web, base and fulcrum, and the number of failures compared on a basis of five year-service has been materially reduced.

The subject of special investigations is covered in the third section of the report and includes a series of papers on mill inspections, influence of gage length and elongation in drop tests, tests of manganese steel rails, inhibited or delayed transformation in rail heads, intensity of pressure on rails and rail failure statistics for 1916 covered in the previous section. The fourth section dealing with track bolts and nut locks recommends that the specifications submitted in 1916 be adopted, with some changes, by the association. Under mill practice dealt with in the fifth section the general results of mill inspection of rails manufactured in 1915 and 1916 are covered and there is a discussion of the specifications on which the rails were bought.

Progress is reported on sections six and seven dealing respectively with the study of joint bars from the standpoint of design and material and the relative value of various heat treatments. Subject eight on the intensity of pressure of rail resistance covers extensive field and laboratory tests dealing with the crushing effect on rail metal of various wheel loads. Methods of inspection covered in section nine state that it is believed that inspection of rails by the hydraulic bender could be carried on much quicker than by the drop test. On subject ten, commission rulings, the committee reports progress.

ROADWAY

The committee on roadway reports on the six subjects assigned to it, namely (1) recommendation for changes in the subject matter of the Manual; (2) methods of determining extent, character and effect of subsidence under embankments; (3) methods of estimating the shrinkage of embankments; (4) prevention and cure of water pockets in roadbeds; (5) a study of the unit pressures allowable on roadbeds of different materials; (6) the best method for draining roadway through stations and yards. The last is the only topic to which it has been possible to give full consideration. The substance of the report on this subject is that the drainage of roadway through stations and yards should be treated in accordance with local condi-

tions, but that the surface water should be carried off as quickly as possible. The proper method for doing this depends upon the soil, contour of ground, etc. Methods of procedure are given for different types of sub-grade and for the proper type construction in yards.

SIGNS, FENCES AND CROSSINGS

The work of this committee included a study of the subject of flangeways in crossings of steam and electric tracks. The report contains a number of tables of dimensions showing widths and depths of flangeway on straight and curved track for different weights of rail for both electric railway and steam railroad. The committee says that after careful consideration of these tables it recommends the following dimensions for flangeways on straight track:

	Steam Railways	Electric Railways		
Depth of flange.....	M. C. B. standard..	7/8 in.,	1 in.,	1 1/8 in.
Width of flangeway..	1 3/4 in.	1 1/2 in.,	1 5/8 in.,	1 3/4 in.
Depth of flangeway..	1 1/8 in.	1 1/2 in.,	1 3/4 in.,	1 3/8 in.

For flangeways in curved tracks of steam railroads the report recommends an increase in width of 1/16 in. for every 2 deg. of curvature over 2 deg. For flangeways in curved tracks of electric railways no special increase is recommended, as the dimensions given above cover ordinary operating conditions. On some roads the width of flangeway is increased as the gage is increased, so as to keep the distance between the gage line and wearing surface of the opposite guard rail uniformly 4 ft. 6 3/4 in., which is good practice and recommended for excessive curvature.

For flangeways of steam railroad tracks located in paved streets, the reports show widths generally ranging from 1 1/2 in. to 2 1/2 in., with one case each of 3 in. and 4 in. These flangeways are, as previously reported, formed by rails laid on side rails placed upright with separators, planks and other paving materials, and special guard rails. For flangeways of electric railway tracks located in paved streets, the width generally ranged between 1 1/2 and 2 in., although one case reported a width of 3 in., another 3 1/2 in. The depth of flangeways of steam railroad tracks varies generally from 1 1/4 to 2 in., with two cases of 3 in., while the depth of flangeways of electric railway tracks varies generally from 7/8 in. to 1 3/4 in.

The committee also continued its study in regard to fences and concrete fence posts and repeats its conclusion of 1914 that "concrete fence posts are practical, economical and a suitable substitute for wood."

TRACK

The report recommends various minor changes in the Manual and then passes on to detailed plans for turn-outs, cross-overs, slip switches, double cross-overs and other details of track construction. It is intended that the committee shall permit further plans on these construction details at the next convention. A report is made on the reduction of taper of tread of wheel to 1 in 38 and on canting the rail inward. The summary of this section is that the best results will be obtained from both wheel and rail wear if the rail is installed and maintained so as to provide a uniform bearing and wear on the head of the rail. A section on specifications for relayer rails for various uses classifies used rails suitable for relaying into those suitable for main track,

Power Production in War Times*

How the Cost of Coal Has Gone Up and Its Quality Has Gone Down—Problems of Coal Delivery and Station Operation Which the Power Superintendent Has to Face—Possible Economies Suggested

BY WALTER C. SLADE

Superintendent Power and Lines, Rhode Island Company, Providence

THE problem of producing steam generated power in war times is one which is beset with difficulties and with trials. The question of the cost of production, although always of prime importance, has at times been obscured at least temporarily by the more important question whether for certain periods power could be produced at all, irrespective of the cost. In Rhode Island we have felt the shortage of bituminous coal keenly. The two power producing utilities at Providence have been operating of late with inadequate coal reserves, and the Rhode Island Company in particular has recently been forced to operate its main power station for three or four days with borrowed coal entirely.

The coal requirement for our railway power plants at Providence and Rockland for the year ending June 30, 1916, was about 73,100 gross tons. In the calendar year 1917 it amounted to as much as 90,500 gross tons, although the power generated had increased above the value applying to the former period by less than 5 per cent. The increased consumption, the cause of which is explained later, met with ever decreasing ability on the part of coal mining companies and transportation companies to fulfill requirements.

The Rhode Island Company, as is the case with possibly 50 per cent of the railway companies in the country, operates its own power stations exclusively for a

traction load. The diversity factor resulting from different classes of service which the average central station enjoys does not exist. The maximum demands for power, though relatively brief, are high as compared with the average load, and, characteristic of the railway load, the load factor is relatively poor. As the small engine plant at Rockland, which generated 1,423,217 kw.-hr., and the large turbine plant at Providence, which generated 73,492,300 kw.-hr. in 1917, represent widely different types and capacities of stations, they are further typical of many plants of the same kind now operating.

COST PER TON OF COAL CONSTANTLY INCREASING

The prices which we have been forced to pay for coal in cargo lots alongside the Providence plant have varied, but they seem to be constantly increasing. For the fiscal year 1915-1916 we were fortunate in obtaining coal at a practically uniform price of \$3.32 alongside. We could then get discharging done at 8½ cents per ton. In the spring of 1917 we paid as high as \$11 and \$12 a ton for some coal and bought considerable coal at prices between \$6 and \$9 a gross ton. Later developments proved that this action was justified. Since the government fixed the price of coal and has established transportation rates and other rulings concerning the mining and shipping of coal, we have had to pay not less than \$7.72 a gross ton alongside for Southern coal, and one cargo has cost us as much as \$10.35 alongside. The average price is now running to more than \$8.35 alongside, provided there are no demurrage charges. Due to government regulation, the consumer absorbs not only demurrage charges, whether they occur on cars or on the boat at loading end or at discharging end, but also other charges, such as war taxes, insurance, etc. To date we have received nearly \$6,000 in demurrage bills on the last eleven boats, on which about two-thirds was incurred at the loading end. Finally, from 8½ cents per ton our discharging costs have advanced to 15 cents to 23 cents per ton. This is due to the fact that we are obliged to discharge boats on overtime work to avoid the high demurrage charges, and to-day coal passers along the water front are demanding 50 cents per hour straight time, 65 cents per hour overtime and 75 cents per hour for work on Sundays and holidays. They are able to get the money. The majority of these men are unable to read or write or to speak or understand English.

Early in the year 1917 we realized from the experience of the previous winter the necessity of providing at an early date a supply of coal to carry us through the winter of 1917-1918. We planned to accumulate a

(Concluded from page 566)

those which may be made suitable for main track by resawing and those suitable for side tracks. A fourth class includes those suitable for scrap purposes. A further section of the report is devoted to the design of cut track spikes. The design submitted by the committee is the same as that recommended by the committee in March, 1916, with the exception that there is a reduction in the amount of reinforcing under the head for the spike.

The effect of fast trains on the cost of maintenance of way and equipment is the subject of one section of the report and is illustrated by many plates and by one important and comprehensive chart which divides the factors influencing the cost of maintenance of way and structures into three elements, namely, weather stress, density of traffic and character of traffic, differentiating between passenger and freight traffic. It is stated that a fourth factor, *i. e.*, the ability of the management to regulate the expenditures in strict accordance with the demand of the traffic may enter into consideration. The last section of the report devoted to the subject of widening of flange of wheels considers it to be unnecessary to make any difference in the width of flange-way of frogs and crossings or change the present method of track construction.

*Abstract of address before the New England Street Railway Club, Boston, Feb. 28, 1918.

supply that would carry the station for perhaps three months, and between early May and July we increased our tonnage from approximately 6000 to 26,000 gross. In August we discovered that we were going to have trouble with fires in part of the stored coal before the winter was over, due to the rapid heating property of some of the coal which was of poor quality, though it had been purchased at high prices. We had our fire trouble even earlier than anticipated. Besides this, about Sept. 1 coal shipments became less frequent, so that we were forced to draw upon our storage supply, and in December it was reduced to about 7500 gross tons. In early February we consumed what coal we had left and were finally forced to operate on coal borrowed through the aid of the local Fuel Administrator. There was delay in loading coal and in transporting it by water. The longest delays have been in elapsed time between the completion of loading and the arrival of the boat at point of discharge. Formerly boats used to come through in a week or less, but the time required during last winter was from one week to five and a half weeks, with an average of possibly two and a half weeks. This delay was doubtless due to the deficiency in towing capacity in the coastwise trade. During all this period we had exerted all possible pressure to have suitable deliveries kept up to prevent the depletion of the supply.

QUALITY OF COAL KEPT GETTING WORSE

Prior to the time when the coal mining conditions became abnormal and transportation facilities became demoralized, we had made a practice of burning New River coal or Pocahontas, the average analysis of which used to run about 14,900 B.t.u. Even the same grade of coal, due evidently to poorer preparation at the mines, and at a later time due possibly to the pooling of the coal supplies by the government, gave noticeably lower average B.t.u. value on analysis. The spot cargoes which were purchased outside, consisting mainly of Pennsylvania coals, but which were expected to be of average quality, in some instances were of extremely poor quality. Of the coal placed in yard storage, 35 per cent showed a heat value under 14,500 B.t.u. and 46 per cent under 14,750 B.t.u. In fact, 21 per cent was under 14,000 B.t.u., some of it containing 15 per cent ash. Due to the deterioration of this coal in storage before it was consumed under the boilers, the average B.t.u. value of the coal as fired was not over 14,300 B.t.u. The effect of the quality of the coal was reflected directly in the cost of operation, in addition to the effect of the higher cost of the coal alongside. It resulted also in increased boiler-room maintenance. The net result was to raise the unit cost of power for the year 1917 by 104 per cent, as compared with the twelve months ended June 30, 1916.

The coal factors for both power stations have been growing worse since the fairly satisfactory showing for the year ended on June 30, 1916. This year was the last fiscal year that was not affected materially by advancing costs of fuel, material and labor.

	Manchester Street Station		Rockland Station	
	Lbs. Coal per Kw.-Hr.	Per Cent Increase	Lbs. Coal per Kw.-Hr.	Per Cent Increase
12 months ended June 30, 1916.	2.28	...	3.49	...
6 months ended Dec. 31, 1916.	2.38	4.4	3.78	8.3
12 months ended Dec. 31, 1917.	2.69	18.0	3.99	14.3

The unusually high factor for the turbine plant in 1917 was due to a combination of operating conditions requiring a large number of banked hours on standby boilers not used in 1916, together with the necessity of burning a considerable amount of inferior coal, as well as coal damaged by spontaneous combustion. The performance will not be repeated in 1918. In fact, under favorable conditions the plant was operating for a part of January at 2.13 lb. The decrease in economy at both turbine and engine plants, as shown above, has been of the same relative order.

COST PER KILOWATT-HOUR MORE THAN DOUBLED AT MAIN PLANT

As regards the increased cost of busbar power, some comparisons may be made with the costs which apply to the year ended June 30, 1916. Comparing the last six months of 1916 and the year 1917 with this period, we find that the cost per kilowatt-hour at the busbar increased for the six months 23.4 per cent and for the following twelve months 104 per cent at the Manchester Street plant. At the small Rockland plant the busbar cost of power for the same periods increased respectively 31.8 per cent and 73.5 per cent. The cause of these remarkable increases in the unit cost of power, as stated above, is due primarily to the abnormally high price of coal, but also to the character of the coal that was burned. Some of the coal was of such poor quality that it raised our stoker and furnace maintenance to an undesirable point. The increase in the cost of fuel, as fired, was 132 per cent, and raised the fuel charge in 1917 to as much as 83 per cent of the total maintenance and operating costs. Referring to operating charges in the same year, while fuel cost advanced 132 per cent over the 1916 cost, wages advanced 30 per cent and all other operating charge 25 per cent. The average of the above percentage increases is 106 per cent. The kilowatt-hour delivered increased only 4.9 per cent and the pounds of coal per kilowatt-hour 18 per cent.

WHAT SHALL WE DO WITH OUR RAILWAY STATIONS?

Before concluding, I will dwell briefly upon a few possible economies, first in power production and second in power utilization. The great majority of the existing railway power plants were built at a time when 25 cycles was the only commercial frequency that was considered suitable for traction purposes. These 25-cycle plants as a rule enjoyed no diversity factor in their load. Only the power stations of the larger capacities can compete with the large central stations of to-day in the cost of manufactured power. So much capital is invested in these large railway plants that even though they are able to generate less economically than adjacent central stations, it is difficult to consider anything but a continuance of the operation with added improvements in the interest of economy of these stations. Between the average large 60-cycle central station and the average large 25-cycle railway station there can be no interchange of power except through frequency changers, a method which is sufficiently uneconomical to make this exchange feasible only for emergency purposes. Such an arrangement for emergency operation is, however, feasible. It is also equally practicable in certain cases, it would seem, when new equipment is added to existing 25-cycle power plants.

to install the equipment for 60-cycle operation, so that in the future more railway plants would be able to take advantage of central station power which in normal times is steadily being produced at decreasing cost, as well also of hydroelectric 60-cycle developments that will, doubtless, be made throughout the country. In short, the big 25-cycle power plant must continue in operation as an individual unit, operating either independently or to varying degree in conjunction with other power stations to obtain both a desirable diversity factor and to reduce capital investment that would otherwise be necessary for new equipment.

But what of the small engine-driven railway plant that is struggling along trying to produce power cheaply even in normal times? Many of these plants could and should be shut down as soon as arrangements can be made for equipment suitable for operating from central station or hydroelectric service. With increasing cost of coal, the balance is all in favor of the big station, and it is questionable if the price of coal in future years reaches a minimum that is \$1 to \$1.50 a ton above the prices that prevailed before the war.

BOILER ROOM ECONOMIES ESPECIALLY NECESSARY WITH HIGHER FUEL COST

As regards increasing economies in our power stations I am going to speak principally of the boiler room. In ordinary times the fuel item will represent from 70 per cent to 75 per cent of the total cost of generated power. I recently stated that our own experience had seen the fuel cost reach a point equal to 83 per cent of the total cost, in fact, at least 90 per cent of the total cost was expended in the boiler room for fuel, water, wages, supplies and materials required for maintenance. We should indeed consider spending money in such a field where such a large proportion of the expense of production lies.

The best solution, perhaps, is to follow the practice, already observed I believe in a few cases, to put under the chief engineer a technically trained man or at least a man who understands the theory of combustion sufficiently well, who can keep constant check of operating conditions in the boiler room, working in constant touch with the chief engineer. This type of man has been termed "combustion engineer." Even plants of moderate capacity could well afford to maintain such a man on the payroll. Working with the assistance of the necessary weighing, measuring and metering devices with which he should be provided, he could put the true spirit of industrial control into boiler room practice. To aid the "combustion engineer," so called, in effecting the desired economies, it would be well to consider the advisability of making the operation of all equipment as nearly automatic as possible. Man power may be at a premium for some time to come, and at all times undue dependence on the human element is undesirable.

WILL INSTALL AUTOMATIC SUBSTATIONS

Transmission, conversion and distribution of power are but a step beyond its production. In this field there has been developed an idea which makes additional economies possible for all. I mean the automatic railway substation. We have built and are preparing within a short time to start two small automatic substations. We hope to build more at a later

date if these prove successful. With these stations we will eliminate power losses and labor, which more than offset the additional fixed charges required for the automatic equipment or any possible increased cost of maintenance that we can contemplate.

SAVINGS POSSIBLE ON THE CAR

As regards the utilization of power, let us consider how power is being wasted at the present time on the car through unskillful operation of equipment, unnecessary application of brakes, wasteful use of heaters and lights. Without doubt there is not a railway company operating which is not able to reduce its power consumption by at least 10 per cent through a proper and persistent instruction of its motormen regarding economical methods of operation and to install some type of automatic checking device on its cars to maintain a record of performance after once established. I believe that in some cases power bills can be reduced without trouble and in a short time as much as 15 or even 20 per cent. At present, with the possibility of effecting savings as great as they are at the trolley car, opposition on the part of employees would indicate not only a great lack of co-operative spirit but a lack of patriotic feeling.

The effect of reducing the stops per mile has recently been discussed at length in the technical journals. If through the co-operation on the part of the people that we serve unnecessary stops can be eliminated and car mileage reduced, the effect will be immediately noticeable. Thermostatic control of car heating is an important consideration, because of the beneficial effect that it has in reducing the peak demand, as much as the effect in conserving power. Safety cars are, of course, of great interest to many of us at present and are surely capable of being used on at least a part of every railway system.

Other opportunities for establishing economies could readily be suggested. Some of these have been put into effect in Rochester, as described in a recent issue of the *ELECTRIC RAILWAY JOURNAL*. Another interesting example of co-operation in a small way between a railway company and an industry is the arrangement between the Pittsburgh Railways and the Westinghouse Electric & Manufacturing Company, at East Pittsburgh, where the latter company supplies cars to the railway line through a rotary converter in its factory. In this way a good voltage is maintained on the lines, and the rapid handling of the traffic to and from the works is assured. The load handled by the converter is removed from the railway power station at a time when it is most undesirable, and is put onto the power station at the factory at a time when there is a much lessened demand because of partial shutdown.

I. C. C. Report for 1916

The report of the Interstate Commerce Commission for the year ending June 30, 1916, just published, shows that on that date the total mileage of interstate railroad companies was 394,944, being an increase of 3802 miles as compared with the corresponding period in the preceding year. Of this increase, 1641 miles were single track and 1959 miles were in yard track and sidings. At the same time, there were 65,314 locomotives of all kinds, 2,342,217 freight cars, 54,774 passenger cars, and 98,190 service cars.

Zone System Best for Rhode Island

Special Commission Finds Conditions Require Central Five-Cent Areas and Two-Cent Intermediate Zones — Recommends Abolition of Municipal Franchise Taxes and of City Regulation

A MODIFIED zone system, with certain tax, franchise and other reforms, constitutes the relief needed by the Rhode Island Company, Providence, R. I. Such is the tenor of the recent report by the special commission appointed by the Legislature early in 1917 to investigate the affairs of this railway. The commission consisted of the chairman of the State Board of Tax Commissioners, the chairman of the Public Utilities Commission and the bank commissioner.

Since the report was submitted to the General Assembly on March 7, as noted in the *ELECTRIC RAILWAY JOURNAL* of March 9, the legislators have created a peculiar situation. In April, 1917, they approved a bill authorizing the special commission to certify any necessary fare changes to the Public Utilities Commission and directing the latter body to order such changes to be made. Now, however, as stated in the issue of March 16, the General Assembly by special order has prohibited a change in the rate of fare and created a committee of legislators to report before March 26 upon the electric railway situation. The new zone system was to go into effect on or before April 1.

Although the matter of adopting a zone system for the Rhode Island Company has thus not been finally settled, the report of the special commission is of value because of the system outlined for handling the fares on the company's 354.07 miles of electric railway track, and also because of the recommendations to the Legislature on other matters. These facts justify the publication at this time of further material from the special commission's report, which is now available in full.

FINDINGS AND RECOMMENDATIONS

The findings of the special commission may be summarized as follows:

1. That the Rhode Island Company is furnishing to the people of the State transportation facilities which compare favorably with those furnished in other cities of approximately the same size, and that reasonable provision is made for the demands of the traffic.
2. That the Rhode Island Company does not receive a fair and equitable return upon the property owned and controlled by it and devoted to the public service, and for several years the property has been operated at a heavy loss.
3. That the fair value of property owned and controlled by the Rhode Island Company and devoted to the public service upon which the company is entitled to a fair and equitable return is \$29,000,000.
4. That 6 per cent is a fair and equitable return upon the property owned and controlled by the Rhode Island Company and devoted to the public service.
5. That a modification of the present system of fares and transfers is necessary to provide in part for a fair and equitable return upon the fair value of the property owned and controlled by the Rhode Island Company and devoted to the public service.

Upon the basis of these findings the commission recommended:

1. That primary regulation of the utility be by the Public Utilities Commission.
2. That municipal franchise taxes be abolished.

3. That the Rhode Island Company be relieved from its paving obligations as they now exist and be required to maintain only that part of the highway actually worn out by it, and to repair all damage done.

4. That routing of cars be changed to conform to the plan recommended by the commission's engineers.

5. That changes in equipment recommended by the commission's engineers be made as soon as practicable.

6. That the company provide some definite and adequate system for collecting and compiling statistical information relative to traffic costs, passenger movements, service furnished, and a record of the reasons deemed sufficient to warrant changes in routing or service furnished.

TAXATION IS EXCESSIVE

In discussing taxation, the commission states that in Rhode Island the company pays taxes to forty-two subordinate taxing jurisdictions as well as to the State itself, and in twelve of these subordinate jurisdictions it pays two kinds of taxes. These various taxes, paid to the State and its subordinate jurisdictions, amount to \$498,186, or 8.44 per cent of operating revenue, and if the taxes paid to the United States (\$34,468) and the State of Connecticut (\$1966) be added, the tax imposed amounts to 9.04 per cent. If the calculation includes the payments made by the Rhode Island Company for paving and is based on revenue received from passengers only, the percentage reaches 10.73 per cent.

Such a rate of taxation, the commission feels, cannot be justified. Even if it were a fact that the receipts enabled the payment to be made without interfering with a fair and equitable return on the capital properly invested, the commission considers it unjust to exact in taxes 0.5 cent out of each 5 cents paid by a passenger. The company is one of the heaviest-taxed properties of its kind in the United States.

Exclusive of the taxes on real estate and tangible property, the company pays franchise taxes of \$147,860 in twelve cities and towns, and it pays the State 3 per cent (\$166,915 in 1917) of its gross earnings. The commission believes that the municipal franchise taxes are not justified under present conditions. If the system were a strictly urban one, there would be considerable force to the argument that there should be no franchise tax by the State or that it should be a small amount. Under conditions as they exist, however, the State appears to be the natural and proper recipient of such franchise taxes as should be imposed.

STATE SHOULD REGULATE

The Rhode Island Company operates in twenty-six cities and towns and in each is subject to regulation by municipal authority. Under the existing system the company may at the same time be compelled to observe regulations emanating from State or local authority by any of the three following methods:

1. Regulatory power directly exercised by a town or city.
2. Regulatory power directly exercised by the Public

Utilities Commission in the performance of its functions.

3. Regulatory power indirectly exercised by the Public Utilities Commission where the action of a town or city is made the subject of review by the commission.

It is the opinion of the investigating commission that a direct and unified control by State authority will be in the public interest and will result in better and more uniform regulations. The regulating authorities will have a broader and more comprehensive view of the situation than under present conditions and will, therefore, be better able to judge as to the advisability or necessity of changes desired by either the public or the company. The business and social life of the whole State is more or less directly concerned in and affected, by the operation and management of this utility, and its regulation should be positive and direct by State, not municipal, authority.

FAIR VALUE IS \$29,000,000

The commission reports the following figures for purposes of comparison on the basis of reproduction new:

Commission's engineers	\$28,966,755
Ford, Bacon & Davis.....	33,275,184
1910 Validation Commission's report corrected and brought to June 30, 1917.....	29,565,193
Approximate cash invested.....	28,802,590

The cost of reproduction new was found by the commission's engineers, Sloan, Huddle, Feustel & Freeman, to be \$28,966,755 and by the company's engineers, Ford, Bacon & Davis, \$33,275,184. The cost of reproduction new less depreciation was \$22,345,913 and \$26,067,466 respectively. The difference in the totals arrived at, on the basis of cost of reproduction new, by the two independent investigations, amounting to \$4,308,429, is accounted for by \$979,951 for payments covering current liabilities of leased companies, which were held to have been improperly included; a difference in overhead percentages, resulting in a discrepancy of \$1,513,270; differences in quantities and prices of paving and grading, amounting to \$940,558, and certain other minor differences in unit prices used. With the first two items excluded, the difference amounts to but \$1,815,208, or approximately 6 per cent of the total cost of reproduction new as found by the commission's engineers.

The special commission decides that the fair value of the property owned and controlled and devoted to the public service is \$29,000,000. The preliminary report of the commission's engineers, which forms a part of the present report, was abstracted in the *ELECTRIC RAILWAY JOURNAL* of Nov. 3, 1917, page 815.

The commission states that apparently it would not have been possible for any of the companies involved to have accumulated a depreciation fund. It was not customary, and public opinion sustained the owners of public utilities in the belief that all revenue in excess of that required to pay ordinary operating expenses belonged to the stockholders. The courts were in many instances opposed to the accumulation of funds to provide amounts considered necessary for future accrued depreciation.

It, therefore, does not seem just or equitable in the present instance to deduct an amount estimated to be equal to the accrued depreciation from the cost of re-

production new to arrive at the fair value of the property involved. It appears reasonable and just to the commission, however, to allow, in determining the fair and equitable return, an amount sufficient to enable the company to maintain its property in condition to render properly and efficiently the service required without impairing the net returns.

In regard to the rate of return, the commission says that present conditions are so abnormal that it does not appear wise or expedient to attempt an adjustment of rates according to them, or to determine what would be fair and equitable merely for the present. It seems more reasonable to adjust rates on a normal basis, and then, if necessary, make special provisions to take care of the very unusual conditions which now prevail, as occasion may require.

Under normal conditions a net return of 6 per cent on the fair value would be enough to maintain an issue of stock for a like amount at par, or somewhat over, and also to attract capital in sufficient amounts to meet all the legitimate requirements of the business. It is not expected that the carrying into effect of the recommendations of the commission and the modification of the system of fares and transfers will immediately result in the earning of 6 per cent net on the rate-base. It is assumed, however, that the company will have sufficient revenue for efficient operation, and that at present some net return will be earned. Upon restoration of normal conditions, the commission says, the company should, after compensating for bad judgment, be able to earn 6 per cent net on the rate-base and in addition a fair profit for conducting a large and complicated business.

After an allowance of adequate provision for renewals and replacements, the property as a whole in the year ended June 30, 1917, fell approximately \$200,000 short of earning 4 per cent. If the calendar year 1917 were used, not one of the properties would show earnings of 4 per cent. The properties fell short to the extent of \$776,092 for the fiscal year ended June 30, 1917, of earning 6 per cent. This financial showing, the commission states, indicates clearly the necessity of immediate relief, if the service is to be maintained, whether the system is operated as a unit by the Rhode Island Company or as a number of independent roads by several companies.

ZONE SYSTEM SEEMS BEST FOR RHODE ISLAND

In adopting a zone system of fares as one of the means of relief for the Rhode Island Company, the commission summarizes the fare problem as follows:

a. Flat increase in existing fare:

Advantages: Ease of collection of fare, both passenger and conductor readily understanding the principle involved. All passengers are treated alike. No change is made in the method of identifying passengers. Existing fare limits are not disturbed. No tendency exists to restrict the spread of population to outlying districts and to encourage congestion.

Disadvantages: Increased fare of all riders alike. Exaggerated discrimination against short-haul passengers. Tendency to decrease short riding with consequent loss of the most profitable business. Tendency to increase jitney competition. Advance over present rate could not be less than 20 per cent. Tendency to discourage extension and expansion by the utility. Required making of change for all passengers or a ticket system.

b. Transfer charge:

Some claim that the free transfer unduly extends the length of ride for the original fare, and also that even if the ride is comparatively short an extra stop and start are

required as well as twice the equipment used by a passenger in a continuous ride. On the other hand, if a charge is made for transfers, there is immediately a demand for through service which may be perfectly just, but which, if granted, would seriously interfere with economical or convenient routing. A free transfer tends to equalize the charge between different sections within the transfer limits, encourages the spreading out of the population and does not encourage congestion. There is no general rule which may be applied to all cases; each transfer question must be determined according to the peculiar circumstances relating to it.

c. Modified zone system:

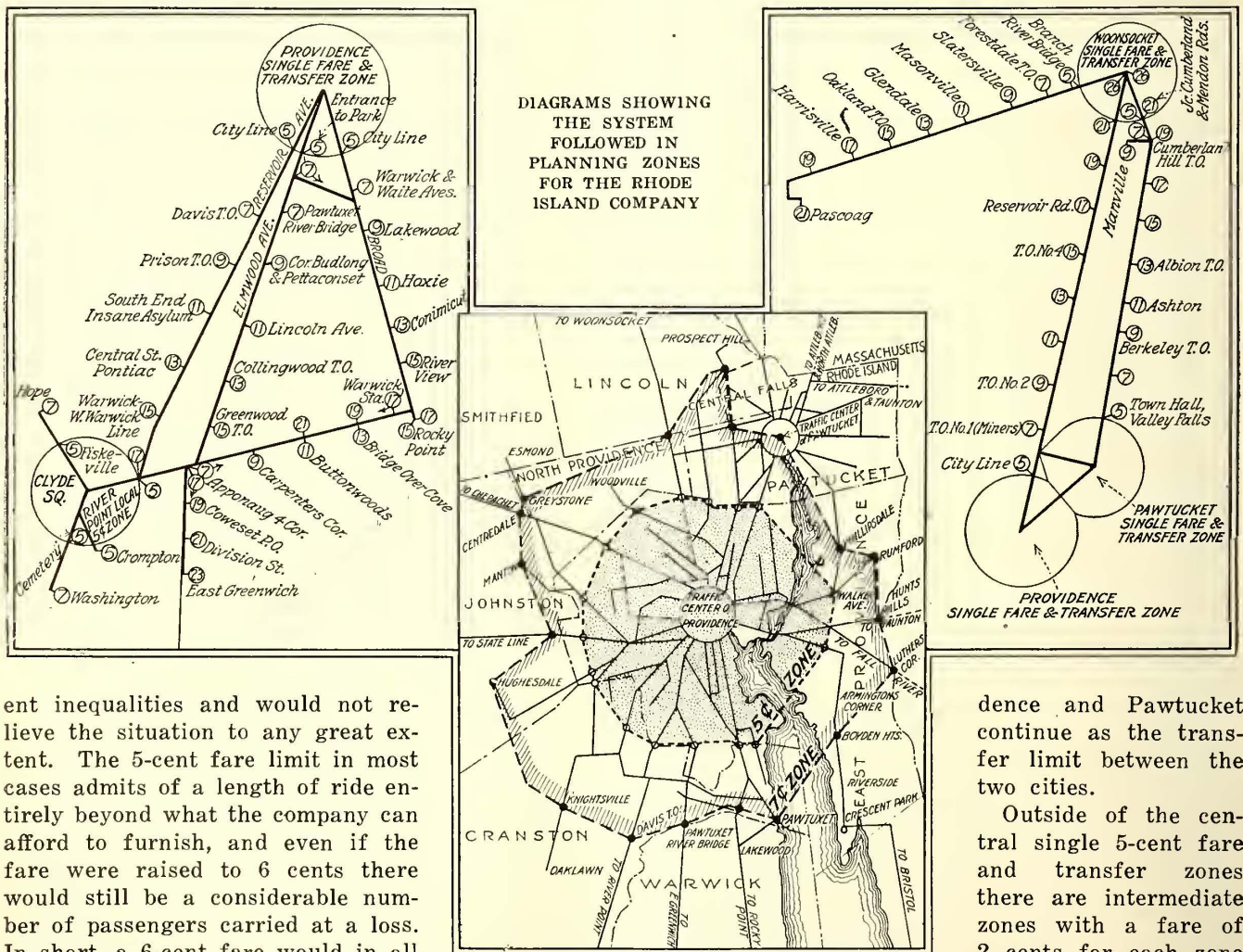
Advantages: The charge approximates service received. Reduced discrimination against short rides. Considerable flexibility. Reduced number of passengers carried at a loss. Only a part of the passengers affected. No tendency to reduce the number of short rides.

Disadvantages: Difficulty of identification of passengers and in the collection of fares. Tendency to prevent spreading of population beyond 5-cent fare limit and consequent congestion. Inconvenience to passengers required to pay several fares. An entirely new system of fares and fare collection with which both the public and the conductors are not familiar.

It is the opinion of the commission that a flat increase in the present fares would exaggerate the pres-

bad sociological effects will follow the application of the proposed system; inconvenience due to the change will be reduced to a minimum and the charge for transportation will be as nearly proportionate to the cost of the service rendered as is practicable. The increase in transfer privileges will be of substantial benefit to the public without unduly reducing the gross earnings of the company.

The accompanying diagrams and table indicate the system followed in planning the zone system. Single 5-cent fare and transfer zones as established are identical. Four transfer zones are provided for the following centers, viz.: Providence, Pawtucket, Woonsocket and Clyde Square at River Point. Limited local 5-cent fare and transfer zones are provided for Cranston and East Providence. A local 5-cent fare zone is provided from Olneyville Square, Providence. The Providence single 5-cent fare and transfer zone includes the area within a radius of approximately 2½ miles from Exchange Place as a center, excepting in the direction of Pawtucket, where the city limits of Provi-



ent inequalities and would not relieve the situation to any great extent. The 5-cent fare limit in most cases admits of a length of ride entirely beyond what the company can afford to furnish, and even if the fare were raised to 6 cents there would still be a considerable number of passengers carried at a loss. In short, a 6-cent fare would in all probability cause inconvenience and dissatisfaction altogether out of proportion to whatever advantage was gained, and there seems to be very little, if anything, to recommend a flat increase so far as the case under consideration is concerned.

It is the opinion of the commission that a modified zone system with 5-cent central areas will produce the best results and operate more justly to all concerned than either of the systems without modification. No

dence and Pawtucket continue as the transfer limit between the two cities.

Outside of the central single 5-cent fare and transfer zones there are intermediate zones with a fare of 2 cents for each zone and a minimum fare of 5 cents for travel through two zones. Upon the Danielson, Sea View, Pawtucket-Cumberland Hill and Chepachet lines, which present similar low earnings, the average length of such zones reflects a rate of approximately 2½ cents per mile. Upon these lines a minimum fare of 5 cents entitles a passenger to travel through three of such zones. Upon the other interurban or suburban lines

Struggling with Poor Coal*

**“Black Asbestos” Was the Name Given by One Engineer to the Material Which the Connecticut Company Tried to Burn Under Its Boilers Last Winter—
To Difficulties in Combustion Was Added Injury to Mechanical Stokers Caused by Impurities, as Well as Other Troubles**

BY GEORGE E. WOOD

Mechanical Engineer The Connecticut Company

THE Connecticut Company has six generating plants ranging in capacity from 16,500 kw. to 350 kw., which supply the entire system with energy, with the exception of the New Britain, Waterbury, Norwalk and Stamford divisions, the latter sections being supplied with purchased power. The total installed capacity is 40,000 kw., of which 12,000 kw. is held in reserve. The Bridgeport, Hartford and New Haven plants supply 85 per cent of the total output.

Since the latter part of 1916 the quality of the

coal has been gradually getting poorer, and at present it is a continual struggle to keep the plants operating, to say nothing of trying to improve the efficiency. If good coal could have been obtained last year a 10 per cent increase in efficiency over 1915 would have been attained in fuel consumption, due to new and reconstructed plants. However, as the quality of fuel which could be procured was below standard, the actual tonnage consumed increased 24 per cent over that required in 1915 and 31 per cent over what would have been required in 1917 with standard quality coal. It appears that with good quality coal 7 per cent fewer cars would be required on the railroads compared with the rolling stock needed to handle what one of the company's engineers termed “black asbestos.”

Soon after the first lot of poor coal was received the tonnage consumption began to rise. The company engaged the services of a competent combustion engineer, who instructed the various boiler-room engineers in the vagaries of combustion under the conditions attending the constantly changing grades of coal. Without his aid the tonnage consumed would have been considerably greater.

It is possible economically to consume low-grade fuels of uniform quality and corresponding low price, where the furnaces are designed to suit the fuel, with ash removal machinery capable of meeting the heavier demands, and, of course, suitable unloading facilities. When, however, a plant is designed for a high-grade coal and the fuel actually used is worse than a uniform low-grade product, there is no doubt as to what the results will be. Thus, one consignment of fuel received would pack down upon the tuyeres so solidly that the combined capacity of all the blowers in the plant could not force sufficient air through to allow it to burn. To attain any semblance of combustion, it was necessary to apply slice bars through the observation doors, and even then interruptions of varying duration could not be avoided.

About the time this coal had been “run through the furnaces” and the firemen were able to attain better results, the next shipment would be received. As this new coal followed the last of the previous shipment through the bunkers, the firemen would find that with the usual plenum in the wind boxes, the coal would be blown over onto the dump plates and pile up in a red-hot mass to a depth of 3 to 4 ft. Often the entire dump plate and shaft twisted out of shape so badly that they had to be entirely renewed. Within a few days some coal was received that would burn nicely for about an hour, after which it could be seen gradually to shut off the air supply. The shaking grates

*Abstract of address before New England Street Railway Club, Boston, Feb. 28, 1918.

(Concluded from page 572)

the average length of such zones varies from 1.18 to 2.08 miles and the average rate from 0.96 cent to 1.69 cents per mile. In the case of these lines, the commission determined a properly advanced through rate, having in mind the existing rate, the nature and density of traffic, and the probable effect of the increased rate.

LENGTHS OF ZONES AND RATES OF FARE UNDER SYSTEM PROPOSED FOR
RHODE ISLAND COMPANY
Interurban and Suburban Lines

	Track Mileage			Intermediate Zones			Total Fare	
	Local	Intermediate	Local	Number	Length	Cts. per Mile	New	Old
Providence-Woonsocket.....	2.84	9.74	2.21	8	1.22	1.64	.26	.20
Providence-Rocky Point.....	3.40	7.60	.....	6	1.27	1.58	.17	.10
Providence-Buttonwoods.....	3.40	9.97	.....	8	1.25	1.61	.21	.15
Providence-East Greenwich.....	3.45	10.66	.....	9	1.18	1.69	.23	.20
Providence-River Point.....	3.11	7.15	2.44	6	1.19	1.68	.22	.15
Providence-Washington.....	3.11	8.31	4.82	7	1.19	1.68	.24	.20*
Providence-Riverside.....	2.43	3.43	.....	2	1.71	1.17	.09	.10
Providence-Crescent Park.....	2.43	4.40	.....	3	1.47	1.36	.11	.10
Woonsocket-Pascoag.....	2.14	12.93	.....	8	1.62	1.24	.21	.15*
River Point-Rocky Point.....	2.05	7.60	.....	5	1.52	1.32	.15	.10
Pawtucket-Crescent Park.....	1.64	7.83	.....	4	1.96	.98	.13	.10
Providence-Esmond.....	2.96	4.17	.....	2	2.08	.96	.09	.10
Providence-Oaklawn.....	3.23	4.08	.....	2	2.04	.98	.09	.05
Woonsocket-Manville.....	3.25	2.73	.....	2	1.36	1.47	.09	.05
Providence-Prospect Hill.....	2.76	3.96	.....	2	1.98	1.00	.09	.10

Interurban and Suburban Lines, With Low Earnings

Pawtucket-Cumberland Hill.....	2.52	5.86	.....	7	.84	2.39	.19	.10
Providence-Chepachet.....	2.96	12.26	.....	15	.82	2.5	.35	.30
Providence-Danielson (State line).....	2.62	24.57	.....	30	.80	2.5	.65	.55
Sea View Railroad.....	.....	19.14	.....	24	.80	2.5	.48	.50
Barrington, Warren and Bristol (Crescent Park to Bristol).....	.....	10.57	.....	10	1.00	2.	.20	.15

*Special book tickets, ten trips for 50 cents, have been issued to residents of East Providence, entitling passenger to ride between East Providence-Barrington town line and Post Office, Providence, without Providence transfer privilege, for 5 cents.

The existing 5-cent fare limits were adopted as the new 7-cent limits about Providence, thus making a uniform increase of fare of 2 cents to all persons living in the area included between the old and the new 5-cent fare limits, riding to and from Providence, but entitling such passengers therefore to a transfer within the Providence transfer limits.

could not be moved more than $\frac{1}{2}$ in., and a slice bar thrust in along the grates would lift nearly half the fire up from the grate. Steam jets in the ash pits were of little assistance in preventing this "India rubber" like clinker, and after a short time the plant was shut down for two hours. Section breakers and feeder switches were relocated to relieve the load on the plant, and the arrival of more coal made it possible to resume operation under these conditions. It also gave the operators a chance to take the boiler out of service and clean the heating surfaces, which were covered with soot and slag.

This boiler had been in service continuously for three weeks and as a result of the cleaning five barrows of stalactites were taken out, in spite of the fact that the boiler was dusted daily. If the boiler had not been taken out of line at the time, a deposit would have formed which practically would have closed the gas passage.

An investigation of the records of fuel analysis shows samples containing 24 per cent of volatile hydro-carbons, 45 per cent fixed carbon, 29.8 per cent ash and 3 per cent sulphur, with a calorific value of 10,300 B.t.u. per pound. One particular cargo "passed through the furnace" with the ash running close to 37 per cent by weight. The average for all coal received in 1917 was but little better than the case cited, for, although it may have had a greater heat content, the nature of the ash was such as to make it impossible to burn the coal with any degree of economy.

POOR COAL INCREASED MAINTENANCE

In addition to serious interruptions, which caused the public to criticise the company in spite of the fact that it was doing all that was humanly possible, great trouble has been experienced from stoker failures. These occur at some plants at the rate of two a day, and on this account it is impossible to repair them in a first-class manner. It is a case of patching up to keep going. This is not to be wondered at when one stops to think of the foreign substances found in the coal, such as trap rock, short bolts, coupler pins, slate, slag, brickbats and even pig iron. The smaller pieces pass through the crushers and into the furnaces, in spite of the vigilant eye of the weigh-hopper man, and then there is a cracked bearing cap, broken bracket or sprung crankshaft. Stoker repairs are tripled, and the stock of repair parts so seriously depleted that it has been necessary to make up temporary repair parts in the company's shops, to send a representative to the factory to look up delayed orders, and bring the parts to New Haven or Hartford by motor truck.

The poor quality of coal has added to the difficulties of the labor situation. It has been particularly difficult to retain the ashmen and firemen. For every carload of ashes taken out of the ash hoppers during 1915, three carloads are taken out at present. This means that the ash hoppers must at times be emptied upon the floor to make room to dump the stokers. It is often necessary to call in a local contractor to assist in this work in order to keep men on the job. On account of this condition a good laborer will not consider the proposition, and the result is that only mediocre men can be obtained.

An inspection of the operating records shows that the total unit cost of production for 1917 was 1.48

cents, or double the cost for 1915. Of this, 82.5 per cent is due to fuel cost. Comparing the total amounts for the fiscal years 1915, 1916 and 1917, the total cost of production for 1915 was \$630,000; for 1916, \$745,000 (an increase of 18 per cent for 8 per cent increase in production), and in 1917, \$1,187,500, an increase in production of 11 per cent and a cost increase of 90 per cent. In 1915 the total amount paid for fuel for the six plants was \$425,000, or 67 per cent of the total production cost. In 1916 it was \$520,000 or 70 per cent, and in 1917 it was \$976,900, or 83 per cent, which is more than twice that paid under normal conditions. Labor shows an increase of \$33,000 and maintenance an increase of \$70,000. It is not unreasonable to state that fully 90 per cent in the company's increased cost of power is due solely to the fact that the road is paying for, but not getting, coal.

COMPANY PLANS ADDITIONAL EQUIPMENT

Several plans are afoot to relieve conditions in the near future. The most important is the installation of additional ash-handling facilities and coal-handling equipment and storage space. In the last case it is proposed to discharge sufficient coal at each plant between the dates of April 1 and Nov. 1, 1918, to take care of the needs during this period and have stored at the latter date sufficient coal to carry the plants through until the spring of 1919. To do this it will be necessary to receive in 214 days 150,000 gross tons of coal, which is equivalent to unloading 692 tons per day. To attain this result the Connecticut Company will have to expend between \$200,000 and \$300,000. For the New Haven power plant it will have to furnish additional storage space. In the Hartford plant the same thing pertains, and in the Bridgeport plant another dock will have to be built, with facilities for reclaiming the coal and getting it into the bunkers. To put in this coal and get it into storage about \$500,000 will have to be expended. A quotation received in this connection for an eight-wheel locomotive crane with 50-ft. boom and a $1\frac{1}{2}$ -cu.yd. bucket was \$18,458, compared with \$7,650 in 1915. This plan will relieve much anxiety as to coal shortage next year and will relieve traffic congestion.

The Connecticut Company has exerted every effort to reduce fuel consumption to a minimum. Strict attention has been paid to turning off all unnecessary lights and electric heaters; the skip-stop system of operation has been inaugurated; a vigorous campaign in power saving has been instituted with good results, and in all heating systems drips are trapped to avoid waste, all unnecessary coils are shut off, etc. In closing, the author quoted the ten suggestions for fuel economy published on page 1121 of the ELECTRIC RAILWAY JOURNAL for Dec. 22, 1917.

London Trams on Raid Nights

It was stated at a meeting of the London County Council that the running of tramcars on raid nights was subject to the general officer commanding the London district. When guns were heard the cars stopped, and restarted when firing ceased. So far as extraordinary circumstances were concerned, arrangements were made to enable passengers to complete their journeys without additional payment by rejoining cars with tickets issued before the stopping.

Boston's Future Considered

Service-at-Cost Plan and Public Control as Available Methods of Relief for Boston Elevated Railway Discussed at Legislative Hearing by Chairman Macleod of Commission and President Brush of Company

THE respective merits of the public control and service-at-cost plans for relief of the Boston Elevated Railway were discussed at recent hearings before the joint legislative committee on street railways and metropolitan affairs by Hon. F. J. Macleod, chairman of the Massachusetts Public Service Commission, and Matthew C. Brush, president of the company. Hon. Joseph B. Eastman of the commission also spoke at length upon the board's plan, and explained its details. A summary of the remarks of the two first mentioned follow:

MR. MACLEOD DESCRIBES PUBLIC CONTROL PLAN

Mr. Macleod explained to the committee the difficulties of the company in rendering service under the severe winter conditions, and also because of labor shortage, high prices and long deliveries, combined with the need of additional net revenue. Passenger revenues in November, December and January fell off materially as compared with a year ago. Mr. Macleod then described the commission's plan of relief, involving public control of the property by a board of public trustees and a guaranteed dividend to the stockholders. Under the proposed plan the trustees would direct the general policies of the road, leaving the direct management in the hands of the operating officials as at present. The commission feels that the public would be more disposed to accept rate increases if established through public trustees with the excess above 5 cents applied to service betterment than by private directors. Mr. Macleod said that he could see no reason why under proper public control the car riders and the public at large would not meet a justified fare increase in the same spirit that the postage increase from 2 to 3 cents was met a few months ago. The chairman outlined the advantages of being able to raise money through public credit, as in Cleveland.

Some part of the cost of rehabilitation, the speaker thought, should be placed upon the community at large, in view of the peculiar position of the company with reference to existing rapid transit lines. At present it would cost the company about \$7,000,000 a year to meet its rentals, taxes and fixed charges and to pay a 6 per cent dividend. This would mean that out of every nickel only about 3.25 cents would be available for operation. "The rapid transit lines are breaking the back of the system," said the speaker, "and they will break the back of any system that tries to carry them, out of the receipts from the car riders. It never has been done and never can be done. In this case the problem will never be properly solved till the taxpayers assume their proper share of the burden. We hear a great deal about the car rider paying his way, and paying for what he gets. I agree to that, but you should go a step farther and say that the taxpayer should also pay for what he gets. Men who do not ride in the cars at all get more benefit in many cases from the operation of these rapid

transit lines than the car riders themselves. These lines in effect represent a duplication of existing street facilities." Mr. Macleod held that the possible contribution from the taxpayers should not exceed one-half the present cost of subway rentals.

Under public control, the speaker said, men of the type of the present management might properly continue in charge of the road. The commission has confidence in the ability of the present management, and considering the tools and facilities it has to work with, it has done about as well as could be expected under the conditions. In the last analysis a return on the investment of the stockholder is as necessary to keep the property running as the payment of wages to the conductors and motormen.

The commission itself, the chairman said, is too busy to take over the general direction of the company's policies. Its plan provides that if the trustees are unsatisfactory a new set can be appointed. Mr. Macleod said he approved of the general principle of the service-at-cost plan, and that there should be a direct relationship between what the passenger gets and what he pays for. This is provided under the commission's plan so far as the fare in excess of 5 cents is concerned, and the same principle might properly be applied to the basic 5-cent fare, at least to the extent of fixing a limit beyond which increases in the current costs of operation would be paid for by the car riders. Gov. McCall's plan, the chairman said, of authorizing the commission to grant temporary rate increases during the war would not be likely to give the company the credit necessary to obtain new money. Mr. Macleod said that he did not think the subway development in Boston had been in excess of public needs, but that subways are luxuries and that any community which desires them must be prepared to pay for them. The Boston Elevated company yielded to popular pressure in taking over such heavy subway burdens, but the action has proved very ill-advised from the standpoint of the company's interests.

The speaker commended the general principles of service at cost, but said that he did not believe that it would result in a spirit of co-operation between the public and the Boston company to anything like the extent of the plan proposed by the commission. The chairman thought the falling off in traffic would be less relatively in Boston in the event of a fare increase than on other roads, on account of the large amount of long-haul business handled.

MR. BRUSH EXPLAINS ELEVATED POSITION

Mr. Brush reviewed at length the recommendations of the Beeler report to the Public Service Commission for possible economies on the Boston property. He agreed with Mr. Beeler that it is impossible to build subways for street cars and make them pay. Train operation eventually must come in the Boylston Street subway.

The company has petitioned for a third track in Commonwealth Avenue to increase the capacity of the Boylston Street tube and is considering four-car train operation with multiple-unit equipment. Express service would be rendered over this third track inward mornings and outward afternoons. Mr. Brush said that he would never dead-end a rapid transit line if loop construction were possible.

Mr. Brush disagreed with some of Mr. Beeler's suggestions, such as that to abandon the Park Street subway station in Boston and establish a single downtown terminal at Washington and Summer Streets. Others required considerable capital expenditure. He considered Mr. Beeler's report as thorough and intelligent and that it demonstrates that the necessary increase in net revenue can be obtained only through an increase in the present rate of fare.

The consolidation of divisions and carhouses, as recommended in the report, is economically desirable and has already begun. A substantial saving can be made by a keener, more co-operative spirit on the part of motormen in car operation. The company is doing everything possible by mechanical devices and others to encourage and compel a lower power consumption and a reduction in track and equipment maintenance by increased coasting. To equip all surface cars with coasting clocks would require about \$150,000. The savings secured by these on the rapid transit lines are good, though not as large as were estimated. There is a further saving possible on the surface lines by this means, but success depends on the sincere co-operation of the motormen.

Mr. Brush created a mild sensation by displaying to the committee a small truck-load of exhibits composed of investigations and reports made on the Boston Elevated property during the past few years. He reviewed the finances and investigation history of the road along lines previously printed in this journal. Some new figures as to the rental per subway mile which the company is required to pay annually were then presented. Mr. Brush then described the subway policies in New York and Philadelphia relative to the sharing of cost by the city. He maintained that subway rentals should not be borne by the car riders.

Mr. Brush vigorously resented intimations that the management had been lacking in initiative and cited numerous examples of advanced practice in the road's development. Among these is the installation of a 35,000-kw. turbo-generator set two years after units of 15,000-kw. rating had been installed to gain 20 per cent in efficiency, the use of motor-driven fare boxes (his company was the first in the world to provide these), establishment of prepayment areas, provision of signals on all rapid transit and the latest subway lines, remodeling of the power system from "straight d.c." to an a.c. and d.c. combined system, improvement in rolling stock designs, such as the building of articulated cars, provision of center-entrance motor and trailer cars, etc.

The investment carried by the company is now \$116,000,000 and in the immediate future will be \$130,000,000. The earnings in 1897 were \$8,000,000 and now are \$19,000,000. Since 1897 the earnings have increased 137 per cent, the investment 364 per cent and the population 49 per cent. In Cleveland

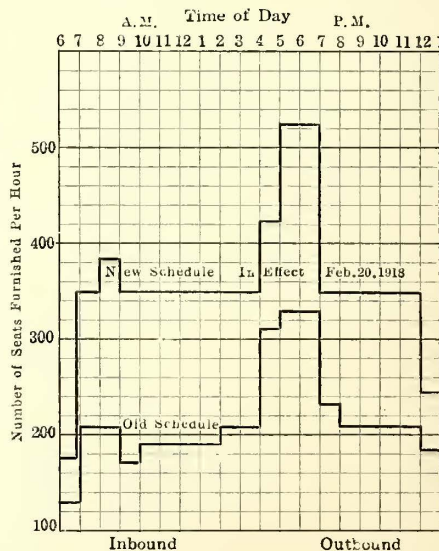
the average ride per passenger is 2.19 miles, compared with an estimated 4.4 miles at Boston.

Mr. Brush said that the so-called service-at-cost scheme as applied in Cleveland, Dallas and elsewhere, if properly developed and drawn would probably work for the Boston company. This plan creates a reciprocal relationship between the car riders and the public, a sliding scale of rates adjustable to yield a fair return, and only that, to the investor. By a fair return is meant one which will invite capital.

"Under no circumstances would an investor accept the public control bill as drawn by the Public Service Commission and now before the legislative committee," said Mr. Brush, in part. "You could not justify a banker or investor investing his money in an enterprise and then turning it over to five trustees at whose pleasure the property might be returned." It is estimated that a 6-cent fare in Boston would produce about \$3,500,000 additional revenue per year. To make higher fares successful, the public must be convinced that no matter what the service is, the people are getting what they are paying for under the circumstances. No group of four or five trustees can actually manage a property except through a competent chief executive. The speaker believes that the service-at-cost scheme will eventually restore public confidence in the property.

More Service with Fewer Cars

ON FEB. 20, 1918, the Puget Sound Traction, Light & Power Co. substituted a one-man car service on its Summit Line for a two-man car service. The two-man cars formerly used were equipped with longitudinal seats, and each car had a capacity of twenty-six passengers. The new one-man car has a capacity, with



NEW SCHEDULE WITH ONE-MAN CARS REQUIRES LESS ROLLING-STOCK

cross seats, for thirty-five passengers. A somewhat higher schedule speed was put into effect so that ten of the one-man cars now are used during the rush period instead of eleven of the old style two-man cars, yet the seats per hour are forty-six per cent greater than under the old schedule. The accompanying diagram shows the new and old schedules.

LETTERS TO THE EDITOR

Heating Does Not Account for All the Winter Increase

ALBANY, N. Y., March 20, 1918.

To the Editor:

Suggested methods of reducing coal consumption on electric railways during the winter which has just passed have included programs for less heat on the cars, particularly during the peak hours. Considerable saving can undoubtedly be made in this way, but I wish to point out that exaggerated ideas of the amount of conservation thus to be effected are obtained when the consumption per car-mile or per ton-mile of energy in the summer and winter months is compared and the assumption is then made that the electric heaters are responsible for the difference. This assumption makes no allowance for the facts that it takes more energy to propel a car over a snow-covered track than over a clean one; that the wind resistance of a car closed is greater than when the sashes are down; that the number of stops and slow-downs, and therefore the energy consumption, is greatly increased when snow-cleared track is blocked by other vehicles; that frozen lubricant increases journal friction and that the car-lighting periods are much longer. That such allowances should be made is borne out by the records of companies which use devices for checking the motorman's use of energy for propulsion. These records usually show a rise in energy consumption following severe weather. Any company operating with coal stoves knows perfectly well that its energy per car-mile or ton-mile tends to rise as the temperature drops.

Another point which should be remembered in any analysis of the energy taken by electric heaters is that with a little care and oversight no heat need be wasted. Generally speaking, the average energy use of electric heaters during the winter months should be within

one-half of their rated capacity, even in long continued periods of cold. Where this is not the case, the responsible officials are not doing their duty in enforcing the "1-2-3" car heating order scheme. The difficulty of doing this has led to the more extended use of the thermostat as an energy saver, for it is not only automatic, but is also most sensitive to changes in car temperature.

From the foregoing it is fair to conclude that due allowance for other energy-using factors and the wiser use of the equipment will make the electric car heater much less of a fuel-eating bugaboo than it now appears to be.

W. S. HAMMOND.

Transportation Engineers Needed

BOSTON, MASS., March 19, 1918.

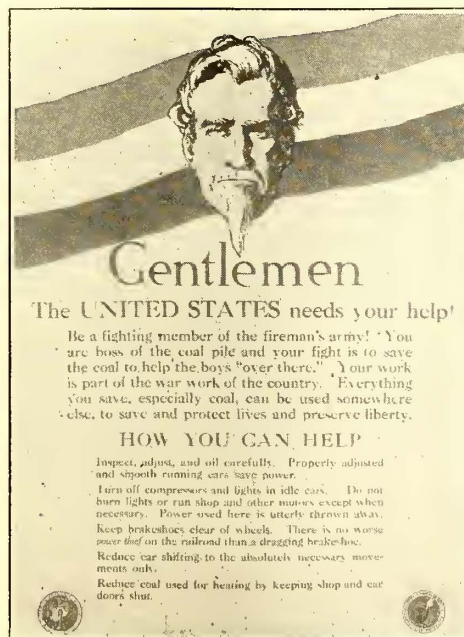
To the Editor:

A great deal has been written about the increasing outgo and decreasing income of electric railways, particularly of the city railway with its 5-cent fare, diluted by transfers. I do not propose to discuss the political and economic reasons for this condition, but to consider what can be done by the operator along engineering and transportation lines to improve conditions.

It is almost inconceivable that until recently the number of transportation departments which carried on any traffic analysis could be counted on the fingers of one hand. In fact, one transportation superintendent who lost his job could not understand the reason given by the engineer-manager, namely: That he would not have in his employ a transportation man who would not learn how to read a traffic curve. Nevertheless, important as it is for the transportation man to know how to analyze traffic, he will fulfill only half of his functions unless he makes an endeavor to fit his equipment to the service needs which his traffic analyses disclose. The following are some considerations in traffic selection often overlooked:

Schedule speed is determined not so much by maximum speed as by such factors as height of floor and

UNCLE SAM wants the help of the men who run the cars and feed the boilers to save fuel. To aid in this campaign the Fuel Administration has sent to electric railway companies 20,000 of the poster shown at the left and 10,000 of the "extra shovelful" poster, shown at the right. The design and distribution of these posters were carried out with the cooperation of the War Board of the American Electric Railway Association.



Gentlemen
The UNITED STATES needs your help!

Be a fighting member of the fireman's army! You are boss of the coal pile and your fight is to save the coal to help the boys "over there." Your work is part of the war work of the country. Everything you save, especially coal, can be used somewhere else, to save and protect lives and preserve liberty.

HOW YOU CAN HELP

- Inspect, adjust, and oil carefully. Properly adjusted and smooth running cars save power.
- Turn off compressors and lights in idle cars. Do not burn lights or run shops and other motors except when necessary. Power used here is utterly thrown away.
- Keep brakeshoes clear of wheels. There is no worse power thief on the railroad than a dragging brake-shoe.
- Reduce car shifting to the absolutely necessary movements only.
- Reduce coal used for heating by keeping shop and car doors shut.

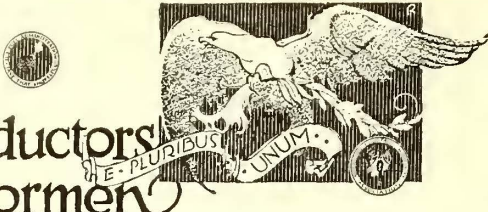


UNCLE SAM NEEDS THAT EXTRA SHOVELFUL

Help Uncle Sam to Win the War
by following these Directions:

1. Fire small amounts of coal often.
2. Keep fuel bed even by putting coal on thin spots. Avoid raking and shoveling.
3. Keep fuel bed about six inches thick.
4. Look out for air leaks in helter-skelter.
5. Increase or decrease steam pressure by opening or closing draft flapper in grate.
6. Clean fire when the demand for steam is small, and while cleaning close the draft flapper partly closed.

UNITED STATES FUEL ADMINISTRATION



**Conductors
Motormen**

the UNITED STATES needs YOUR help.

Be a fighting member of the firemen's army! You are boss of the coal pile and your fight is to save the coal to help the boys "over there."

HOW YOU CAN HELP

1. Get up to speed as fast and smoothly as safety and comfort of passengers will permit.
2. Coasting saves coal. Shut off controller and coast as far as possible before applying brakes.
3. It is seldom necessary to use current on down grades.
4. Bring car to a stop as quickly and smoothly as comfort of passengers will allow. With air brakes best results are usually had by making but one sufficiently strong application of air and then easing off.
5. Use judgment, when a vehicle is just ahead, and let car roll instead of feeding up controller.
6. Avoid skidding wheels. Avoid lanning air. Heavier air applications can be used at high speeds than at low speeds.
7. Save coal by economizing on light and heat.
8. The conductor's co-operation with the motorman in handling bell cord and passengers will mean getting the cars over the road with the least consumption of current.

THIS IS A REPRODUCTION OF THE POSTER WHICH THE FUEL ADMINISTRATION IS DISTRIBUTING FOR POSTING IN CAR CABS

steps, the width of platforms and aisles, the character of operation for doors and steps, employment of fare-collection devices that give quick, accurate collection, and so on. In short, schedule speed is determined not only by the propelling equipment, but by the equipment that hinders or hastens interchange of passengers at stops.

Second, a car should be of the type that will get the maximum travel during twenty-four hours. In the past we have scanned too closely the item of platform expenses. Cars have often been so large that operators have not run them on sufficiently short headway to get all the business. Whether the jitney stays or not, many people will walk a mile rather than stand ten to fifteen minutes waiting for a car.

Third, the equipment should be adequate to meet future needs. Only lack of credit justifies the purchase of equipment which makes no allowance for expansion. It is true that 40-hp. motors are cheaper than 50-hp. motors, but if the territory is growing, larger motors will be needed within four or five years because of the increased stops, so that the first cost of the large motor will often be justified purely on the grounds of higher rate of acceleration with lower maintenance cost.

E. W. HOLST.

"Pull-Together" Order Distributed to Pennsylvania Railroad Employees

Every one of the 250,000 employees of the Pennsylvania Railroad System, both east and west of Pittsburgh, will receive an individual copy of Order No. 8, issued by William G. McAdoo, Director General of Railroads, calling upon the working forces of all lines to "pull together" in the National service and work unitedly to win the war. For this purpose the order has been reprinted, in small leaflet form, for distribution.

AMERICAN ASSOCIATION NEWS

Rhode Island Company to Organize Section No. 12

EMPLOYEES of the Rhode Island Company, Providence, R. I., plan to organize a company section in that city on April 9. Representatives of the American Association will attend in order to advise the employees as to the method of procedure which has been found satisfactory elsewhere.

More Medals and Cash Prizes Awarded at Manila

AT THE thirty-sixth monthly meeting of joint company section No. 5, held at Manila on Jan. 15, medals were awarded for merit in papers presented before the section as follows: Gold medal to Francisco Santiago, chief meter inspector, for his paper on "Economic Influence of Electric Light and Power on the Industrial Philippines"; silver medal to Nicolas Tranfaglia, assistant superintendent track department, for his paper on "Co-operation", and bronze medal to F. P. Santiago, assistant claim agent, for his paper on "Accident Prevention." Cash prizes were also awarded as outlined in the following letter to each recipient, dated Jan. 15, 1918:

CONDUCTORS' AND MOTORMEN'S CASH PRIZE AWARD FOR PERFORMANCE OF DUTIES ACCORDING TO COMPANY'S STANDARDS OF SERVICE, YEAR ENDED DEC. 31, 1917.

In accordance with bulletin to employees dated July 20, 1917, providing that all conductors and motormen earning the distinction of "Excellent Service Employee" at the close of each calendar year, Dec. 31, be given cash prizes (Class A 30 pesos or \$15, Class B 20 pesos, Class C 10 pesos), as awards, based on the performance of their duties according to the company's standards of service, it affords the company great pleasure and satisfaction that you have been awarded a cash prize and to present you with a check in accordance with said award.

The award was made by a committee of nine, consisting of the superintendent of transportation, the assistant superintendent of transportation, a division superintendent, two inspectors, two conductors and two motormen, after a thorough investigation of their records for the year 1917 and a careful consideration of all of the circumstances in connection therewith.

On behalf of the company officially, as well as myself personally, I desire to congratulate you upon the award of the cash prize given you and to assure you that the company is proud of having in its service as faithful and loyal an employee as you have proved yourself to be and who has so well performed his duties according to the company's standards of service.

C. N. DUFFY,

Vice-president and General Manager.

Still other cash awards were made to conductors and motormen as a result of a "conductors' and motormen's group accident prevention contest." In this the employees were divided into three groups, denominated respectively "red," "white" and "blue."

At the meeting Retiring President Santiago reviewed the work of the year, J. M. Bury read his inaugural address as president-elect, and other incoming officers spoke briefly. C. N. Duffy, general manager of the company, explained the purpose of the several awards and urged the members to make the most of the various competitions open to them.

Line Truck Used for Removing Snow

MANY and ingenious have been the devices for removing snow from railway tracks and streets, and to some extent those adopted by any railway will depend upon local conditions. Snowplows and sweepers are, of course, essential for clearing the tracks of the heavier falls of snow. For lighter snow, however, and more especially for cleaning the points not directly on the railway track, the United Railways of St. Louis has



LINE TRUCK AT ST. LOUIS CLEARING SNOW FROM STREET

devised a type of equipment which seems to be both novel and efficient.

Some time ago a Garford truck chassis was purchased by this company and equipped in its own shops with a body comprising a pole-raising device and an adjustable tower for repairing trolley and feed wires. Recently the truck has been used as a snowplow.

A snowboard is attached by means of a rod on each side fastened to loose hubs on the rear wheels. The improvised plow rests on the ground and, to prevent side movement, is fastened to the front of the truck by



SAME TRUCK CLEARING SNOW FROM CAR TRACKS

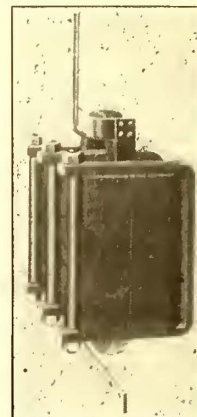
means of chains. The object in fastening the rods to the rear instead of the front hubs is to allow for inequalities in the surface of the pavement. To provide sufficient weight to hold the snowboard on the ground a heavy T-rail is laid across the top.

No figures as to the cost of construction or operation of the snowboard are available at this time, but the cost was amply low to justify the outlay. The truck shown here may be used for general utility work, pole setting, wire repairing, or snow cleaning, the equipment thus being kept in constant use.

Track Impedance Bonds for Signal Circuits

THE impedance bond manufactured by the Union Switch & Signal Company, which is made up by assembling silicon steel laminations about a spirally wound coil of strap copper, has been improved by bringing the terminal connections for the rails out at the side in such a way that the cables will come between ties and be protected against dragging equipment.

The spiral winding of flat or strap copper allows for satisfactory insulation between turns, and at the same time provides a sufficient surface for dissipation of heat. The two windings are so arranged as to neutralize any mechanical stresses due to surges of propulsion current. Rail cables can be connected without removing the bond cover. A sloping cover also provides for protection against dragging equipment.

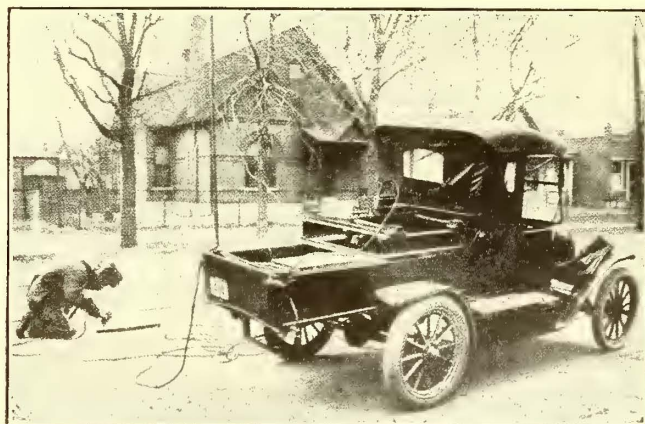


IMPROVED TRACK IMPEDANCE BOND

Increasing the Usefulness of Bonding Equipment

ONE of the most handy arrangements of the Lincoln bonding outfit which has recently come to notice is that in use by the Denver (Col.) Tramway. As shown in the accompanying illustration, this machine mounted on a Ford automobile makes a very satisfactory emergency outfit for the repairing of all open rails and similar welding work, when car service cannot be delayed.

The New Brunswick (Canada) Power Company fur-



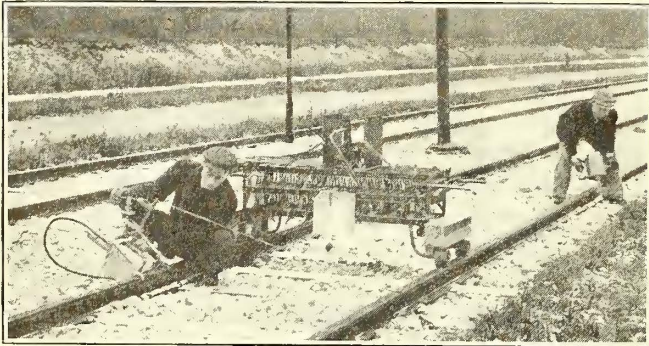
THE FORD MAKES BONDING EASY

nishes another example of increasing the usefulness of bonding outfits. Instead of putting its Lincoln bonder away for the winter this company uses it daily in the shops at welding armatures, bearings, etc., thus making the machine earn dividends twelve months a year.

A 140-Lb. Welding Outfit for Rail Bonds and Arc Welding

ALTHOUGH the 140-lb. combination portable welder rheostat of the Electric Railway Improvement Company, Cleveland, Ohio, has already been successfully installed on a number of railways, for rail bonding and arc welding, particulars of its operating principles and construction have not been made available until now.

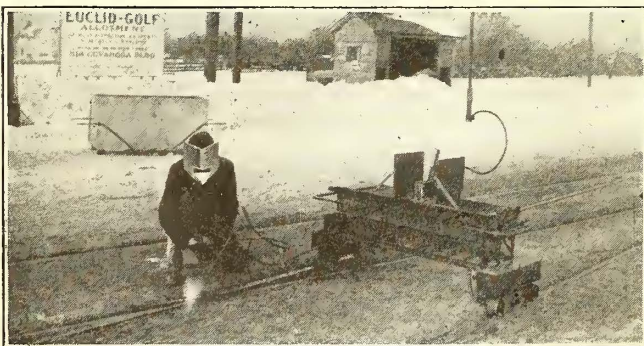
The standard outfit will operate on any voltage between 250 and 750. The welder weighs 65 lb., and consists of an inclosed furnace box with a graphite plate



PORTABLE WELDER IN USE FOR RAIL BONDS

on the front side. The carbon electrode enters this box through an opening in the rear, and the heating is produced by drawing an arc between the carbon electrode and graphite plate. The furnace box is further surrounded with a magnetic coil which is in series with the line and which focuses and directs the arc. For bond welding the apparatus will draw from 75 to 100 amp. from the line and consumes from 1½ to 2 kw.-hr. per No. 0000 bond. The actual time of welding is about one minute per terminal on a No. 0000 bond.

For rail bonding the power is taken directly from the trolley wire, with the rheostat and welder in series.



PORTABLE WELDER IN USE AS AN ARC WELDER ON SPECIAL WORK

The rheostat is used to regulate the heating by producing the proper voltage for the welder. For arc welding the power is taken from the trolley wire through the rheostat to the metal pencil.

The rheostat is provided with thirteen parallel paths, all tied together at the busbar. Four of these paths are permanently connected to the main switch. Each of the remaining nine paths connects with the main switch through a "cut-in" switch. Each path gives approximately 15 amp. at 600 volts, thus 60 amp. is the

lowest current obtainable at that voltage. By throwing in "cut-in" switches, the current can be brought up to full load of 195 amp. in steps of 15 amp. each.

The rheostat is also provided with three "cut-in" switches connected to the busbar. The purpose of these switches is to cut out part of the rheostat to compensate for a decreased line voltage.

Progress on the Toledo Power Plant

THE new Acme power plant of the Toledo (Ohio) Railways & Light Company has been completed to a point where it is ready to furnish current for both light and power to the system which has heretofore been depending upon the Water Street plant alone. One turbo-generator of 20,000-kw. capacity has been installed and the plans call for two more generators, the combined capacity of the three, together with that of the old power house, being 200,000 kw. This is sufficient for a city many times larger than Toledo, but provision has been made not only for the growth of the city, but for the development of the use of electric power and the increase in the operation of the local and interurban lines.

The plant is located in what is known as East Toledo, on a plot of forty-two acres. Of this about a third is high ground, while the remainder lies below the level of the Maumee River. This is to be filled and developed as needed.

Three buildings of reinforced concrete, steel and brick construction have been practically completed. Eight boilers are ready for operation and a complete automatic stoker system has been installed. Coal is carried to the bunkers by a belt conveyor from pits outside at a speed of 150 tons an hour, if necessary. A submerged storage system, which is to have an ultimate capacity of 200,000 tons, is being constructed. It will consist of four pockets of 50,000 tons each, and one will be completed at once. The bottom of the pockets is 20 ft. below the lake level and the top is 10 ft. above. They are of concrete construction.

A reinforced concrete trestle on wood piling carries the necessary railway tracks. It is so arranged that twenty cars of coal can be dumped at one time, directly into the storage pits. Coal is stocked and reclaimed by a 160-ft. crane, which has a capacity for stocking from the tracks to the center of the pits at about 250 tons per hour, and for reclaiming at 150 tons per hour.

Three large tunnels connect the plant with the river. They are 9 ft. high, 9 ft. wide and 500 ft. long, and each has a capacity of 400,000 gallons per minute. Two will be used for intake purposes and the third for discharge. The tunnels are 22 ft. below the lake level.

G. W. Saathoff, engineer with the Henry L. Doherty Company, superintended the construction of the new plant. Others who have been identified with it are Fred J. Derge, William Long, M. R. Bump, E. J. Billings, J. R. Ruggles, J. M. Strike and engineers with the Bentley & Sons Co.

The recent winter has been unusually severe in its effect of causing flat spots on car wheels. In December the mechanical department of the Detroit (Mich.) United Railway reground 379 pairs of wheels and placed 397 new pairs on axles, making a total handled of 1552 during the month.

News of the Electric Railways

TRAFFIC AND TRANSPORTATION

FINANCIAL AND CORPORATE • PERSONAL MENTION • CONSTRUCTION NEWS

How to Join Army Engineers Men Trained in Engineering Can Engage in Their Specialty by Joining Replacement Regiment

The Kaiser has placed the keenest engineering talent of his own and allied empires into the Imperial armies of the Central Powers to defeat the world. During these last three years the best engineering skill of France, Great Britain, Russia and Italy and their allies has been matched against the enemy. Up to this time voluntary enlistments of the high-class technical men in the United States Army are below requirements. This deficiency is probably due in part to the lack of proper information concerning the engineering branch of the service.

FIRST REPLACEMENT ENGINEERS

An important factor in keeping up the engineering strength of our army in the future will be the First Replacement Regiment of Engineers, which was organized at Washington Barracks, D. C., on Dec. 14, 1917, with the express idea of accomplishing this end. This regiment has not only the responsibility of finding men to fill up depleted ranks, but it must also fit them to step into the work of trained, efficient and disciplined soldiers.

The preliminary work of the recruit is first a thorough training in military drill. Drills gradually give way to engineer work and specific technical training. The engineer soldiers must know how to tie all the important kinds of knots and lashings, to build spar and truss bridges, to construct revetments, dig trenches, place wire entanglements, construct machine-gun emplacements, build pontoon bridges and to construct roads. They must also know the methods of demolition, sapping and mining. Specialized training in lithography, zincography, surveying and other branches are also given to those qualified for further training.

WIDE RANGE OF WORK

Engineers are called upon to perform such a wide range of work that practically every man with any technical training or mechanical ability can find a place in this organization. Every male citizen in the United States who is physically fit, and between the ages of eighteen and twenty-one, and thirty-one and forty, is eligible to join the regiment by voluntary enlistment.

To be assured of assignment to this regiment, the applicant for enlistment should write to the Commanding Officer, First Replacement Regiment Engineers, Room 107, Headquarters Building, Post of Washington Barracks, D. C., for application blank. If the

blank shows the man to be eligible, an enlistment card is filled out and sent to the recruiting officer nearest to the applicant's place of residence, with instructions to enlist the man for service in this regiment. Transportation and means will be furnished by the recruiting officer, and the man will be instructed to report at the post for duty.

Avoid Unnecessary Work

California Commission Thinks Utilities Should Not Be Bound by Franchise Requirements

The Railroad Commission of California, upon its own initiative, has been conducting an investigation into the transportation system of that State during the emergency created by the war. It recently announced several recommendations which it directed to be called to the attention of interested parties.

Most of the suggestions have to do with the problems of steam operation, but one directly concerns electric railways and other utilities in California. It deals with franchise requirements, and the opinion of the commission is summed up thus:

"State, county and city governmental authorities should not require utilities, during the present emergency, to live up to franchise requirements which call for improvements, street work, etc., that is not absolutely necessary for operation. Moreover, all public improvements not necessary in the prosecution of the war should be deferred so that the labor and materials may be available for railroads or other necessary war work."

Commenting upon this point the commission said:

"Steam, electric interurban, and street railways, as well as other public utilities, should not be required at this time to live up to such of their franchise stipulations as necessitate otherwise uncalled for new construction, such as street paving in cities, replacement of existing T-rail with more expensive girder rail, and similar items. The latter suggestion will, of course, have its effect also on maintenance and capital expenditures and consequently on the net earnings of the carriers.

"We recommend that the commission address the appropriate state, county and city governmental authorities, inviting their co-operation with the program. We also suggest that the commission offer its informal assistance in cases where, by reason of franchise requirements, a city insists upon construction work which is not essential and which would appear to interfere with the more important railroad work."

New Franchise Suggested

Company at Norfolk Submits Proposal for Thirty-Year Grant With New Tax and Paving Provisions

The Virginia Railway & Power Company has submitted to the business men's traction committee at Norfolk, Va., a proposition embracing a general scheme of rerouting, skip stops, new franchises and taxation, the development of which to final completion would require several years, and with the shortest possible relief, outside of the skip-stop feature, not to be effective for less than four months.

Two new franchises are suggested, each to run for a period of thirty years. One of them embraces the Norfolk Railway & Light Company's railway system and electric lighting system, and the other, in the name of the Virginia Railway & Power Company, takes care of the various other electric railways not embraced in the Norfolk Railway & Light Company's system.

TAX IN LIEU OF OTHER PAYMENTS

Under present regulations the company pays a tax of 6 per cent on its gross receipts in the city and also must pay for the paving of all streets between the tracks and for 2 ft. on each side of the tracks. In lieu of this the company proposes a tax of 4 per cent on its gross receipts not only in the city but from all service outside the city east of the southern branch of the river, taking in the Ocean View and Terminal lines.

T. S. Wheelwright, president of the company, presented the proposition for his company, and after reading a prepared statement, submitted five separate plans for improving electric railway service in Norfolk. After discussing the paving and tax questions to which reference has just been made, Mr. Wheelwright said:

"As to the matter of railway fares, the 5-cent fare is now considered the minimum compensation for this service, especially in view of the fact that more than 100 electric railway systems throughout the country have been granted fare increases above the 5-cent fare and many other applications are now pending for an increase over this amount.

"As to the 2½-cent school tickets, while the service rendered to school children costs quite as much as for any other passenger, the policy of the company has always been in the direction of being liberal on this point. The original provision for 2½-cent tickets for school children was limited to public schools or such schools as do not make a charge for tuition, and the understanding is that school tickets shall

Valuation Commission for Pittsburgh

Railway, City, Surrounding Boroughs and Public Service Commission
All Represented on New Valuation Body

A commission of five engineers, one representing the city of Pittsburgh, one representing the boroughs surrounding that city, two representing the Pittsburgh Railways and the fifth, the chairman, representing the Public Service Commission of Pennsylvania, has been selected to direct a valuation of the property of the Pittsburgh Railways. This is in accordance with the decision of the Public Service Commission in connection with the case against the railway growing out of the new fares put into effect by the company on Jan. 22. The members of the commission are as follows:

F. Herbert Snow, chairman, chief engineer of the State Public Service Commission.

Robert M. Feustel, member of the firm of Sloan, Huddle, Feustel & Freeman, consulting engineers of Chicago and Boston, representing the city of Pittsburgh.

George Warren Fuller, New York, member of the firm of Fuller & McClintock, representing the boroughs.

Morris Knowles, Pittsburgh, chief engineer in charge of housing for the United States Shipping Board, under whose direction the filtration plant at

Aspinwall was built, representing the Pittsburgh Railways.

J. A. Emery, New York, appraisal manager of Ford, Bacon & Davis, representing the Pittsburgh Railways.

It is expected that the members of the commission will sit on Thursday and Friday of each week.

CAREERS OF THE ENGINEERS

The work done previously by Messrs. Snow, Feustel and Emery is more or less well known to the readers of the *ELECTRIC RAILWAY JOURNAL*. With Messrs. Fuller and Knowles, however, the case is somewhat different. For this reason there follows a summary of their activities:

Mr. Fuller is a graduate of the Massachusetts Institute of Technology, and for fifteen years has been engaged in valuation work, principally of water companies. He spent several years in Cincinnati and Louisville in charge of works for the purification of the Ohio River water supply to these cities. He has been adviser on the water supply of New York, New Haven, Paterson, N. J.; Washington, D. C.; Buffalo, Columbus, Indianapolis and New Orleans, and has been on the city side in valuation and other cases.

Mr. Knowles was chief engineer of the Pittsburgh city bureau of filtration, 1901-10, in which time the Aspinwall filtration plant was placed in successful operation. He has been engaged for years in private practice as a consulting engineer, and now is in charge for the Shipping Board of its plan for housing shipyard workers.

Chairman Ainey of the Public Service Commission said at one of the sessions at which the fare in Pittsburgh was under discussion:

"The only way to establish what is a reasonable rate of fare is to find what fare would yield a just return on the money invested, and the only way that can be done is by taking an impartial valuation of the properties of the company."

St. Louis Bill Up March 22

The board of Aldermen of St. Louis, Mo., decided on March 15 to postpone action on the United Railways "compromise" bill until March 22, when the bill, with the amendments ratified by the board of public service, will be made a special order of business before a committee of the whole, after the regular meeting.

The principal amendments to the aldermanic bill recommended by the board of public service, after two months' consideration, are the reduction of the tax on gross earnings from 3 per cent as originally proposed to one-half of 1 per cent, thus reducing the tax from approximately \$480,000 a year to approximately \$65,000; permitting the company to pay the accrued mill tax, amounting to approximately \$2,300,000,

in ten annual payments without interest, instead of in five annual payments; allowing the company twelve months instead of nine in which to accept the "compromise," unless the war ends before that period expires; and, if it does, the company to file its acceptance of the ordinance within six months of the end of the war; and permitting a change in the \$60,000,000 valuation to any valuation fixed by the State Public Service Commission.

Community Ordinance In

Sponsors of Toledo Grant Think Presentation of Measure Now to Be Ill-Advised

The community plan ordinance was introduced in the City Council of Toledo, Ohio, on March 12, by Councilman Irwin. It was referred to the street railway committee. This action seems to have been a surprise to the members of the commission which formulated the ordinance. The *Toledo News-Bee*, of which Commission Cochran is editor, said that the draft is incomplete. The *Toledo Blade*, edited by Commissioner Wright, contends that the ordinance was forced into Council. Member Thurston advances the idea that the introduction of the measure was the work of some one who is adverse to the ordinance. The *Toledo Times* asks the commissioners what they expected would be done with the ordinance if it was not to be put before the people for discussion.

It is said that the ordinance makes no provision for a valuation of the property, although a valuation must be made before negotiations could be completed for assumption of control by the proposed new community traction company. The question is asked as to who will make this valuation. It is supposed that Council will have to make provision for this and other things that must be done, in the event that the ordinance meets with approval. There must be a referendum vote after Council has acted on the draft.

\$100,000,000 Chicago Program Advanced

The local transportation committee of the City Council of Chicago, Ill., on March 20 concurred with the recommendation of the Traction & Subway Commission's physical plan for the immediate construction of three subways and four elevated line extensions. This would provide a complete revolution of local transportation, increasing the rapid transit facilities 150 per cent in the first six-year period. The new plan would serve 60 to 70 per cent of the population with rapid transit where now 20 per cent is served. The program involves the expenditure of more than \$100,000,000. The money is at hand. A sub-committee has been appointed to draft an ordinance and submit it to the local committee at an early date. This sub-committee will designate the length of the franchise.

(Concluded from page 581)

apply only to pupils under eighteen years of age attending institutions where no tuition is charged, and upon proper certification that they are entitled to such transportation.

"The rates for light and power recommended are the same as those filed with the State Corporation Commission and in effect in Richmond, Petersburg and other divisions of the system. They are worked out on the block system and are more favorable than the present prevailing rates for retail light and power in Norfolk.

"The matter of increase or decrease in the electric railway fares and increase or decrease in the light and power rates to be left open after a period of ten years for decision by the State Corporation Commission, as was recommended by the committee and approved in the previous franchise.

"Much of this work has been carefully studied and outlined in the franchises previously recommended by the joint committee and which will be of great value in facilitating an early and definite disposition of the whole matter.

"It is our understanding that whatever plan is now agreed upon will be supported by the citizens of Norfolk and recommended by them to the Council, and when the matter is brought up for consideration by our board of directors, it will have our recommendation and support; all legal questions, of course, to be subject to the approval of the general counsel of our company and the city attorney of Norfolk."

News Notes

Commission Membership Increased.—Governor Edge of New Jersey has signed the bill to increase the membership of the board of Public Utility Commission from three to five.

Merchants Oppose Municipal Ownership.—The directors of the Merchants Association of New York have entered a protest against the passage of bills now pending in the New York State Legislature authorizing municipal ownership and operations of public utilities.

Springfield Men Receive an Increase.—The Springfield (Ohio) Railway has announced an increase of 1 cent an hour in the wages of motormen and conductors, effective on April 1. The schedule ranges from 27 cents for one-year men to 31 cents for men who have been in the service four years.

Bill Taxing Gross Incomes Signed.—Governor Edge of New Jersey has signed Assembly Bill No. 69, which provides for a tax on the gross income of electric railway, gas and electric corporations, instead of the personal property assessment that prevailed previously. The law is to become operative on Oct. 1 next.

Joplin Strike Ended.—The strike of the employees of the Joplin & Pittsburg Railway, Pittsburg, Kan., has ended and the men have returned to work after having been out for one month. It is said that the international officials of the union held that the men had no right to refuse to work under a contract which they had accepted and signed and that the men must live up to the contract.

Strike in Waco.—Conductors and motormen, to the number of 110, employed by the Texas Electric Railway in the operation of the local lines in Waco, Tex., went on strike at midnight of March 9, following rejection of their demands by A. J. Bush, Jr., assistant general manager of the railway and general superintendent of the Waco lines. The men demand recognition of the union and a basic nine-hour day with time and one-half for overtime.

Bought Thrift Stamps.—Many of the patrons of the Pittsburgh (Pa.) Railways who received the rebate on the excess night fares are said to have bought War Savings Stamps with the money which was returned to them. The amount invested in this way is estimated to have been more than \$35,000. James Francis Burke, director of savings in Western Pennsylvania, made the suggestion about this use of the rebates to the benefit of the government.

City Representatives Inspect Railway.—Members of the street railway

committee of the City Council of Cleveland, Ohio, made their annual inspection of the property of the Cleveland Railway on Feb. 21. Councilman Starnard is the new chairman of the committee. Charles H. Clark, superintendent of maintenance of way of the company; Paul E. Wilson, secretary to J. J. Stanley, president of the company, and Fielder Sanders, Street Railway Commissioner of the city, accompanied the members of the committee.

Conference on Daylight Saving.—Operating managers of the various transportation companies in the city of New York notified the Public Service Commission at a conference on March 20 that they anticipated no difficulty in conforming to the daylight saving plan. Each company will turn the hands of the clock ahead one hour at 2 a. m. on March 31. The managers did not see any necessity of changing the present rush-hour schedules. As the change will take place on Sunday morning, it will help the public in getting used to it before a work day begins.

Railway Dragged Into Politics.—Roy Smock, the first city railway supervisor under the franchise secured by the Des Moines (Ia.) City Railway, is without desire on his part playing an important part in the city campaign which is now on. Steve Hill, styled by many as the Chamber of Commerce candidate for Mayor, charges that Mr. Smock has been favorable to the interests of the Des Moines City Railway to the detriment of the interest of the city, and states openly that if elected one of his first acts will be to discharge Mr. Smock.

Seek to Amend Vestibule Bill.—A bill to amend the public service commission's law in relation to inclosing the platforms of street cars has been introduced in the Assembly and referred to the committee on railroads. The new section, as amended, would read as follows: "Power of commission to order street car platforms inclosed. The commission having jurisdiction shall, after a hearing either on its own motion or on a complaint, have power to make an order compelling the inclosing or vestibuling of all platforms on street cars for the safety and comfort of the employees and public, operated in any city of over 450,000 inhabitants upon any line or lines of street railways therein."

Increase in Wages Asked in Hamilton.—The conductors and motormen employed by the Hamilton (Ont.) Street Railway, whose agreement expires on April 1, have asked the company for an increase of wages of 12 cents an hour over the present schedule, and for other concessions. The new rates requested are: First year men, 36 cents an hour; second year men, 38 cents an hour; three years and over, 42 cents an hour. The men also ask time and a half for overtime and legal holidays, double time for Sundays, 25 cents a day extra for training beginners and operating snow sweepers. They also want free uniforms for men who have served more than a year.

M. O. Path in Tacoma Not Easy.—Members of the City Council of Tacoma, Wash., see a possibility of the Federal Board of Investments refusing to sanction a bond issue at the next spring election for the purchase by the city of Tacoma of the Tacoma Railway & Power Company's system, as proposed by Commissioner C. D. Atkins. Mayor Fawcett is opposed to purchase of the traction system, suggesting as an alternative that the city condemn portions of the property as the company's franchises expire within the next few years. The other members of the Council consider the Mayor's plan to be faulty, in that it would take years for the city to acquire the system by the condemnation method outlined.

Motorman Sentenced for Reckless Driving.—One of the few cases in which a motorman has been sent to the penitentiary in connection with accidents in which life was lost is that of Fred West, who was received at the Indiana Reformatory, Jeffersonville, Ind., on Feb. 19, from Indianapolis, to serve a term of from two to twenty-one years for involuntary manslaughter. On Aug. 12, 1917, a car operated by West ran off the tracks at College and Fairfield Avenues and overturned. A number of persons were injured and several were killed. An indictment was returned charging West with operating his car at excessive speed in violation of a city ordinance. West pleaded that his brakes refused to hold and that he was unable to control the car.

Another Hearing on Chicago Program.—A public hearing was held in the City Council chamber in Chicago on March 13 on the program outlined by the local transportation committee for the solution of the traction problem. Chairman Capitain and G. T. Seely, assistant general manager of the Metropolitan West Side Elevated Railway, Northwestern Elevated Railroad and the South Side Elevated Railroad, explained the plans in detail. A number of representatives of improvement associations also spoke, most of them desiring extensions of rapid transit lines into remote territory. There was also some objection to building a two-level elevated structure on one of the downtown streets. The committee took all these matters under consideration and will hold another meeting at an early date.

Asks Mayor to Be Accurate.—Mayor Hylan of New York uses the Brooklyn Rapid Transit lines to reach the City Hall. He is impatient of delays such as the regular operation of a railroad impose at times, and in several instances has scored the company unjustly. One of his habits is to use figures carelessly. For this he has already been called to account by Chairman Straus of the Public Service Commission. On March 14 Acting Chairman Whitney of the commission felt it incumbent upon him to write the Mayor about his besetting sin. Mr. Whitney said in conclusion: "In view of the facts it must be again apparent to you that your statement that the B. R. T.

has thirty-two fewer cars in operation now than in 1917 or 1913 is not justified by the facts, and in all fairness should not be repeated."

Programs of Meetings

National Lumber Manufacturers' Association

The National Lumber Manufacturers' Association will hold its sixteenth annual meeting at the Congress Hotel, Chicago, Ill., on April 8-9.

New England Street Railway Club

The banquet committee of the New England Street Railway Club announces that on March 25 seat assignments will close for the eighteenth annual meeting and banquet of the club, to be held at the Copley-Plaza Hotel, Boston, on March 28. The speakers are Thomas N. McCarter, chairman of the war board of the American Electric Railway Association and president of the Public Service Railway, Newark, N. J., and John W. Weeks, Senator from Massachusetts.

Wisconsin Electrical Association

The program has been announced for the tenth annual convention of the Wisconsin Electrical Association at the Hotel Pfister, Milwaukee, on March 27 and 28. The opening of the session at 9.30 a. m. on March 27, will be followed by the address of the president. The afternoon session will be in conjunction with the Wisconsin Gas Association. A joint convention dinner will be held in the Fern Room of the Hotel Pfister on the evening of March 27, at 7 o'clock.

The program of the papers for March 27 follows:

"Depreciation in Connection with Public Utilities," by Edwin S. Mack, of Miller, Mack & Fairchild, Milwaukee, Wis.

"Public Regulation of Public Service Companies," by John H. Roemer, formerly chairman of the Railroad Commission of Wisconsin.

"The Presentation of a Case Before a Public Service Commission," by Harold L. Geisse, secretary of the Railroad Commission of Wisconsin.

The program of the papers for March 28 follows:

"The Utilities and the War," by M. C. Ewing, secretary-treasurer of the Wisconsin Valley Electric Company, Wausau, Wis.

"Metal Electrode Welding," by Dean Treat, manager of the Wisconsin Railway, Light & Power Company, La Crosse, Wis.

"Increasing the Efficiency of Hydro-electric Plants," by Daniel W. Mead, of Mead & Seastone, consulting engineers, Madison, Wis.

"Three-Phase Four-Wire Distribution," by George E. Wagner, superintendent of plant of the Madison Gas & Electric Company, Madison, Wis.

In addition to the papers on March 27 there will be an address by W. N. Fitzgerald, State Fuel Administrator for Wisconsin.

Financial and Corporate

British Columbia Meeting

£44,000 Transferred from Reserve Fund to Meet Dividends—Net Gain of £26,000 for Year

At the annual meeting of the British Columbia Electric Railway, Ltd., Vancouver, B. C., it was announced that the net income of the company for the year ended June 30, 1917, was £160,844. After adding the preceding year's balance and transfers, and deducting interest on debentures and debenture stock and dividends already paid on the 5 per cent cumulative perpetual preference stock, there remained a balance of £7,032 to be carried forward. In order to meet the dividend payments accounted for it was necessary to transfer £44,000 from the reserve fund. The figures given represent an improvement of approximately £26,000 over the previous year's results.

It was stated at the meeting that for the first four months of the current year the gross earnings showed an increase of approximately £29,400. This increase, however, was more than absorbed by increased expenses due to higher wages and increased cost of materials. As a consequence, the net earnings showed a decrease of £520.

Owing to the uncertain outlook for the immediate future, the directors felt it prudent to postpone the payment of the interim dividend payable on Jan. 15, 1918, on the 5 per cent cumulative perpetual preference stock. If at the end of a financial year an improvement in operating results is shown, however, the whole or part of the dividend may be distributed next July.

Spokane Valuation Hearing

Washington and Idaho Commissions Begin Hearings to Fix Rate-Making Values

Hearings were held for two days recently before the Public Service Commission of Washington and the Public Service Commission of Idaho to fix a valuation on which will be based the new rates to be charged by the Washington Water Power Company, Spokane, operating 110 miles of electric railway. At the outset the company objected to the Public Service Commission of Idaho fixing rates on power developed in Washington. The company contended that this was beyond the jurisdiction of the Idaho commission.

J. S. Simpson, an engineering accountant for the Washington commission, told how the company had grown from a corporation with an investment of \$235,000 in 1889 to one with nearly \$25,000,000 at the end of 1916. He said that there was a dollar of actual investment for every dollar of outstanding stock or indebtedness.

All matters pertaining to the affairs

of the Washington Water Power Company in Idaho were asked to be separated from the Washington figures by the Idaho commission. Mr. Simpson promised to see that this was done.

Attorney Post for the company served notice on the joint commission that he will ask that the valuation be based on the level of 1917 war prices rather than on the five-year average ended Dec. 31, 1916.

Chairman Blaine of the Washington commission thought it was impractical for the commission to base its valuation on the abnormal prices prevailing since the war began. The commission had followed the plan of averaging costs for a period of five years and basing its valuations accordingly. He thought the commission, when considering the cost of operation, would take into consideration the increased cost of labor and operating material.

The cost of reproduction fixed for the company's property follows:

Property in Washington.....	\$21,625,969
Property in Idaho	2,492,815
Total	\$24,118,784
PROPERTY IN WASHINGTON	
General office buildings.....	\$295,073
Power plants	6,993,897
Railway system	5,664,512
Storage battery	178,338
Transmission lines	1,047,236
Rural extensions	79,580
Telephone lines	88,198
Substations	1,492,281
Distribution system	2,903,210
Miscellaneous property	302,681
Pole line easements	29,916
Working capital	115,200
Lands	1,531,992
Total	\$20,732,114
Non-operating property.....	893,855
Total	\$21,625,969
POWER PLANTS IN WASHINGTON	
Monroe Street power plant.....	\$681,019
Little Falls	1,943,711
Long Lake	4,369,167
Total	\$6,993,897

The hearing will be continued on April 8.

Ten Per Cent Gain in Ottawa Operating Net

The net earnings from operation of the Ottawa (Ont.) Traction Company for the calendar year 1917 amounted to \$535,289 as compared to \$484,564 in the year preceding. The increase, therefore, was \$50,724, or 10.4 per cent. The gross receipts in 1917 totaled \$1,240,627 as compared to \$1,154,912 in 1916. The total expenses, including mileage payments, taxes and interest, were \$830,961 in 1917 and \$776,587 in 1916.

The usual quarterly dividends of 3 per cent were paid during the year, and a bonus of 3 per cent. The reservation for depreciation was \$110,000. The balance to the credit of profit and loss account at the end of the year was \$267,590. A total of 29,347,692 passengers were carried in 1917, as compared to 27,033,778 in 1916, an increase of 2,313,914.

I. T. S. Shows Revenue Needs

Detailed Exhibit Presented to Illinois Commission to Support Petition for Emergency Rates

The principal exhibit of the Illinois Traction System, Peoria, Ill., in the emergency rate case now pending before the Public Utilities Commission, consists of a series of compilations showing the company's financial condition. Previous references to the hearings on the company's blanket application for increased rates on fourteen city railway, electric and gas properties were made in the *ELECTRIC RAILWAY JOURNAL* of Feb. 23, page 389, and March 9, page 479.

WHAT THE EXHIBITS SHOWED

The exhibit was submitted in two sections, each one containing compilations for each class of petitioning service and for certain combinations of classes and all classes combined. Part I showed the average earnings and expenses and the average return received by each property during 1914, 1915 and 1916 (the three pre-war years). It also showed the earnings and expenses as estimated for 1918, on the assumptions that the rates remained without

properties on Jan. 1, 1918, was put at \$22,684,818. This figure was obtained by totaling actual prices paid, as shown by cost vouchers. The average amount available during 1914-1916 for depreciation and return was \$2,122,141, or 10.31 per cent. Under 1917 conditions as regards rates and business, and with prices in effect in December, 1917, the amount available for depreciation and return in 1918 would be \$1,505,871, or 6.64 per cent. With business the same as in 1917 and prices continuing the same as in December, 1917, but with rates increased as proposed, the amount available for depreciation and return in 1918 would be \$2,140,533, or 9.38 per cent.

Application Made for Receiver

Chancellor Walker has signed an order requiring the Trenton, Lakewood & Seacoast Railway to show cause at Long Branch, N. J., why a receiver should not be appointed for the company. The order carries with it a preliminary injunction restraining the company from disposing of any of its assets pending the receivership application, which is made by Frank Tilford, New York, a bondholder. The company

1917 Returns for York

Gross Earnings Increased 8.7 Per Cent, but Operating Expenses Increased 22 Per Cent

Although increased travel brought about a wholesome improvement in revenues for the York (Pa.) Railways during the year ended Nov. 30, 1917, the cost of transportation showed a preponderating increase. The gross earnings in 1917 totaled \$1,051,472, an increase of \$83,975 or 8.7 per cent over those for the preceding year. Operating expenses and taxes, however, rose \$118,565, or 22 per cent, to a total of \$655,873. The expenses included an item of \$60,161 for depreciation, an increase of \$19,620.

The net earnings at \$395,658 represented a decrease of \$34,589. The payments for interest and bond discount showed a small decrease, however, and as a result the net income fell off \$27,154 or 15.8 per cent, to a figure of \$144,018. The surplus balance on hand on Nov. 30, 1917, amounted to the sum of \$240,813.

CONSTRUCTION CURTAILED

Owing to high cost, the difficulty of obtaining equipment and the desire of

FINANCIAL DATA COVERING ONLY THE CITY RAILWAY DEPARTMENTS OF ILLINOIS TRACTION SYSTEM

	Three Year Average Operation 1914—1915—1916				Fair Value Jan. 1, 1918	Estimated Operation—1917 Busi- ness and Rates, with Prices Prevalent at End of 1917				Estimated Operation—1917 Busi- ness and Rates Adjusted to Pro- posed Rates, and Prices Preva- lent at End of 1917			
	Gross Operating Revenue	Expense and Taxes	Available for Depreciation and Return			Actual Revenue, 1917	Estimated Expense, and Taxes	Available for Depreciation and Return		Earnings Under Proposed Rates	Esti- mated Expense and Taxes	Available for Depreciation and Return	
			Amount	Per Cent				Amount	Per Cent			Amount	Per Cent
Jacksonville Ry. & Lt. Co.	\$48,944	\$34,053	\$14,891	6.29	\$243,876	\$44,509	\$33,766	\$10,743	4.40	\$50,860	\$33,766	\$17,094	6.77
B. & N. Ry. & Lt. Co.	202,021	127,632	74,389	6.84	1,116,060	183,363	163,709	19,654	1.76	203,963	163,709	40,254	3.61
Caro Elec. & Trac. Co.	57,388	38,358	19,030	8.99	274,300	52,234	45,947	6,287	2.29	62,154	45,947	16,207	5.91
Danville St. Ry. & Lt. Co.	213,397	111,271	102,126	9.39	1,113,800	248,618	195,395	53,223	4.78	252,618	195,395	57,223	5.14
Decatur Ry. & Lt. Co.	216,851	123,676	93,175	11.21	804,500	238,943	161,122	77,821	9.67	245,243	161,122	84,121	10.45
Galesburg Ry., Lt. & Pr. Co.	149,709	102,616	47,093	6.45	846,000	141,216	123,230	17,986	2.12	147,916	123,230	24,685	2.92
Northern Ill. Lt. & Trac. Co.	41,952	30,788	11,164	8.36	145,820	28,117	18,600	9,517	6.52	28,117	18,600	9,517	6.52
Peoria Ry.	783,731	523,149	260,582	12.18	2,477,470	859,670	665,617	194,053	7.83	932,670	665,617	267,053	10.78
Quincy Ry.	208,408	128,625	79,783	7.68	1,044,000	213,821	149,885	63,936	6.12	225,021	149,885	75,136	7.20
Urbana & Cham- paign Co.	146,307	84,453	61,854	11.53	554,000	145,704	101,688	44,016	7.95	149,204	101,688	47,516	7.27
Total	\$2,068,708	\$1,304,621	\$764,087	9.62	\$8,619,886	\$2,156,195	\$1,658,959	\$497,236	5.74	\$2,297,766	\$1,658,959	\$638,807	7.62

change during the year, that the business continued approximately the same as in 1917, and that the prices of coal, oil, labor and materials prevalent in December, 1917, continued in effect. Part II differed only in that it showed the estimated earnings for 1918 under the proposed higher rates.

The accompanying table shows the data submitted for the railway departments of the various properties. The tables from Part I and Part II have been combined to avoid the repetition of the first five columns. With business the same as in 1917 and prices the same as in December, 1917, the railway departments would show \$497,236, or 5.74 per cent, available for depreciation and return under 1917 rates, and \$638,807, or 7.62 per cent, under the proposed rates.

The fair value of all the petitioning

was formed to build an electric railway 40 miles long, extending from Trenton by way of Allentown and Lakewood to Point Pleasant.

In 1908 the Court of Chancery named James M. Dickinson receiver for the company and he sold the property to new interests. Mr. Tilford sets up in his bill of complaint that no part of the road has ever been constructed; that in July of 1910 the company executed to the Trenton Trust & Safe Deposit Company as trustee a mortgage to secure \$1,500,000 of gold bonds, of which \$260,000 have been issued; that the company has no income; that judgments have been entered against it, and that it owes Charles R. LeCompte and James H. Butcher \$19,800 for money loaned or advanced by them. He declares that a receiver is necessary for the protection of those interested.

the government for companies to avoid making unnecessary demands upon the investment market, the York Railways did not in 1917 engage in any construction work not absolutely required. The expenditures charged to cost of property for the railway lines were \$39,764.

FLOATING INDEBTEDNESS KEPT DOWN

During the last fiscal year no securities were sold and no floating indebtedness was incurred. The deferred dividend on the preferred stock, amounting to 2½ per cent, was fully paid up on Jan. 30, 1917. Items aggregating \$44,325 were written off and charged to depreciation. A sum of \$13,656 was realized from the sale of obsolete and worn-out equipment and credited to construction. Real estate amounting to \$1,310 was sold by the company.

Wants Valuation Discontinued

Declaring that continuance of the work of making a physical valuation of the country's railroad systems, authorized by Congress several years ago, would involve an expenditure of upwards of \$50,000,000 at a time when this money could be used for more vital war purposes, directors of the Philadelphia Bourse have adopted and forwarded to Washington resolutions urging that Congress repeal the law under which the valuation is being made.

A bill providing for the repeal of the physical valuation act has already been introduced and the Bourse makes an earnest plea that it be favorably acted on.

Financial News Notes

Wheeling Suburban Line Leased.—Arrangements are said to have been completed by which the property of the Steubenville, Wellsburg & Weirton Railway, consisting of about 14 miles of line, will be operated under lease by the Wheeling (W. Va.) Traction Company.

Additional Preferred Stock for Rochester Company.—The Public Service Commission for the Second District of New York has granted permission to the Rochester Railway & Light Company to issue \$2,000,000 par value of its 7 per cent cumulative preferred stock. The company will use the additional capital in paying off notes taken up for construction work and to reimburse its treasury for sums expended for purposes of capitalization.

Indiana Road for Sale Under Foreclosure.—Herbert E. Bucklen, appointed

receiver for the St. Joseph Valley Railway, Elkhart, Ind., in the Superior Court at Elkhart several weeks ago, has been ordered to sell the property and advertised the road to be sold on March 20. It was proposed to offer the road first as a going concern and if it could not be sold that way to sell it in parcels. Should this manner of selling prove unprofitable, the ties, rails and rolling stock will be sold separately and the road junked. The road is 9 miles long.

Funds Deposited to Meet Pittsburgh Coupons.—The Pittsburgh (Pa.) Railways has deposited funds with the trustees for the coupons that were in default on the various issues of bonds, except the \$4,804,000 of United Traction Company, Pittsburgh, bonds. The coupons will be paid on presentation. The bondholders' protective committee, of which Thomas S. Gates is chairman, has a suit pending seeking to compel recognition by the Philadelphia company of responsibility for the principal and interest on underlying bonds of companies in the Pittsburgh Railways.

Object to Abandonment.—A joint resolution has been adopted by the Common Council of Richmond, Va., and will now go to the Board of Aldermen asking City Attorney Pollard to report as to what steps will be necessary to compel a resumption of service by the Richmond & Chesapeake Bay Railway, or else remove the company's tracks from the streets of Richmond. The suspension of operation by the company was noted in the ELECTRIC RAILWAY JOURNAL of Jan. 12, page 105.

Debentures Offered by Cities Service.—Stockholders of the Cities Service Company, New York, N. Y., are given the right to subscribe to \$3,000,000 series "B" 7 per cent convertible gold debentures. They are dated Jan. 1, 1918, and are due Jan. 1, 1966. Coupon debentures, which may be registered as to principal, are in denominations of \$1,000 and \$500. Debentures, registered as to principal and interest, are in

denominations of \$5,000, \$1,000, \$500, \$100, \$10 and multiples of \$10 up to \$100. Interest on coupon debentures is payable semi-annually on Jan. 1 and July 1 in each year. Interest on debentures, registered as to principal and interest, is payable by check at the option of the holder, either annually, semi-annually, quarterly or monthly, except that interest on debentures of less than \$100 principal amount shall be payable on Jan. 1 annually. The only interest bearing obligations of Cities Service Company, other than these series "B" debentures, are \$54,900 series "A" 5 per cent debenture bonds yet remaining unconverted and a note given in purchase of Liberty Bonds.

Dallas Return 2 Per Cent in January.—Figures showing the earnings of the Dallas (Tex.) Railway for January, 1918, under the Hobson-Strickland franchise, as compared with those for January, 1917, under the old franchises, have been prepared by M. N. Baker, supervisor of public utilities. The gross earnings for January, 1918, show an increase of \$3,736 over those of the same month in 1917, but a decrease of \$6,234 as compared with December. Railway operating expenses increased materially, the increase being mainly for power purchased, salaries and wages, and expenses in connection with the operation of the Interurban Terminal Building. Operating statistics show that more cars were operated in January, 1918, but that the earnings per car-mile were considerably less. Up to Jan. 31, 1918, a total of \$45,386 had been expended on improvement requisitions by the railway. The balance available for the authorized return for January, 1918, was at the approximate annual rate of 2 per cent of the authorized property valuation. The return was about 4 per cent for the first four months of operation under the new franchise. This period included the time of the Texas State Fair, when business was particularly heavy.

Electric Railway Monthly Earnings

CAPE BRETON ELECTRIC COMPANY, SYDNEY, N. S.							HUDSON & MANHATTAN RAILROAD, NEW YORK, N. Y.						
Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income		Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income	
1m., Dec., '17	\$46,120	*\$27,356	\$18,764	\$6,535	\$12,229		1m., Jan., '18	\$575,927	*\$291,809	\$284,118	\$217,531	\$66,587	
1 " " '16	40,284	*22,346	17,938	6,552	11,386		1 " " '17	541,294	*234,332	306,962	216,231	90,731	
12 " " '17	464,081	*298,247	165,834	78,652	87,182		NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO						
12 " " '16	393,666	*231,265	162,401	78,327	84,074		1m., Jan., '18	\$542,301	\$370,858	\$171,443	\$94,665	\$76,778	
COLUMBUS (GA.) ELECTRIC COMPANY							1 " " '17	490,380	282,843	207,537	84,008	123,529	
1m., Dec., '17	\$103,820	*\$42,155	\$61,665	\$31,782	\$29,883		PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.						
1 " " '16	84,383	*30,166	54,217	28,527	25,690		1m., Dec., '17	\$971,130	*\$611,043	\$360,087	\$203,619	\$156,468	
12 " " '17	1,096,066	*420,461	675,605	359,102	316,503		1 " " '16	788,880	*443,296	345,584	184,923	160,661	
12 " " '16	881,353	*351,233	530,120	343,574	186,546		12 " " '17	9,454,861	*5,854,019	3,600,842	2,351,187	1,249,655	
GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.							12 " " '16	8,107,371	*5,120,995	2,986,376	2,212,982	773,394	
1m., Dec., '17	\$209,590	*\$129,650	\$79,940	\$38,573	\$41,367		REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO						
1 " " '16	176,496	*109,857	66,639	36,859	29,780		1m., Dec., '17	\$492,941	*\$359,717	\$133,224	\$92,201	\$51,497	
12 " " '17	2,088,121	*1,384,871	703,250	450,880	252,370		1 " " '16	373,412	*223,729	149,683	81,746	\$72,965	
12 " " '16	1,944,839	*1,236,107	708,732	438,993	269,739		12 " " '17	4,889,915	*3,241,183	1,548,732	1,004,426	\$611,511	
HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.							12 " " '16	3,987,616	*2,327,407	1,660,209	827,569	\$853,606	
1m., Dec., '17	\$31,192	*\$20,311	\$10,881	\$5,975	\$5,806		TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS, MINN.						
1 " " '16	29,777	*15,080	14,697	5,240	9,457		1m., Jan., '18	\$841,724	\$662,165	\$179,559	\$160,515	\$19,044	
12 " " '17	343,133	*216,452	126,681	61,300	65,381		1 " " '17	897,932	612,161	285,771	149,363	136,408	
12 " " '16	326,398	*186,459	139,939	63,916	76,023		*Includes taxes. †Includes non-operating income. §Includes accruals under rapid transit contracts with city payable from future earnings.						
INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK, N. Y.													
1m., Jan., '18	\$3,569,021	*\$1,964,320	\$1,604,701	\$1,170,105	†\$726,346								
1 " " '17	3,630,692	*1,707,049	1,923,643	1,005,214	‡\$975,997								
7 " " '18	23,238,037	*13,059,033	10,179,004	7,652,190	‡\$4,260,578								
7 " " '17	22,653,717	*10,885,528	11,768,189	6,978,987	‡\$5,196,829								

Traffic and Transportation

Lincoln Petition Heard

Nebraska Commission, Having Decided Against Emergency Rates, Proceeds with Permanent Appeal

The State Railway Commission of Nebraska on March 4 opened the hearing on the application of the Lincoln (Neb.) Traction Company for a permanent increase in the rates of fare. The commission had previously denied an amended appeal for emergency increase. This was noted in the *ELECTRIC RAILWAY JOURNAL* for March 2, page 435.

RATE AND CAPITALIZATION CASES COMBINED

As a first move the commission decided to consolidate the rate case with the application to issue \$281,000 of new preferred stock. This the commission did over the objection of the company. W. E. Sharp, president of the company, took the position that inasmuch as the company was entitled to earn a specific per cent, 7 per cent or some other rate, on the actual investment the amount of stocks or bonds was immaterial, as the distribution of what was left after operating expenses were met was a matter for the company to determine under the supervision of the commission.

The commission had issued orders that certain improvements should be made, and the money of the company was used in making them. It was now asking that it be authorized to sell securities to replace the money. Mr. Sharp had always insisted that rates should be large enough to permit the company to meet all its charges and also build up a surplus to take care of the refinancing and abnormal conditions.

O. J. Shaw, secretary of the company, testified with regard to the details of operation of the company. He said that if the company carried the same number of passengers in 1918 that it did in 1917 it would require an average revenue from each of 6.51 cents to give a return of 1 per cent on the investment. The interests of the company require that the rate of fare shall not be so high that it will drive traffic away from the railway.

SUGGESTIONS FOR CUTTING EXPENSES

Mr. Shaw said there were several ways in which the expenses could be curtailed. One way was to get rid of duplications, reduce unnecessary service and by consolidating lines. Instead of making a flat rate of fare with free transfers, he proposed several alternatives. One was to make a basic rate of fare, with additional charges for zones. Another was to charge for transfers. Attention was also called to the fact that the selling of school

tickets at ten tickets for a quarter was just about half the cost of carrying the holders, and that it was impossible to prevent the abuse of the school tickets and the fraudulent use of transfers by passengers, owing to the location of the lines.

VALUE PLACED AT \$3,300,000

Mr. Shaw figured the total actual value and investment in the railway, the light and power, and the heating department as in excess of \$3,300,000. In arriving at these figures he took the basic valuation as determined by the commission in 1909, when the consolidation took place, which was \$1,992,000, and to this added all additions and betterments and made the necessary deductions. He found values as follows: railroad plant, \$2,861,724; of the light and power plant, \$341,163, and of the heating plant, \$131,431.

Oregon Commission Upheld

Circuit Court Upholds Right of Commission to Fix Rates—Necessity or Reasonableness Not Considered

The 6-cent fare ruling of the Public Service Commission of Oregon in the case of the Portland Railway, Light & Power Company was upheld by a unanimous opinion handed down on March 14, by the six circuit judges of Multnomah County sitting en banc.

The opinion states that the "expediency, necessity or reasonableness" of the 6-cent fare was not considered, but that the opinion was based solely on the points of law involved in the question of whether the commission has the power to regulate the rates of any public utility. The opinion covers all the arguments advanced both for and against the 6-cent fare during the hearing.

The city will appeal the case to the State Supreme Court.

DECISION A VICTORY FOR COMPANY

The decision is regarded as a signal victory for the company as the collection of 6-cent fares can continue. This would not have been the case if the opinion had been unfavorable.

The decision of the commission in the case was reviewed at length in the *ELECTRIC RAILWAY JOURNAL* of Jan. 26, page 184. The hearing on the appeal of the city to the courts from the decision was begun on Feb. 26 and the testimony was reviewed in the issues of this paper for March 9, page 479, and March 16, page 543. In addressing the court Assistant Attorney General Bailey, who represented the commission, said that the only question before the court in the case was whether or not the court had the jurisdiction to change the rates.

Franchise Relief Refused

Washington Body Dismisses Service Complaint, But Otherwise Is Uncertain of Its Authority

The Public Service Commission of the State of Washington, in a recent decision in Tacoma, dismissed the complaint of certain Tacoma residents against the Tacoma Railway & Power Company, filed for the purpose of compelling the company to improve service given on Center Street. The majority of the commission took the view that the commission was without power to grant the railway authority to increase its fares beyond the 5-cent limit fixed by the State law.

COMMISSIONERS NOT FULLY AGREED

Each member of the commission wrote an opinion in the case. Commissioners A. A. Lewis and Frank R. Spinning both expressed the belief that the maximum 5-cent fare, fixed by the State law, could not be exceeded. Chairman E. F. Blaine, however, took an entirely opposite view, holding that it was the province and duty of the commission to say what was a reasonable and fair rate, irrespective of the 5-cent maximum given in the State law. The commissioners, however, in view of the varied opinions of its members, expressed the hope that the matter will be taken to the Supreme Court, and a precedent established on which they may base future decisions.

Corporation Counsel Caldwell of Seattle has been instructed by the City Council to appear in the case, as a friend of the court, in the event an appeal is taken. Counsel Caldwell, in calling the matter to the attention of the court, pointed out that, from the decision in the Tacoma case, it would seem likely that any attempt of the Puget Sound Traction, Light & Power Company, Seattle, to obtain an order increasing its fares, would meet the unfavorable action of the commission, unless one course is to be followed in Tacoma and another in Seattle.

CASE CARRIED TO COURT

Immediately following the decision of the commission, Louis H. Bean, manager of the Tacoma Railway & Power Company, secured a writ from Chief Justice Ellis, directing the Public Service Commission to either grant the Tacoma company such relief at once, or show cause before the Supreme Court on March 15 why it should not be done. The petition recites that while the commission, in the recent Tacoma Avenue decision, denied the company's prayer for increased fare and relief from franchise obligation, it also found that the company could not render safe, adequate and sufficient service without such relief. In seeking a writ, the company contends "that great and irreparable injury will be done the city of Tacoma, Pierce County, and the United States if the commission's policy as announced by the majority opinion is carried out, because of existing war demands for adequate transportation."

Connecticut Fare Brief Filed

Answer of Company in Rate Case Says City Has Failed to Prove Six-Cent Fare Unreasonable

In concluding its brief filed with the Public Service Commission of Connecticut in the case involving the appeal of the city of Hartford for the restoration of the 5-cent fare in that city, the Connecticut Company made the following statement of remedies suggested for the relief of the present financial condition of the company:

"In addition to a finding by the commission that at the present time the 6-cent fare upon all its lines is not unreasonable and excessive, we still feel that there are other remedies which should be granted to the company, although most, if not all, of these remedies lie rather in the power of the Legislature than in the power of the Public Utilities Commission.

REMEDIES SUGGESTED

"1. The company should be allowed to earn a sufficient amount to pay its operating expenses, taxes, fixed charges, maintenance and depreciation, and a fair return upon the value of the property devoted exclusively to the public use, irrespective of how this revenue shall be secured.

"2. The industry is such an important part of the community life that any further legislation should look toward permanent means of keeping the property in a safe and convenient operating condition, and to secure to the company the opportunity of raising either public or private funds in such a way that the development of the property may be constant, both with respect to the extension of lines and enlargement of facilities on existing lines.

"3. There should be no change or alteration in the law which permits the directors of the Connecticut Company to manage the properties as they have been accustomed to do in the past, but they should still be subject to inspection and supervision by the Public Utilities Commission. Especially should no change be made in the fare regulatory powers of the commission.

"4. The company should be relieved of the burdens placed upon it by statute, providing for the construction and maintenance of pavements between its tracks, and the company should not be subject to the construction programs of municipalities which vary from year to year, and which compel the expenditure of money out of capital or earnings, the expenditure of which funds is entirely non-productive to the car rider.

"5. The company should be given relief from the excessive burden due to ornamental bridge construction, which falls within the same class as the burden with respect to new pavement and pavement repairs.

"6. There should be passed legislation with respect to the competition of jitneys, so that if this form of transportation is to exist it may be taxed by the State and regulated by the commission, so that the competition be-

tween the two forms of transportation should be upon a fair basis.

"7. The only manner in which first class electric railway service can be assured to the car rider, regardless of whether public or private capital is employed, is for the rate of fare to be sufficient to pay a proper rate of interest, and if public funds are to be employed, any deficit in operating expenses must be made up from taxes upon the community served.

"The solution suggested by Mr. Brush is the service-at-cost scheme, which has been tried in Cleveland, Dallas and Kansas City. This plan involves a graduated scale of fares to go up and down automatically as the rehabilitation fund is increased or depleted. It is similar to the Cleveland scheme, with the exception that it avoids the criticism of the latter in that it has no maximum rate of fare. Such a scheme avoids any hearing upon what rate of fare shall be charged. As this scheme is in an embryonic state, it will not do in this brief to go into the subject, but for a final solution of the street railway difficulties some such method undoubtedly must be adopted eventually."

THE CITY'S POINTS ANSWERED

In conclusion, the company answered the points of counsel for the city at the end of his brief, by stating:

"1. That Hartford has no right to be considered separate and apart from all the other properties of the Connecticut Company for the purpose of determining whether or not the 6-cent fare in Hartford is reasonable for the reasons hereinbefore stated. That the company is not delinquent in keeping its books, as they are kept in accordance with the Interstate Commerce Commission system of accounting, and in the form prescribed by the Public Service Commission of Connecticut, and that it has been justified in keeping them in this manner, though the method employed does not meet with the approval of the city of Hartford.

"2. That no rearrangement of the fare zones should be made at the present time, or made at any time, without the most careful study into both social and economic conditions.

"3. That the proof shows very clearly that, owing to the large increase in operating expenses of the company, the 6-cent fare is not unreasonable or unjust to the short rider than was the former 5-cent fare.

"4. That the city has failed to maintain its burden of proof that the 6-cent fare is an unreasonable and excessive rate of fare or charge in the city of Hartford, and from Hartford to adjoining towns, and that the petition of the city of Hartford should be dismissed."

The brief of the city was reviewed in the *ELECTRIC RAILWAY JOURNAL* for Feb. 16, page 339. The city did not

concede that in so far as Hartford was concerned the company needed additional revenue, but it argued that if this were the case then there should be a rearrangement of the fare zones, with a central 5-cent fare zone as a base.

Relief for Jersey Interurban Company Authorized to Increase Fare from Five Cents to Six Cents in Each of Seven Zones

The Northampton, Easton & Washington Traction Company, Easton, Pa., was authorized by the Board of Public Utility Commissioners of New Jersey on March 11 to increase the rate of fare from 5 cents to 6 cents in each of the seven fare zones from Phillipsburg to Port Murray, N. J., a distance of 17 miles. This is in accordance with the application made previously to the commission, but denied by that body in July, 1917, because of court rulings, which have since been more liberally construed.

PETER ROBBERD TO PAY PAUL

At the previous hearing it was shown that there was a deficit of \$7,150 for the year 1915; and a deficit of \$5,311 for the year 1916. The additional proofs offered when the appeal to the commission was renewed showed a deficit of \$7,131 for 1917, and a comparative deficit for January and February, 1918, of an increased amount. The proofs also showed that conditions were growing worse instead of better. Not one dollar had been set aside for depreciation in any of the years mentioned. The net operating return had been and continued to be insufficient to meet interest on the bonded debt, but the interest on the bonded debt of the company had been paid, any deficit in the sum of money required for the payment of interest having been loaned by the Northampton, Easton & Washington Traction Company of Pennsylvania to the New Jersey Company.

The New Jersey board in its previous report dated July 16, 1917, recognized the serious financial condition of the company, but felt constrained to deny it relief because of its interpretation of the decision of the New Jersey Supreme Court in the case of the Atlantic Coast Electric Railroad vs. the Public Service Commissioners, 89 N. J. Law, page 407.

The petitioner caused the findings of the Board of Public Utility Commissioners in its proceedings to be reviewed by the Supreme Court, and the decision filed during the present February term holds that it is the duty of the Board of Public Utility Commissioners to approve the establishment of a just and reasonable rate, when it appears that the existing rate is insufficient regardless of limitations contained in municipal ordinances respecting rates of fare.

The order in question was therefore set aside and the Northampton, Easton & Washington Traction Company renewed its application before the New Jersey Board for the increased fares.

Suburban Seeks Increase

Trenton-Princeton Road Wants to Boost Fare Unit from Five Cents to Six Cents

The New Jersey & Pennsylvania Traction Company on March 16 asked the Board of Public Utility Commissioners of New Jersey to sanction an increase of 4 cents in the fare between Trenton and Princeton. The company would also have the board rescind the order requiring it to sell blocks of twelve tickets for \$1. The commissioners set April 12 for a hearing on the request.

FARE INCREASE FROM TWENTY TO TWENTY-FOUR CENTS

The Princeton branch is at present divided into four 5-cent zones. The company is asking the commission to allow it to demand 6 cents for each zone, making the fare 24 cents one way. The block tickets were ordered continued by the Utility Board when the fare was made 20 cents in 1916. They are good for travel from Lawrenceville to Trenton or Princeton. The traction company maintains that the use of the tickets is being abused for continuous rides between Trenton and Princeton. The company contends that to eliminate the tickets and make the fare 6 cents for each zone would increase the revenues "sufficiently to overcome, in part at least, the advanced operating expenses now being incurred."

Frank S. Katzenbach, counsel for the company, sets forth that its net earnings for 1916 were \$19,417, but that they dropped last year to \$13,328 because of the increased cost of labor and materials. Gross earnings for 1917, however, increased \$4,004 over 1916.

FARE ONCE TEN CENTS

The road was in the hands of a receiver in 1913, when the fare to Princeton was 10 cents. The Utility Board ruled that the income was insufficient and Princeton and Princeton Township revoked their ordinances which prohibited any increase. The Utility Board fixed the rate at 15 cents, but on two years' trial ruled that the sum was still too low and then 20 cents was decided upon. The board declared in 1913 that a net profit of \$30,000 was warranted by the value of the property.

Opposition Organizes

At a conference of the executive committee of the New Jersey State League of Municipalities on March 14 after the postponement of the hearing before the State Board of Public Utility Commissioners on the application of the Public Service Railway for an increase in fares, it was agreed to ask the cities effected to contribute an assessment of 2 cents per capita to raise a fund of between \$25,000 and \$35,000 to fight the proposed increase. George N. Seger, Mayor of Passaic, president of the league, was authorized to engage ex-Congressman Marshall Van Winkle of Jersey City as chief counsel for the league in the matter.

I'm a Voice

—the voice of a fellow you meet every day and yet probably never had a conversation with in your life.

He's a pretty sizable fellow, too. He's got one hand over Jordan and the other up among the boys in khaki at the Fort. His head nestles somewhere in Davis County; he has one foot dangling out Sandy way and the other pokes into the Cottonwoods.

His backbone is along Main Street. Come to think of it, his heart must be just above his left knee, for it's located on Seventh East and Fifth South.

Sure you know him?

He works for you. Mostly you call him "Street Car Company," except when he doesn't come along quick enough and—well, you know what you call him then. But his full and proper name is Utah Light and Traction Company.

And I'm his voice!

Pleased to meet you!

Ever think what a busy person he is? Works 16 hours a day and sits up the rest of the twenty-four getting ready to start again.

Enters—Another Baby!

The Utah Light & Traction Company, Salt Lake City, Utah, has begun the publication of a four-page weekly, in which it will carry the message of the company to its patrons. The first issue was dated March 2. The paper has not yet been named. The company is leaving that for its patrons to do, subject, of course, to certain limitations. This process will be turned into a competition best told by the paper itself, as follows:

"Jimminy!

"Oh, my, this is awful!

"They've sent me out all dolled up and haven't given me a monacher—something for folks to call me by when they want me.

"I feel all fussed—just like I'd run off without a necktie—or worse!

"I've simply got to have a name, even if I have to pay to get one. I figure my folks will stand for at least \$25 to get me christened.

"So I make you this proposition—

"If you'll find me a name, one that has a lot of pep to it, and that will give folks a good idea of just who, what and why I am, I'll see that a check for \$15 goes to the man, woman or child whose name for me is selected by a committee as the best one sent in. For you who are good scouts enough to try, and come close, I'll make \$5, a second prize, \$3, a third prize and \$2 a fourth prize.

"Remember my mission in life—to start the liveliest kind of a conversation on the transportation likes and dislikes, needs and wants of the Salt Lake public and their neighbors and visitors. Put all that in your name, spice it up with a snappy sound, and you'll get those prize simoleons."

The first page of the first issue of the new paper is shown above.

Refer the Doubters to Us

"If you don't believe the situation in the electric railway industry is serious, yes, menacing, read the **ELECTRIC RAILWAY JOURNAL** of Jan. 5, 1918."—*Watts Watt* of the Portland Railway, Light & Power Company, Portland, Ore.

President McMeen's Story

He Acquaints the Public of Columbus, Ohio, with the Necessity for Increased Fare

In a public statement made on March 13, Samuel G. McMeen, president of the Columbus Railway, Power & Light Company, Columbus, Ohio, said in part:

"We have been telling facts about the cost of railway service and the reason why an increased fare is necessary. We shall continue to do so from day to day. There still remain many facts to be told and many conclusions to be drawn.

ASKING HIGHER FARES DISTASTEFUL

"We do not like to ask for higher fares. But as we are subject to the same trying conditions as others, we must meet them with such action as they require.

"In our discussion of the problem with you and your representatives we mean to be frank, sincere and patient. After all, the task is one calling for a rational meeting of minds, and we feel that some progress has been made. We do not doubt the ultimate fairness of the people of Columbus."

CITY AND COMPANY INTER-DEPENDENT

In one of its advertisements the company calls attention of the inter-dependence of the city and the street railway. The advertisement states that this mutual necessity imposes an obligation upon both. Because the company needs the city and the city needs the railway, it is necessary to take into consideration the means of keeping the road in the best operating condition and at the same time place no undue burden upon the public.

In another advertisement the company defines the ride, instead of the trip, as the unit of measure in electric railway service. The ride consists of three elements, boarding the car, remaining on the car after it has started, and alighting from the car. A trip, if it consists only of a ride, has but the three elements, but if it consists of two rides it has six elements, and if three rides are necessary then there are nine elements.

Whether the passenger proffers for his ride 5 cents, 3½ cents or a transfer, the company is compelled to furnish the ride. Hence the ride is the unit of service and for this the company is receiving an average of only 2.6 cents per passenger.

BRINGING APPRAISAL UP TO DATE

According to an estimate furnished the City Council by G. Herman Gamper, the cost of making an appraisal of the present unvalued property of the company would be between \$5,000 and \$6,000. The Public Utilities Commission's appraisal furnishes the figures for about two-thirds of the property. A committee of Council had been instructed to make an investigation of the cost with the idea of securing data for conducting intelligent negotiations with the company in the future.

City Heard

City Engineer of St. Louis Regard's Present Fare Adequate if Franchise Relief Is Granted

C. E. Smith, city engineer of St. Louis, Mo., testified on March 14 before the Missouri Public Service Commission on the United Railways' petition for increased revenues. Mr. Smith said that in his opinion the company would receive a fair return under the present 5-cent passenger fare if it were relieved of the mill tax, other city taxes were reduced, and a franchise extension granted. He added that the company would have to effect certain additional operating economies. Mr. Smith also stated he believed a 5-cent-an-hour increase for carmen was fair, instead of the 10-cent-an-hour increase the men demand.

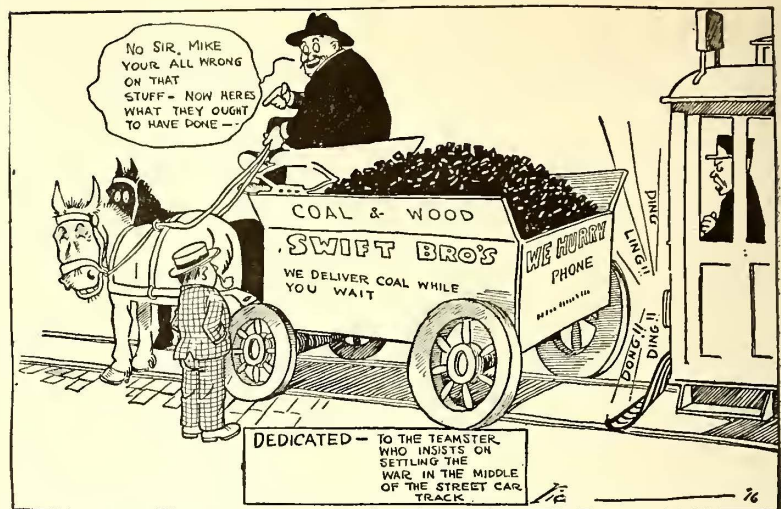
Mr. Smith said that when the United Railways sought a settlement of the mill tax and a thirty-one-year extension of its franchises last year the company's books were opened to him. The company's first financial difficulties came in 1910, when notes for \$1,405,000 fell due. The city announced it would fight to collect the mill tax, then about \$1,500,000, and also showed it was not disposed to grant an extension of the Jefferson Avenue franchise, which expired in 1911. This franchise has not been renewed. These matters coming at the same time prevented the company from getting new capital, and it had not since been able to obtain the capital. The net earnings of the company from 1910 to and inclusive of 1917 were \$31,558,000, or an average of \$4,294,775 a year, a sum equal to 10 per cent of the market value of the company's securities, or 4 per cent of the capital value during that period. The net earnings were spent in improvements. Had the earnings gone into dividends the company soon would have faced receivership.

PRESIDENT McCULLOCH CROSS-EXAMINED

The session of the commission of March 13 was given over almost entirely to the testimony of Richard McCulloch, president of the company. He was cross-examined by City Counselor Daues. He testified that he considered the Keokuk dam and the Union Electric Light & Power Company power contracts among the most valuable assets of the United Railways.

Mr. Smith also referred to the pending franchise settlement with the company. He reviewed briefly the terms of the tentative grant and expressed the opinion that the passage of the ordinance would go a long way toward stabilizing the position of the company.

It was decided by the commission to continue the hearings on March 25. James E. Allison, former chief engineer of the City Public Service Commission, who is engaged in revising the valuation of the United Railways property made by him in 1911, will be the next witness for the city in the hearing of the company's application.



"ELECTROGRAM" ILLUSTRATES THE TEAMSTER NUISANCE

Seattle Cases Go Over

Ticket and Gross Earnings Litigation Will Come Up Before State Supreme Court in May

Argument of the 4-cent ticket case, and the 2 per cent gross earnings case, in both of which the Puget Sound Traction, Light & Power Company and the city of Seattle, Wash., are the principal litigants, which was set for March 13, has been postponed until the opening date of en banc hearings at the May term of the Supreme Court. The Supreme Court recently advised Hugh M. Caldwell, corporation counsel of Seattle, to this effect, taking the view that the cases are of such importance that the entire bench should have opportunity to pass on them.

The 4-cent ticket case went to the Supreme Court on appeal taken by the city of Seattle from a decision of Superior Court Judge J. R. Mitchell, at Olympia, in affirming the order of the Public Service Commission eliminating the 4-cent tickets without advising the city of any pending petition with that end in view.

The 2 per cent gross earnings case reached the court on an appeal taken by the company from Judge Ronald's decision in awarding the city a judgment against the company for about \$62,000, representing unpaid gross earnings tax for 1916. The company has made an appeal to the Public Service Commission to be relieved of certain of its franchise obligations, including 2 per cent of the gross earnings annually, and, while willing to pay the amount under protest, refused to do so unless the city dismissed litigation for the enforcement of the obligations, pending an order by the commission.

Safety Campaign Helpful

The safety campaign of the Toledo Railways & Light Company, Toledo, Ohio, under the management of Raymond T. Metzger, is bearing fruit. Accidents through February of this year, both on the streets and in the shops, show a decided decrease over those of

the same month in 1917. In all there were 296 accidents during the past month, while the number was 389 for February a year ago.

Of these 114 were automobile accidents and fifty were to horse-drawn vehicles. Last year there were fifty-six accidents to persons boarding and alighting from cars. The number this year was reduced to twenty-seven. Mr. Metzger attributes this reduction partly to the use of pay-as-you-enter cars, but the additional safety devices provided and the campaign of education among the employees have had much effect.

Accidents to shop employees numbered twenty-one this year, compared with fifty-two during February, 1917.

Large calendars, bearing safety illustrations, have been placed in every school room in the city, and the company invites persons who have the care of any number of children to call for these calendars and place them where they can be seen.

Slow Progress in New York Fare Cases

At the hearing on March 14 before Governor Whitman, in regard to a bill to authorize a 6-cent fare throughout New York, Joseph K. Choate, chairman of the committee of ten of the New York Electric Railway Association, described in detail the critical condition of electric railways in the State. In the course of his remarks Mr. Choate said that petitions for increased fares had been filed ten months ago with the First and Second District Commissions, but that no hearings in the First District had been brought to a conclusion and only six or eight cases had been finished in Albany. This delay, he said, had been almost unavoidable in complying with the law and the requirement of the commissions that the right to increase rates can be authorized only on the basis of a "fair return upon a fair valuation." This requirement has been complied with or is being complied with at the present time, but it has of necessity required a long time to prepare and hear the cases.

Rhode Island Recommendations Defended

Legislative Committee Examines Members of Special Commission Which Recommended Zone Fares

The question of financial relief for the Rhode Island Company, Providence, R. I., is being considered by a special legislative committee created for the purpose of reviewing the report presented by the commission which has been studying the matter for the past year and which recently recommended the establishment of a modified zone system and other changes estimated to increase the revenue of the company \$890,000 a year.

In the meantime, under acts passed by the Legislature and signed by the Governor, the establishment of the zone system is held up, and the Public Utilities Commission has been ordered not to authorize or allow any change to be made in the present fare system or rates until further authorization from the Legislature.

The first act of the legislative committee was to give a hearing to the officials of the company. Mr. Jennings of the committee ascertained from C. A. Babcock, comptroller of the company, that since 1908 the company has borrowed \$3,500,000 from the New Haven Railroad and an additional \$1,662,000 through the Industrial Trust Company, Providence. Mr. Jennings asked the company's officials if it was considered good financing to borrow money and at the same time pay dividends. They suggested that this was a question to be referred to the trustees, who were not present.

ZONE SYSTEM DESIRABLE

The second day of the hearings was taken up with a presentation of the case by Chairman Zenas W. Bliss of the special commission which recommended the zone system, and William C. Bliss, also of that board and chairman of the Public Utilities Commission. Both of these men defended the report and declared that the establishment of the zone system as recommended was desirable and for the best interests of all concerned. Zenas W. Bliss declared that State ownership was not, to his mind, a good solution of the electric railway problem in Rhode Island. He declared that the State could not operate the lines with a 5-cent fare, even if they were taken over. Mr. Bliss explained the details of the zone system and declared that it was a just and equitable arrangement.

William C. Bliss stated that in the act creating the commission that body was directed to make a report and show a "just and equitable" system of fares. He showed that under the present system some lines carry a passenger 9 miles for 5 cents where other lines take a passenger only 2 miles for 5 cents. He declared that such unjust conditions as those should not be continued and certainly could not be made a part of a just and equitable fare system. The commission therefore eliminated them and made the zones as

near equal in length as reasonable under existing conditions. He said: "Naturally those persons who have been able to get a long ride for little money would be compelled under the zone system to pay a greater increase than those who in the past had been paying for all they got in the form of a ride."

Zenas W. Bliss said that absolute State control of the road, with a guaranteed return to the owners, was the best solution.

Officials of the city of Providence appeared at the third hearing. The fourth hearing was devoted to listening to the opinions of members of the General Assembly. The committee is directed to make a report on or before March 26 to the Assembly.

I. T. S. Rate Case Closed

With the hearing of oral arguments at Springfield, Ill., on March 20, on the petition of fourteen local utilities included in the Illinois Traction System, Peoria, for emergency increases in rates the case was closed and the Public Service Commission took the matter under advisement. Arguments opposing the proposed increases were presented by representatives of Bloomington, Champaign, Decatur and other cities, while in some of the cases the opposition was withdrawn. The Council of Clinton has already accepted the rates. Quincy, Jacksonville and Ottawa were not represented for argument. Counsel for the city of Bloomington questioned the authority of the commission to change the franchise rates. H. I. Green, counsel for the company, cited the case of the Chicago & West Towns Railroad as a precedent. The ruling of the commission on the application of this company was referred to in the *ELECTRIC RAILWAY JOURNAL* for Feb. 9, page 295. Mr. Green closed for the company.

Transportation News Notes

One-Man Cars for Houston.—The Houston (Tex.) Electric Company expects to receive eighteen one-man cars during April.

Skip-Stop Trial in Des Moines.—The skip-stop plan will be tried in Des Moines for a month, starting on April 1 on the University line.

Interurban Uses Skip Stop.—The Indianapolis & Louisville Traction Company is adopting the skip-stop plan to an extent in the local interurban service between Louisville, Ky., and Indianapolis, Ind.

Fare Appeal in Jackson.—The Michigan United Railways, through J. F. Collins, vice-president and general manager, has appealed to the City Commission of Jackson for permission to put a 6-cent fare into effect in that city.

Augusta-Aiken Fares Increased.—Passenger fares on the Augusta-Aiken Railway & Electric Company's lines from Augusta to Aiken, S. C., through the Horse Creek Valley, were increased on March 1, from 25 cents to 40 cents, with the approval of the Railroad Commission of South Carolina.

Twenty per Cent Freight Increase Allowed.—The Public Service Commission of New Hampshire has granted the Claremont Railway & Lighting Company a 20 per cent increase in freight rates, to take effect immediately, pending a further investigation of the proposed increase, placed with the commission some months ago.

Road Wants Mileage Fares.—The Missouri & Kansas Interurban Railway, the so-called Strang line, which operates between Kansas City, Mo., and Olathe, Kan., has applied to the Public Utilities Commission of Kansas for permission to establish a passenger rate of 3 cents a mile between all points in Kansas. At present the road is divided in zones.

New Hampshire Company Seeks Increase.—The Keene (N. H.) Electric Railway, operating between West Keene and Marlboro, also between West Keene and Spragueville, has petitioned the Public Service Commission for a new schedule of fares. At present the single fares are 6 cents, and the company desires that the single fare be raised to 7 cents. Books containing seven-trip tickets and 100 rides will be sold for slightly less than the single fare.

Stops Eliminated in Reading.—In line with the efforts of the police department more effectively to regulate traffic and complying with the government's advocacy of fewer car stops to conserve power, the Reading Transit & Light Company, Reading, Pa., recently agreed to discontinue a number of half square car stops, especially where lines intersect Court and Cherry Streets. These continued to be stopping places after half square stops were generally abandoned several years ago. The new order went into effect on March 17.

Meralco Hit by Coin Shortage.—Because of the emergency arising out of the shortage of copper coins and 5 centavo pieces, the Manila Electric Railroad & Light Company, Manila, P. I., has been forced to resort to the use of "1 centavo fare coupons" as small change on the cars. Each conductor received a book containing 100 of the coupons, which are of the same size as car tickets now in general use. Ten of the coupons are accepted for one second-class fare, and twelve of them for one first-class fare. They are also accepted toward the purchase of car tickets and in the payment of electric light bills.

Another Company Feels the War Burdens.—J. A. Cleveland, vice-president and general manager of the Saginaw-Bay City Railway, Saginaw, Mich., has issued a statement to the press of the cities in which the company operates reviewing the conditions of increasing costs that confront the utilities. Mr. Cleveland said that "conditions have reached a point where it is now spelling disaster to the public utilities of the country and the inevitable result will be that these companies will cease to be able to furnish proper and adequate service to the public depending upon them unless some relief is obtained and this relief obtained immediately."

Owl Service Considered for Dallas.—Owl car service on all the principal lines of the Dallas (Tex.) Railway is being considered by Richard Meriwether, general superintendent, on petitions from a number of residents of the city. The matter has also been referred to M. N. Baker, supervisor of public utilities, who is investigating to determine the amount of patronage such service could expect. Messrs. Meriwether and Baker have addressed inquiries to the persons who signed the petitions, asking on what lines cars should be operated and how often. If it is shown that the service is really desired, Mr. Meriwether declares that it will be started.

Fare Charge Upheld.—The borough of Catasauqua complained that the cash fare of 10 cents charged by the Lehigh Valley Transit Company, Allentown, Pa., for single trips between Allentown and Catasauqua was discriminatory and excessive, and that the practice of selling round-trip tickets between these points only at the offices of the company was unreasonable. After a hearing, the Public Service Commission of Pennsylvania decided that the fare of 10 cents for a single trip was neither excessive nor discriminatory, but that the company should place the sale of round-trip tickets in the hands of the conductors on all cars operating between Catasauqua and Allentown.

Steam Road Protests Electric Interchange.—The Lake Erie & Western Railroad (steam) has filed a suit against the Public Service Commission of Indiana seeking to have set aside an order of the commission requiring that company to receive freight in carload lots from the Chicago, Lake Shore & South Bend Railway (electric). The Lake Erie & Western Railroad contends that the electric railway does not have the terminal facilities, trackage or equipment that would compare with its own and that it is being forced to make business for the electric railway company under the order of the commission. The steam railroad further contends that all of the towns reached by the interurban railway are now connected by steam railroad.

Chicago Revival Makes Traffic Problem.—With about 50,000 people in attendance on Sunday, March 10, the first day of the Billy Sunday campaign in

Chicago, which is to be conducted there during the coming six weeks, the revival promises to create an unusual traffic problem for the Chicago Surface Lines. The Sunday tabernacle is located on Chicago Avenue, near the Lake Shore Drive. It is served mainly by the Chicago Avenue line, with the Grand Avenue line about five blocks away. It is quite distant from the nearest elevated line. To facilitate handling the large crowds the Surface Lines have put in a new cross-over with a stub track which holds twenty-five cars. The Chicago Motor Bus Company is running extra buses, also, to take care of the people.

Complaint Hearings in Pennsylvania.—The Public Service Commission of Pennsylvania, during the week ended March 16, heard electric railway cases in which conditions in Philadelphia, Pittsburgh and Harrisburg were considered. The commission also discussed in executive session the question of jurisdiction in complaints against increases of fare where a 5-cent rate is specified in a franchise ordinance. Complaints of the city of Philadelphia, associations and individuals of that city against the Philadelphia Rapid Transit Company were heard on March 14 in Philadelphia; city of McKeesport against the Pittsburgh Railways in Harrisburg on March 11, and George A. Herring against Harrisburg Railways in Harrisburg on March 13.

Service Hearing in Trenton on April 30.—The Board of Public Utility Commissioners of New Jersey, at the close of the recent hearing on the application of the city of Trenton for improved electric railway service adjourned the matter until April 30 in order to give ample time for the board to conduct an independent investigation by its own inspectors of the service of the Trenton & Mercer County Traction Corporation, its alleged defects and suggested remedies. Peter Witt, Cleveland, testified as to how the company could increase its revenues and at the same time reduce expenses. Rankin Johnson, president of the company, said one of the greatest sources of trouble was the narrow streets. Mr. Witt suggested the installation of fare boxes. He estimated that the use of the boxes would increase the gross revenue materially.

Transfer Interchange Action Likely.—It is regarded as more than likely that the city of Los Angeles, Cal., will attempt to compel the interchange of transfers between the Los Angeles Railway and the Pacific Electric Railway. City Attorney Albert Lee Stephens has announced that in his opinion this is a matter affecting rates, and as the State Railroad Commission has jurisdiction over rates, he would ask the City Council to bring an action before the commission. Following the announcement of Mr. Stephens, Councilman O. P. Conaway, chairman of the public utilities committee of the Council, stated that he would advise action by the Council. Prior to 1915 when the rate-fixing power passed into the hands

of the State Railroad Commission, the courts held against the city in a suit known as the Ninth Street case, brought for a similar purpose.

864,400 Miles One Man's Record.—The local paper at Stroudsburg, Pa., said recently: "Bill' Starner, the well-known motorman on the Stroudsburg Passenger Railway, has the proud distinction of being the most traveled man in this part of the world. 'Bill' has traveled over the billowy main—snow banks and all—with wonderful regularity, for a period of nigh thirty years. It may not be known that 'Bill' travels 100 miles a day, but he does this nevertheless and smilingly acknowledges that most of the trip is taken on a 'moving sidewalk,' i. e., a trolley car. It is interesting to note from 'Bill's' log that, as said before, he has been a-going nearly thirty years and has been feeling just right because his circulation has always been well taken care of from early morning until 'early' at night." The paper estimates that Mr. Starner has traveled 864,400 miles.

Changes in Downtown Pittsburgh Traffic.—The engineering conference committee, consisting of representatives of the city of Pittsburgh, the Pittsburgh Railways and the Public Service Commission of Pennsylvania, after investigating various matters connected with the railway situation in Pittsburgh, made certain recommendations for improvements, and the commission after considering the matter as thus presented issued orders to the railway and recommendations to the municipal authorities designed to carry out the determinations of the committee. These recommendations and orders relate principally to the routing of cars, the changing of stops and the bettering of traffic conditions by various measures which tend to relieve the congestion in the downtown district. They are of interest principally to residents of Pittsburgh or to those familiar with the topography of that city. The case is reviewed in Complaint Docket No. 1571 of the commission.

Diversion of Cars Not Upheld.—The Supreme Court of the State of Washington recently dismissed the order of the Public Service Commission which required the Puget Sound Traction, Light & Power Company to divert the Twenty-third Avenue car line through the downtown section of Seattle during the heavy traffic hours of morning and evening. The case has been in litigation for two years. The Supreme Court held that the through service order granted by the commission in 1915 and later upheld by the Superior Court of Thurston County was unreasonable and that some inconvenience must be expected in reaching the city by residents of the outlying district. The company contended that its yearly operating expenses would be increased \$19,000 by routing its cars through the city. The decision states that in satisfying the public need a carrier is not also bound to satisfy a public inconvenience at any considerable loss to itself, when the service is already adequate.

Personal Mention

J. W. Wood has recently been appointed claim agent of the Savannah (Ga.) Electric Company to succeed J. J. Garity.

R. Frank Jones has recently been appointed secretary of the Macon Railway & Light Company, Macon, Ga., to succeed E. W. Cabaniss.

T. L. Small has recently been appointed assistant treasurer of the Savannah (Ga.) Electric Company to succeed L. E. Drew.

T. C. Nielson has been appointed claim agent of the Alton, Granite & St. Louis Traction Company, Alton, Ill., to succeed C. H. Bartels.

Floyd L. Brewster has been appointed master mechanic of the Binghamton (N. Y.) Railway. Mr. Brewster was graduated from Syracuse University, College of Applied Science, class of 1912, with the degree of electrical engi-

S. J. Steiner has been appointed engineer of maintenance of way of the Aurora, Elgin & Chicago Railroad, Aurora, Ill., to succeed D. H. Howard.

W. L. Campbell has recently been appointed purchasing agent of the Sterling, Dixon & Eastern Electric Railway, Dixon, Ill., to succeed G. H. Ludeking.

J. J. Thames, Jr., has recently been appointed treasurer and auditor of the Macon Railway & Light Company, Macon, Ga., to succeed Richard Ouderluys.

Frank R. Coates, president of the Toledo Railways & Light Company, Toledo, Ohio, has been elected first vice-president of the National Baseball Federation.

Oscar S. Straus, nominated by Governor Whitman of New York to the Public Service Commission for the First District of New York to succeed himself, has been confirmed by the State Senate.

W. J. Harvie, treasurer and general manager of the Syracuse & Northern Electric Railway, Inc., Syracuse, N. Y., has in addition been elected vice-president of the company to succeed T. C. Cherry, now president of the company.

Harry W. Alexander, director of publicity of the Society for Electric Development, Inc., New York, N. Y., has resigned to become assistant to president on sales of the American Writing Paper Company, New York, and Holyoke, Mass.

C. N. James, formerly engineer of overhead construction of the St. Petersburg & Gulf Railway, St. Petersburg, Fla., is now a sergeant with the Fourth Company, Coast Artillery Corps, at Fort Dade, Fla. He plans to enter the school for electrician sergeants at Fortress Monroe, Va.

T. C. Cherry was elected president of the Syracuse & Northern Electric Railway, Inc., Syracuse, N. Y., on March 15. Mr. Cherry succeeds C. Loomis Allen as president of the road. He is vice-president of Allen & Peck, Inc., engineers and operators in charge of the operating management of the Syracuse & Northern Electric Railway, formerly known as the South Bay road.

Roy B. Woolley of the publicity and sales department of the Society for Electrical Development, Inc., New York, N. Y., but late of the American Ambulance Field Service, Verdun sector, France, has been appointed director of publicity of the society to succeed Henry W. Alexander, whose appointment to the position of assistant to president of the American Writing Paper Company, New York, N. Y., is noted elsewhere in this department.

William Priest, since March 1, 1907, division electrician of the Union Trac-

tion Company of Indiana at Muncie, has resigned to accept a position on the Coast. Mr. Priest has been connected with the Union Traction Company and its predecessors for nineteen years. He was working in the shops at Muncie in 1899 when the Citizens' Street Railway, Muncie, the City & Interurban Railway and the Anderson City Street Railway were consolidated and the line built between Muncie and Indianapolis. Mr. Priest continued at Muncie until the completion of the substations at that place and at Daleville, when he went to Daleville to operate the station. In the spring of 1901 he was transferred to the Marion substation, where he worked until the line was started between Indianapolis and Logansport. He was then transferred to Tipton to help install substations. Since then he has been engaged on construction work.

C. H. Van Hooven, claim agent of the Manila Electric Railroad & Light Corporation, Manila, P. I., who has been visiting the United States on a vacation and for the purpose of consulting with officers of the J. G. White Management Corporation, New York, N. Y., the operating managers of the Manila cor-



F. L. BREWSTER



C. H. VAN HOOVEN

neer. Immediately upon graduation he entered the employ of the New York State Railways at Syracuse as night man at one of the substations. A few months later he was transferred to day work at the Townsend Street substation. In the fall of 1912 he was made chief clerk to the master mechanic of the New York State Railways, and on Jan. 1, 1918, was appointed assistant master mechanic of the company. He resigned from the last-mentioned position to become connected with the Binghamton Railway.

E. R. Kennedy has recently been appointed master mechanic of the Cairo Railway & Light System, Cairo, Ill., to succeed C. C. McGarvey.

G. S. White has recently been appointed purchasing agent of the Chicago & Interurban Traction Company, Chicago, Ill., to succeed C. E. Cox.

C. R. Harvey has recently been appointed treasurer of the Fairburn & Atlanta Railway & Electric Company, Fairburn, Ga., to succeed J. H. Longino.

poration, is returning to the Philippines by way of Hawaii and Japan. While in the United States Mr. Van Hooven also devoted considerable time to inspecting the claim methods of electric railways in a number of large cities. He has been connected with the Manila Electric Railroad & Light Company for the last ten years. Mr. Van Hooven was recently admitted to the Philippine bar, having successfully completed the law course at Manila University.

Gilbert Duffy, formerly office manager in the engineering department of the Puget Sound Traction, Light & Power Company, Seattle, Wash., has been appointed secretary to the manager, succeeding J. M. Wilmott, who had been appointed sales manager for the coal mines.

Theodore P. Shonts, president of the Interborough Rapid Transit Company, New York, N. Y., contributed an article, "Sociology and Traction, City's New Rapid Transit Problem," to the magazine section of the New York Sun for

March 10. Mr. Shonts showed the relation between the growth of population and the increase of transportation facilities. He also considered what is in store for the traveling public of New York in the future.

J. R. Lowe has been appointed superintendent and assistant chief engineer of the San Diego & South Eastern Railway, San Diego, Cal. Mr. Lowe is thirty-five years old. He was connected with the Pacific Electric Railway for twelve years, the last eight years in charge of all field survey work in the maintenance of way department. Mr. Lowe is also superintendent and assistant chief engineer of the San Diego & Arizona Railway, which has consolidated with the San Diego & South Eastern Railway.

W. B. Jackson, for many years editor of the public utility column of the *Wall Street Journal*, and later with Claude Meeker, investment broker, is now associated with the bond department of Henry L. Doherty & Company, New York, N. Y. Mr. Jackson is regarded as one of the best posted newspapermen as regards not only public utilities, but various other corporations, as he is intimately acquainted with financing as well as operating problems.

C. Nesbitt Duffy, vice-president and general manager of the Manila Electric Railroad & Light Corporation, Manila, P. I., has been elected president of the board of directors of the Manila Merchants' Association. He succeeds Harold M. Pitt, who has held the office for five years. Mr. Duffy has been actively interested in the welfare of the organization since he entered the Manila business community. He served several years as vice-president of the board.

E. B. Sisson, formerly local superintendent of the Terre Haute, Indianapolis & Eastern Traction Company at Terre Haute, Ind., has been appointed assistant superintendent of transportation of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, with offices at South Bend, Ind. Mr. Sisson entered the service of the Terre Haute, Indianapolis & Eastern Traction Company in 1903 as interurban motorman, and was promoted to the position of inspector three years later.

J. D. Bowles has resigned as electrical superintendent of the Springfield Railway & Light Company, Springfield, Mo., to become connected with a manufacturing company. Mr. Bowles was graduated from Missouri University in 1909 with the degree B.S., and in 1910 received the degree E.E. He engaged in contracting work with a St. Louis and Chicago firm and then entered the service of the Public Service Commission of Missouri. He resigned from the commission to accept appointment to the company at Springfield.

William Baker, assistant chief engineer at the Anderson power plant of the Union Traction Company of Indiana for several years, has been appointed acting chief engineer to succeed Henry Comiskey, resigned. Mr. Baker was chief engineer for the Indiana Rolling

Mill Company from 1908 to 1912. After leaving the Indiana Rolling Mill Company he was appointed chief engineer of the so-called Honey Bee Company about one year before it was taken over by the Union Traction Company. From there he was transferred to the Anderson power plant as assistant chief engineer.

Robert F. Scott, Jr., is on an indefinite leave of absence from the Terre Haute division of the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., of which he is engineer maintenance of way. Mr. Scott left on March 6 for an Atlantic port to take up his new duties as first lieutenant in the railway transportation division. He has been with the Terre Haute property in his present capacity for the last nine years, going there soon after his graduation from Princeton in the class of 1907. Mr. Scott is widely and popularly known in electric railway circles in the Central Electric Railway Association territory.

Robert S. Tomkins was recently appointed assistant treasurer of the Public Service Railway, Newark, N. J., to succeed Robert D. Miller, deceased. Mr. Tomkins entered the employ of the Jersey City & Bergen Railroad, now included in the system of the Public Service Railway, as a clerk in August, 1889. He continued in the employ of the railways in Jersey City until July, 1895, when he was made paymaster for the Consolidated Traction Company. He continued as paymaster of the North Jersey Street Railway, Jersey City, Hoboken & Paterson Street Railway and the Public Service Railway until he was appointed to succeed the late Mr. Miller.

J. R. Ong has resigned as electric railway engineer for the Railroad Commission of Wisconsin to accept the position of traffic engineer for the board of control of the Kansas City (Mo.) Railways. Mr. Ong was graduated from Purdue University in 1909. His practical railway experience began in car shops and power plants during the construction and early operating period of the Indianapolis & Cincinnati Traction Company and the Chicago, Lake Shore & South Bend Railroad. After he was graduated from Purdue Mr. Ong became an apprentice in the East Pittsburgh works of the Westinghouse Company and was later transferred to the Philadelphia sales office of the company. In 1911 he became superintendent of substations on the Fort Dodge, Des Moines & Southern Railway. In December, 1911, Mr. Ong accepted the appointment as electric railway engineer on the joint engineering staff serving the Railroad Commission of Wisconsin and the Wisconsin Tax Commission. In this position Mr. Ong has made extended studies for the Railroad Commission relating to operating matters and service on the electric railways of Wisconsin. The valuation of the electrical equipment of power plants and substations made by the engineering staff was also under Mr. Ong's direction.

New Publications

Finding and Stopping Waste in Modern Boiler Rooms

A reference manual to aid the owner, manager and boiler-room operator in securing and maintaining plant economy. Harrison Safety Boiler Works, Philadelphia, Pa. 274 pages. Flexible cloth, \$1.

Of special value in these times of fuel shortage is this little manual on a very live subject. In it sections are devoted to fuels, combustion, heat absorption, boiler efficiency and boiler testing, and boiler plant proportioning and management. A few pages at the end are taken up with clear diagrams of meters made by the company.

The book is replete with data and is liberally illustrated, principally with curves, showing the relations of the various quantities which have to do with combustion. The subject matter of the book was intended originally as an appendix to one of the company's catalogs, but during preparation it grew to such magnitude and took on such a comprehensive character that it was deemed advisable to put it into separate book form.

The Calorific Power of Fuels

By Herman Poole. Third edition, rewritten by Robert Thurston Kent. John Wiley & Sons, Inc., New York, N. Y. 267 pages. Cloth, \$3 net.

In revising the text of the late Mr. Poole's work on fuels, Mr. Kent found that during the eighteen years since the last edition was published there have been so many advances that it was necessary practically to rewrite the book. In doing so he has utilized the researches of the United States Geological Survey and Bureau of Mines and has adopted as units the pound and the B.t.u., instead of the kilogram and calorie which were used in the earlier editions. In the new edition the measurement of the heating value of fuels and the results of a study of the general characteristics of available fuels are gone into very thoroughly. Numerous calorimeters are described with the aid of cross-sectional drawings. Each important commercial fuel is treated separately with full data of composition and combustion qualities. Valuable suggestions are also given as to the operation of furnaces, flue-gas analysis, etc. In an appendix is given the full text of the "Power Code" of the American Society of Mechanical Engineers. A number of steam and other standard tables are also included.

The conductor grabbed at her—

I heard his teeth chatter

As the pavement she struck with a flop.

'Twas in very bad taste

To alight in such haste,

For the car had not come to a stop.

—A-Z-U-R-I-D-E, Los Angeles Railway.

Construction News

Construction News Notes are classified under each heading alphabetically by States. An asterisk (*) indicates a project not previously reported.

Recent Incorporation

***Havre de Grace-Taneytown Electric Railway, Havre de Grace, Md.**—Incorporation papers for the Havre de Grace-Taneytown Electric Railway have been approved by the State Tax Commission. The company plans to construct a line from Havre de Grace to Taneytown, via Towson, Finksburg and Westminster, about 65 miles. Officers: C. Stanley Stirling, 423 Calvert Building, Baltimore, president; J. Frank Foster, Colora, vice-president; George O'Brien, secretary, and James P. Reese, 32 South Street, Baltimore, treasurer.

Franchises

Birmingham, Ala.—The Alabama Interurban Railway has asked the Board of Revenue of Jefferson County for franchises covering its proposed line from Birmingham to the Warrior River. [March 16, '18.]

Tampa, Fla.—The Board of Public Works has granted permission to the Tampa Electric Company for the construction of an extension to the plant of the Tampa Shipbuilding & Engineering Company and the Oscar Daniels Company, and work will be begun immediately.

Hammond, Ind.—The city of Hammond has begun suit in the Indiana courts to compel the Chicago & Hammond Street Railway to forfeit a fifty-year franchise, obtained from the city in 1904, on account of insufficient service.

Butte, Mont.—The Butte Electric Railway has received a franchise from the City Council of Butte to construct an extension on Main Street from Galena Street to Quartz Street.

Trenton, N. J.—The Board of Public Utility Commissioners of New Jersey has approved the ordinance granted the Camden Horse Railroad by the town of Collingswood for the relocation of certain of its track and the establishment of double tracks in certain streets of Collingswood.

Track and Roadway

Little Rock Railway & Electric Company, Little Rock, Ark.—The city of Little Rock has awarded a contract to the Missouri Valley Bridge & Iron Company, Leavenworth, Kan., at \$5,900,

for the construction of a steel and concrete viaduct 40 ft. long, 36 ft. wide at Eleventh Street and Summit Avenue. The cost of the viaduct will be divided between the city and the Little Rock Railway & Electric Company.

Atlanta & Anderson Electric Railway, Atlanta, Ga.—It is reported that steps have been taken by the Atlanta & Anderson Electric Railway, under the authority recently given by the Georgia Railroad Commission, to issue \$20,000,000 of 5 per cent, forty-year first mortgage bonds for construction purposes, with the Empire Trust Company of Atlanta as trustee. According to the report, the building of the company's line from Atlanta, Ga., to Anderson, S. C., about 140 miles, has been postponed until business conditions have improved. J. L. Murphy, Atlanta, president. [Dec. 8, 1917.]

Chatham County Traction Company, Savannah, Ga.—Construction will be begun at once by the Chatham County Traction Company on its line from Stiles Avenue to the Brampton tract. [March 9, '18.]

Fort Madison (Iowa) Street Railway.—Work will soon be begun by the Fort Madison Street Railway on the construction of an extension on Jefferson Avenue and Santa Fe Avenue, terminating at Second Avenue.

Trenton, Lakewood & Seacoast Railway, Trenton, N. J.—Chancellor Walker has signed an order requiring the Trenton, Lakewood & Seacoast Railway to show cause at Long Branch, N. J., why a receiver should not be appointed for the company. The order carries with it a preliminary injunction restraining the company from disposing of any of its assets pending the receivership application, which is made by Frank Tilford, New York, a bondholder. The company was formed to build an electric railway from Trenton to Lakewood and Point Pleasant, via Allentown, 40 miles, but no construction work has been done on the line. [June 2, 1917.]

Interborough Rapid Transit Company, New York, N. Y.—Henry Bruckner, Borough President of the Bronx, will present to the Board of Estimate plans for an extension of the new Lexington Avenue subway route clear through to City Island. According to an estimate made by Louis F. Haffen, Borough Engineer, the extension would cost about \$1,000,000. Plans for the new structure, drawn by Mr. Haffen, were submitted some time ago to the Public Service Commission for the First District of New York and turned over by that body to Chief Engineer Turner for investigation and report. Under Mr. Haffen's plan the new extension would cross Eastchester Creek to Rodman's Neck, thence across Pelham Bay

to City Island. Practically all of the land along the proposed extension is at present owned by the city.

Philadelphia, Pa.—Bids were opened on March 5 by the Department of City Transit of Philadelphia for furnishing and delivering cast-iron fillet brackets for columns in Frankford Avenue between Church Street and Dyre Street, the lowest bidder being George B. Clopp, Philadelphia, at \$7,820.

Dallas (Tex.) Railway.—Work is under way by the Dallas Railway on the double-tracking of the Ervay Street line to the city limits and the double-tracking of the Columbia Avenue line. The company is experiencing great difficulty in securing laborers for carrying forward its program of improvements and betterments under the terms of its franchise.

Seattle (Wash.) Municipal Railway.—Plans have been submitted by City Engineer A. H. Dimock to the Board of Public Works for a proposed elevated line to the shipyards. As planned, the line will extend from First Avenue South and Washington Street to West Spokane Street and West Waterway and will permit more rapid transit to Riverside, the ship yards and West Seattle. The cost is estimated at about \$350,000.

Shops and Buildings

Gadsden, Bellevue & Lookout Mountain Railway, Gadsden, Ala.—Lightning recently caused the destruction of the carhouse of the Gadsden, Bellevue & Lookout Mountain Railway at Gadsden, together with three electric cars. The loss is estimated at several thousand dollars. It is proposed to reconstruct the carhouse at once.

Northern Ohio Traction & Light Company, Akron, Ohio.—Plans are being made by the Northern Ohio Traction & Light Company for the construction of new warehouses, laboratory, clubhouse and other buildings at Akron at a cost of about \$200,000.

Power Houses and Substations

New York & Queens County Railway, New York, N. Y.—This company has abandoned its former power plant at Long Island City fronting the East River, and has leased the property to the Maritime Warehouse Corporation.

Lehigh Valley Transit Company, Allentown, Pa.—Construction work has been completed on a tie line between the systems of the Lehigh Valley Transit Company and the Pennsylvania Utilities Company at Easton, a section of the line being constructed for 13,200 volts and the remainder for 33,000 volts. The new line will provide for an interchange of about 1200 kw. and will facilitate matters in the event of a breakdown on either system.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS

FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES • MARKET QUOTATIONS • BUSINESS ANNOUNCEMENTS

Lubricants and Oils Rapidly Advancing

Sale to Public Utilities Increases 50 Per Cent—Market in Upset Condition

The raw material—that is, crude oil—from which most of the machine lubricants are derived is not only high but is becoming scarce, refiners say. At least, it is not so easily obtainable as it was even a year ago. With a continually advancing market, the latest increase a few days ago, 25 cents a barrel, brings crude up to \$4 a barrel for Pennsylvania oil. There has also been an increase of 36 per cent on Southwestern crude. As one of the best-known refiners or manufacturers explained the situation to the *ELECTRIC RAILWAY JOURNAL* last week, an abnormal demand on crude stocks has drawn the reserve down rapidly. Last year 30,000,000 bbl. were taken from storage for domestic consumption; 50,000,000 bbl. were exported, 7,000,000 bbl. were imported and placed in storage.

Nevertheless, with apparently heavy stocks in various parts of the country, the danger line of insufficient crude for refining into lubricants and for other commercial purposes is not far off at the present rate of consumption, it is held. For transformer and other oils, which must be of the highest grade, for motors, dynamos, generators, turbines, and in fact all electrical machinery, prices are not only high but are constantly advancing. The last increase, which occurred two or three weeks ago, was 10 per cent. The supply of wood barrels is growing short, labor is difficult to retain, and the cost of delivery, declare refiners, is another controlling factor in to-day's refined-oil market. Manufacturers report great difficulty in securing proper quantities of oil to fill transformer orders. This situation is mostly due, it was said, to rail embargoes. The government is taking tremendous amounts of crude for fuel oil. In truth, its requirements dominate the oil market; or, as one representative refiner phrased it, oil will win the war. In 1915 crude oil sold at 9 cents. Now it sells at 20 cents, and at least 100 new refineries are under construction. Turbine and transformer oils absorbed at least 10 per cent of the surplus stock of crude oil. There is a comparatively easy market, deliveries are better, and government control would be an advantage. Further, according to the same authority, there has been fully 50 per cent increase in the sale of various fine oils for use by public util-

ties. Still another lubricant manufacturer stated that there has been from 10 to 50 per cent increase in the demand for electrical machinery oils and that deliveries were too uncertain even to talk about.

Recent Advance in Price of Car Seatings

Entire Line Affected—Scarcity of Basic Material—Some Goods Have Doubled in Cost

Material used in the construction of car seats and seatings is occasioning more or less uneasiness on account of the growing scarcity. Rattan covering, which comes from Singapore, is most uncertain, and the situation is becoming acute. Prices have not only advanced, but the goods are in short supply. Plush and leather have doubled in cost, and artificial leather has followed closely. According to one of the several manufacturers of car seats, who operate on a large scale, and are accustomed to carrying heavy reserve stocks of raw material, market conditions are fluctuating continually so much so that an increase of from 10 to 15 per cent was found necessary within the last few weeks.

Deliveries of malleable iron fixtures have been held up at all the foundries. The situation is not so acute as it was a few months ago, and some slight relief has been had, but the freight embargoes are still hindering shipments. In fact, as another manufacturer stated, some commodities in this class had been delayed fully six months.

Every manufacturer of recognized standing in the trade dwells upon the high cost of essential material; and while, as in other lines, some factories, anticipating their wants, are better prepared than others to meet emergency or hurried orders, it is conceded that the price advance is general and made obligatory by prevailing conditions.

Denver Sells Boilers

The tremendous demand for boilers is shown by some sales which have recently been made by companies which have been able to reduce their steam-generating capacity through more efficient operation. One of these is the Denver Tramway Company which reports the sale recently of five boilers of 415 hp. of the Sterling type, equipped with chain grate fittings, etc., to the Pennsylvania Shipbuilding Company at \$30 a horsepower. The boilers were installed in Denver about thirteen years ago, and the total amount received for them was \$62,250.

When the Purchasing Agent Should Use Foresight

A Supply Man Who Believes Deliveries Would Be Assisted If Requirements Were Anticipated

Doubtless the patience of everyone is tried to the breaking point when suspended shipments and delayed deliveries affect the arrival of needed car equipment and supplies. When priority orders and the difficulties of transportation at the present time are considered it may be borne in mind that every effort is being made to secure to the customer the best delivery time. In order to minimize confusion and make sure of receiving the immediately necessary articles a little foresight on the part of purchasing agents, storekeepers, or buyers in general would be of assistance. The buying trade has been repeatedly admonished to look the situation squarely in the face and anticipate sufficient requirements with consideration for prevailing delivery dates. Otherwise, according to the complaint, even reasonable deliveries cannot be effected.

In this connection a leading supply man takes occasion to criticize the dilatoriness of purchasing agencies in placing orders without due regard for current unavoidable delays in shipping and deliveries. The letter reads in part as follows:

"There is a matter which we think worthy of a little editorial attention, namely, the storekeeper or purchasing agent who waits until he is all out of a certain vitally necessary part before placing a requisition or order for the same; and who then proceeds to make the life of the supply man miserable with imploring and then threatening letters and telegrams regarding delivery. In these war times, with shortages in labor and raw materials and maddening freight and express delays and embargoes, prompt shipments and deliveries are not to be expected.

"If the railways would anticipate their future needs and place orders for these materials a reasonable period in advance of their actual requirements (specifying, if necessary, that deliveries were not desired before certain dates), they would have the material in their storeroom when required and not have to lay up equipment because of its non-receipt, and would actually save money at the same time, as in the endeavor to make prompt shipments and deliveries, manufacturers are obliged to offer exorbitant wages to workmen and to ship goods by express instead of by freight, and the consumer pays the excess, you may be sure."

Electric Hoist Manufacturers Complete Organization

Officers Selected and the Aims and Objects of the New Association Formulated

Believing that the experimental stage has been well passed and acceptable designs developed the various manufacturers of electric hoists have organized as the Electric Hoist Manufacturers' Association. The manufacturers of the United States, which comprise the new body, propose to co-ordinate and make available for the user all that is best in electric hoist design and practice. The following companies make up the membership:

- Brown Hoisting Machinery Company.
- Detroit Hoist & Machine Company.
- Euclid Crane & Hoist Company.
- Franklin-Moore Company.
- Link-Belt Company.
- Roeper Crane & Hoist Works.
- Shepard Electric Crane & Hoist Company.
- Sprague Electric Works of the General Electric Company.
- Yale & Towne Manufacturing Company.

The officers of the association are as follows: F. A. Hatch, chairman, Shepard Electric Crane & Hoist Company; F. W. Hall, vice-chairman, Sprague Electric Works; C. W. Beaver, secretary-treasurer, Yale & Towne Manufacturing Company.

The association holds monthly meetings for the purpose of studying the specific needs of the hoist user. It will consider uniform nomenclature pertaining to types and parts of electric hoists, fix upon a standard by which hoist motors shall be rated and promote their standardization as far as possible. It will also collect and disseminate information and statistics relative to the industry. The membership of the association is confined to those engaged in the manufacture of monorail electric hoists.

Australian Railways Buy American Shop Equipment

American manufacturers should study carefully the market for railway shop machinery and tools in Australia and New Zealand, says a report completed to-day for the Bureau of Foreign and Domestic Commerce, Department of Commerce, by Commercial Agent Frank Rhea. Of all the various lines of railway equipment and supplies in use in those countries, machinery and tools are first in volume of imports from the United States.

Other supplies and equipment for the state railways are purchased to some extent in America, because in some respects railway conditions in Australia and New Zealand are similar to those in the United States, but the tendency is to manufacture at home all possible supplies. In shop machinery and tools the American manufacturer, by reason of the recognized excellence of his product, is able to compete more successfully with European and domestic

concerns than in any other line, as shown by the business done in the past.

Copies of "Railway Materials, Equipment and Supplies in Australia and New Zealand," Special Agents Series No. 156, can be obtained at 25 cents a copy from the Superintendent of Documents, Government Printing Office, Washington, D. C., or from any of the district or co-operative offices of the Bureau of Foreign and Domestic Commerce.

Rolling Stock Deliveries

Further Evidence That Six Months or So Is Prevailing Time for Order

Many reports have been abroad concerning long deliveries of electric railway cars which the manufacturers state are entirely contrary to fact. In this

connection, W. H. Heulings, Jr., vice-president and general sales manager of the J. G. Brill Company of Philadelphia, has made the following statement for the ELECTRIC RAILWAY JOURNAL:

"The situation hasn't changed any for some time and a delivery of about six months is the prevailing time. We could make deliveries in six months from the time of receipt by us with the complete information to enable us to proceed, but we cannot make deliveries in six months from the time the order is first talked of or closed unless the manufacturing data are forthcoming without any loss of time."

This confirms the statement of Nic LeGrand, general sales agent of the St. Louis Car Company, which appeared in the March 2 issue of the ELECTRIC RAILWAY JOURNAL, in which the prevailing delivery period was given as five to six months upon receipt of the order.

Rolling Stock

Saginaw-Bay City Railway, Saginaw, Mich., is mentioned in the March 2 number of the ELECTRIC RAILWAY JOURNAL as ordering seven double-end double-truck city cars from the St. Louis Car Company, which are to be delivered in four months. The specifications follow:

Number of cars ordered.....	7
Name of road.....	Saginaw-Bay City Ry. Co.
Date order was placed.....	Jan. 20, 1918
Date of delivery.....	4 months
Builder of car body.....	St. Louis Car Co.
Type of car.....	28-in. double end double truck semi-steel
Seating capacity.....	40
Weight (total).....	36,000 lb.
Length over bumpers.....	42 ft. 4 in.
Length over vestibule.....	4 ft. 0 in.
Width over all.....	41 ft. 0 in.
Body.....	Semi-steel
Interior trim.....	Mahogany
Headlining.....	3-ply poplar
Roof.....	Arch
Air brakes.....	Westinghouse
Bumpers.....	Hedley Anti-Climber
Car trimmings.....	St. Louis Car Co.
Control type.....	K
Couplers.....	St. Louis Car Co.
Curtain fixtures.....	Curtain Supply Co.
Curtain material.....	Pantasote
Designation signs.....	St. Louis Car Co.
Door operating mechanism.....	St. Louis Car Co.
Fenders.....	Root
Hand brakes.....	St. Louis Drop Handle
Heaters.....	P. Smith Hot Air
Headlights.....	Ohio Brass Co.
Journal boxes.....	St. Louis Car Co.
Registers.....	R-5 Int.
Sanders.....	St. Louis Car Co.
Sash fixtures.....	St. Louis Car Co.
Seats, style.....	Hale & Kilburn
Seating material.....	Rattan
Step treads.....	Teralin
Trolley catchers.....	Ohio Brass Co.
Trucks, type.....	St. Louis Max Tract. No. 106a
Ventilators.....	St. Louis Car Co.
Buzzers.....	Faraday
Track scrapers.....	Root "Air"

Hudson & Manhattan Railroad, New York, N. Y., which operates the tunnel and subway system under the Hudson River and in New York, as well as the line from Jersey City to Newark, N. J., now under the control of the government, is reported to be making preparations to construct a spur to Port Newark and intermediate shipbuilding points for the transportation of the workmen. From sixty to 100 new all-steel cars are also being considered in the same connection, specifications for which, it

is stated, have been requested by the Emergency Fleet Corporation. When the work and equipment are finally decided upon it will go forward at top speed.

Brooklyn (N. Y.) Rapid Transit Company has requested cost specifications on fifty new center-entrance trail cars.

Washington Railway & Electric Company, Washington, D. C., is reported about ready to place an order for from twenty-five to thirty-five new cars.

Fort Wayne & Northern Indiana Traction Company, Fort Wayne, Ind., has asked car builders for quotations on ten one-man city car bodies for the Lafayette division, but it proposes to use the present trucks and equipment. The company also has received proposals on twenty-five one-man cars complete, eight for Logansport and seventeen for the Fort Wayne division.

Saginaw-Bay City Street Railway, Saginaw, Mich., which was referred to in the ELECTRIC RAILWAY JOURNAL of March 2 as ordering fourteen one-man cars from the St. Louis (Mo.) Car Company, has specified the following equipment:

Number of cars ordered.....	14
Name of road.....	Saginaw-Bay City
Date order was placed.....	Jan. 20, 1918
Date of delivery.....	Four months
Builder of car body.....	St. Louis Car Co.
Type of car.....	One-man
Seating capacity.....	30
Weight (total).....	14,000 lb.
Length over bumpers.....	27 ft. 9 1/2 in.
Width over all.....	3 ft.
Body.....	Semi-steel
Interior trim.....	Birch
Headlining.....	Three-ply veneer
Roof.....	Arch
Air brakes.....	Westinghouse
Car trimmings.....	St. Louis
Curtain fixtures.....	Curtain Supply Co.
Curtain material.....	Pantasote
Designation signs.....	St. Louis
Fenders or wheelguards.....	Root
Hand brakes.....	St. Louis
Heaters.....	Smith Hot Air
Headlights.....	Ohio Brass
Journal boxes.....	St. Louis
Registers.....	Int. R5
Sanders.....	St. Louis
Sash fixtures.....	St. Louis
Seats, style.....	St. Louis
Seating material.....	Rattan
Step treads.....	Feralum
Trolley catchers or retrievers.....	O. B.
Trucks, type.....	St. Louis 72A
Ventilators.....	St. Louis
Wheels (type and size).....	26-in. Grey
Special devices, etc.....	Safety control

Slate Belt Electric Railway, Pen Argyl, Pa., mentioned in last week's ELECTRIC RAILWAY JOURNAL as ordering interurban cars from the J. G. Brill Company, has furnished the following specifications:

Number of cars ordered.....	4
Name of road.....	Slate Belt Electric Ry. Co.
Date order was placed.....	Feb. 21, 1917
Builder of car body.....	J. G. Brill Co.
Type of car.....	Combination passenger and smoking, convertible bodies
Seating capacity.....	48
Weight (total).....	48,800 lb.
Bolster centers, length.....	24 ft. 0 in.
Length over bumpers.....	47 ft. 0 in.
Length over vestibule.....	46 ft. 0 in.
Width over all.....	8 ft. 5 in.
Height, rail over trolley board.....	11 ft. 4 1/4 in.
Body.....	Semi-steel
Interior trim.....	Cherry
Headlining.....	"Agasote"
Roof.....	Plain arched
Air brakes.....	Westinghouse
Axles.....	"EB" Hammered steel
Bumpers.....	J. G. Brill Co.
Car trimmings.....	J. G. Brill Co.
Control, type.....	"H. L." (Westinghouse)
Couplers.....	Portable draw bar
Curtain fixtures.....	Curtain Supply Co.
Curtain material.....	Pantasote
Designation signs.....	Illuminated
Door operating mechanism.....	Brill Manual
Gears and pinions.....	Westinghouse
Hand brakes.....	Brill standard
Heaters.....	"Peter Smith" hot water
Journal boxes.....	Brill standard
Motors.....	Westinghouse No. 306, inside hang
Paint, varnish.....	J. G. Brill Co. standard
Registers.....	Ohmer
Sanders.....	Universal Air
Sash fixtures.....	O. M. Edwards Co.
Seats, style.....	Brill standard "Winner"
Seating material.....	Flush in passenger and Fabrikoid smoking compt.
Springs.....	Brill standard
Step.....	Oak with "Feralium" tread
Trucks, type.....	Brill 27 MCB2X
Ventilators.....	Automatic Ventilators Co.
Wheels (type and size).....	33-in. cast steel

Pittsburgh (Pa.) Railways has just had delivered the last of the fifty cars ordered from the St. Louis Car Company last year.

Gadsden, Bellevue & Lockout Mountain Railway, Gadsden, Ala., had its carhouse and three passenger cars destroyed, with a fourth badly damaged by fire, on March 6, which was caused by lightning. The loss was several thousand dollars. The cars will be replaced as soon as possible, and the carhouse rebuilt at once.

Washington-Virginia Railway, Washington, D. C., recently acquired from the J. G. Brill Company two interurban cars originally ordered for the Slate Belt Electric Street Railway, Pen Argyl, Pa., as mentioned in last week's issue of the ELECTRIC RAILWAY JOURNAL. The specifications are the same in both cases, with the exception that in the Washington company cars there were a few minor changes, the most im-

portant being the substitution of seats upholstered in cane for both the smoking and passenger compartments.

Cincinnati & Columbus Traction Company, Cincinnati, Ohio, reports it needs a motor-equipped freight car of 50,000 to 60,000 lb. capacity.

Wason Manufacturing Company, Springfield, Mass., advises the ELECTRIC RAILWAY JOURNAL it has had no order for trail trucks from the Cumberland County Power & Light Company, Portland, Me., for a year. This matter was referred to in this column last week.

Illinois Traction System, Peoria, Ill., is speeding up the repair of electric motors which were disabled during the recent winter blizzards. The company had about thirty electric locomotives, which were so damaged during the storms that their further use was prohibited until extensive repairing had been done.

West Penn Railways, Pittsburgh, Pa., has recently placed an order for twenty-nine all-steel, double-truck, double-end city cars, to be used on its lines in Wheeling, W. Va. Also nine semi-steel, center-entrance, interurban cars for interurban service between Wheeling, W. Va., and Steubenville, Ohio. Also four semi-steel, center-entrance interurban cars for use on its lines in the coke region of Pennsylvania. The cars will be built by the Cincinnati Car Company.

New Advertising Literature

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.: Pamphlet containing articles on heavy traction by F. H. Shepard, which appeared in recent issues of the *Electric Journal*.

National Pneumatic Company, New York and Chicago: A pamphlet entitled "Maximum Revenue Mileage from the Electric Railway Car." This publication reviews the many advantages of pneumatic door and step control from the standpoints of increased mileage, greater safety, better fare collection, decreased car upkeep, elimination of manual labor and cultivation of public good will.

Trade Notes

Easton Car & Construction Company, Easton, Pa., announces the opening of a branch office in Washington.

Fred B. Duncan has been appointed manager of the Chicago office of the Packard Electric Company, Warren, Ohio.

Union Smelting & Refining Company, Newark, N. J., has moved into its new plant at Avenue L and St. Charles Street.

Gulick-Henderson Company, Inc., New York, N. Y., inspector engineer, has removed its offices from 21 Park Row to the Herald Square Building, 141-145 West Thirty-sixth Street, in order to provide larger and more suitable quarters.

Economy Electric Devices Company, Chicago, has sold to the Fort Wayne & Northern Indiana Traction Company its energy checking devices, Sangamo economy meters, for installation on the cars of the Fort Wayne-Decatur 1200-volt interurban line.

National Pneumatic Company, New York and Chicago, is to equip the 100 new double-end cars of the Philadelphia Rapid Transit Company with its 2 1/2 x 4 1/2 National pneumatic door engines, door shafts and other door and step control fittings complete. National pneumatic interlocking safety door control is also provided to be operative for either single or two-car operation. In train operation the conductor at the rear of the first car will also control the front doors of the following car.

Chicago (Ill.) Varnish Company has placed on the market a new enameling system for car painting under the trade name of Enamelite Ce Ve System. This new system is clearly a war time process which makes possible high grade painting and finishing of cars at a marked saving in the cost of labor and material. The new system of painting is equally as applicable to wood and steel car bodies. It embodies the undercoats of the well-known Ce Ve process and a double coat of Enamelite enamel, giving a very durable finish to the body without sacrificing any of the quick drying qualities for which the Ce Ve process has become noted.

RAILWAY MATERIALS

	Mar. 13 27-30	Mar. 20 27-30
Rubber-covered wire base, New York, cents per lb.		
Weatherproof wire (100 lb. lots), cents per lb., New York	28 1/4 to 34 1/4	28 1/4 to 34 1/4
Weatherproof wire (100 lb. lots), cents per lb., Chicago	33.42 to 38.35	33.42 to 38.35
Rails, heavy, Bessemer, Pittsburgh	\$55.00	\$55.00
Rails, heavy, O. H. Pittsburgh, per gross ton	\$57.00	\$57.00
Wire nails, Pittsburgh, per 100 lb.	\$3.50	\$3.50
Railroad spikes, 9/16 in., Pittsburgh, per 100 lb.	\$3.90	\$3.90
Steel bars, Pittsburgh, per 100 lb.	\$5.00	\$5.00
Sheet iron, black (24 gage), Pittsburgh, per 100 lb.	\$4.90	\$4.90
Sheet iron, galvanized (24 gage), Pittsburgh, per 100 lb.	\$5.80	\$5.80
Galvanized barbed wire, Pittsburgh, cents per lb.	\$4.35	\$4.35
Galvanized wire, ordinary, Pittsburgh, cents per lb.	\$3.95	\$3.95
Cement (carload lots), New York, per bbl.	\$2.25	\$2.25
Cement (carload lots), Chicago, per bbl.	\$2.31	\$2.31
Cement (carload lots), Seattle, per bbl.	\$2.65	\$2.65
Linsed oil (raw, 5 bbl. lots), New York, per gal.	\$1.53	\$1.53
Linsed oil (boiled, 5 bbl. lots), New York, per gal.	\$1.54	\$1.59
White lead (100 lb. keg), New York, cents per lb.	10	10
Turpentine (bbl. lots), New York, cents per gal.	44 1/2	44 1/2

NEW YORK METAL MARKET PRICES

Copper, ingots, cents per lb.	23 1/2	23 1/2
Copper wire base, cents per lb.	26 1/4 to 26 3/4	26 1/4 to 26 3/4
Lead, cents per lb.	7 1/4	7 1/4
Nickel, cents per lb.	50	50
Spelter, cents per lb.	7 3/4	7 3/4
Tin, Straits, cents per lb.	*85.00	*85.00
Aluminum, 98 to 99 per cent, cents per lb.	*f32	*f32

OLD METAL PRICES—NEW YORK

	Mar. 13	Mar. 20
Heavy copper, cents per lb.	22	22
Light copper, cents per lb.	19 1/2	19 1/2
Red brass, cents per lb.	18	18
Yellow brass, cents per lb.	13	13
Lead, heavy, cents per lb.	6	6.38
Zinc, cents per lb.	5 1/2	5 1/2
Steel car axles, Chicago, per net ton	\$42.41	\$42.41
Old car wheels, Chicago, per gross ton	\$30.00	\$30.00
Steel rails (scrap), Chicago, per gross ton	\$35.00	\$35.00
Steel rails (relaying), Chicago, per gross ton	\$60.00	\$60.00
Machine shop turnings, Chicago, per net ton	\$17.00	\$17.00