

Electric Railway Journal

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Continuity in Industrial Power Service Is Essential

ELECTRIC railway companies are doing a substantial and increasing power and light business as a side line. Data given in the issue of this paper for Aug. 11, 1917, show that more than 23 per cent of the companies in this country furnish lighting service, and more than 18 per cent give power service. An important element of these services is continuity, and consequently we find that utilities and large power users as well are giving careful attention to means for insuring against interruptions, or at least minimizing their effects. The results of a study along this line made for a railway supplying power to a community of moderate size is given in an article by D. D. Ewing in this issue. In this case a plan involving the use of a reserve gas engine works out to be the most economical. Each such case presents its own problems but the fundamental principle is the same, namely, to give the people what they pay for—service. While in the case cited the gas-engine solution was undoubtedly best for the particular community in question it is quite likely that there are other communities along the same line which have quite the same right to continuous service. Taking the whole situation into consideration it might be better in the long run to spend the available funds in improving the transmission line as a whole and in introducing effective methods of restoring service after an interruption has occurred. Incidentally whatever improves the continuity of industrial service along the line has the same effect on the railway power supply.

Definitions Committee Should Be Revived

EACH year for some time past the committee on definitions of the Transportation & Traffic Association has made an interesting report, submitted additional definitions and made suggestions for the work of the succeeding committee. The matter, however, of establishing a set of definitions, with the influence of the association to give them backing, is of so great importance in view of the use which the various commissions will make of them, that it has been deemed advisable at each convention to continue the study another year before definite action was taken. At the last convention the committee was abolished, and the subject referred to the company sections for consideration and report. These reports have now been made and some interesting interpretations of proposed definitions are brought out. But now the matter lies dormant. It should not be allowed to remain so for another year. It

would therefore seem a logical and wise procedure to revive the T. & T. Association committee on definitions at the coming conference and give it instructions to bring in a report at the 1918 convention, with definite recommendations for the association to act upon. The subject has been thoroughly treated and with ample time allowed for reflection and discussion. Steps should now be taken to put this dictionary of electric railway terms into concrete form for active use on any property. The completion of such a dictionary will be welcomed and its use will prove valuable.

Consideration of Vehicular Interference Necessary in Schedule Analysis

THERE seems to be a tendency on the part of some who analyze city car operation by means of speed-time diagrams to neglect the very definite and very important fact that the movement of a city car is not accomplished in a fixed and regular routine of acceleration, coasting, braking and stops for passenger interchange. Such a smooth sequence of events, as commonly displayed by the so-called "average speed-time curve," does not represent actual practice. On the contrary, car movement and schedule speed are affected not only by irregular spacing of stopping points (which invariably occurs), but also by vehicular interference. The latter brings about many stops, or their equivalent in slow-downs, in addition to the stops for passenger interchange, and if this fact is neglected in making up "average" speed-time curves, the theoretical results that the speed-time diagram indicates as possible may be little less than absurd. It is, for example, true that, by diagram, a car with acceleration and braking rates of 2.5 m.p.h.p.s. can, if the stops are seven seconds in duration and are made at the rate of six per mile, easily maintain an apparent schedule speed of 13 m.p.h., yet no such results seem ever to be attained in practice. The reason is that six passenger stops in city service would mean a total of eight or ten or even twenty stops of all kinds, when vehicular interferences as well as passenger interchange are considered. If, say, the equivalent of ten stops are caused by vehicular congestion and six stops are made for passenger interchange, the car above mentioned will be doing well if it makes 8 m.p.h. instead of the 13 m.p.h. indicated by a speed-time diagram that was based only on passenger stops. All of this is, no doubt, perfectly obvious. Our reason for referring to the matter at all is that the oversight of neglecting vehicular interference seems to appear quite regularly, and for this, in view of the growing experience of the industry with schedule problems, there is no good excuse.

Freight Traffic Should Be Developed

WE have referred in several issues to the need of electric interurban railways doing more to develop their freight business. A recent analysis of the impediments to this plan show that they can be broadly stated as follows:

The promoters of many of the early interurban railways built their tracks on the main streets of the towns through which they passed in order that they might discharge passengers at the business centers. This choice is all right for passenger traffic but all wrong for freight. In many instances short-sighted town councils limit the freight haulage over their city streets to the night time period. Some will not permit steam railway freight cars on their streets because the M. C. B. wheels play havoc with their particular brand of street paving, while others limit the number of trailers that can be hauled by a single motor car. Through freight rates, both between electric roads and between electric and steam roads, are not in as common use as they could and should be.

It has been feared by some that the auto truck would do to the freight business what the pleasure car has done to the passenger. But these fears have not been altogether realized, and auto-truck lines which were ostentatiously started a year or so ago have been abandoned. When all of the costs are counted, the cost for freight haulage per ton-mile over a railroad is less than it is over even a good highway in the summer time. Moreover, except for very short hauls, freight moves faster via the interurban than by motor truck.

To-day, above all other days, it seems to us is the time to attack the freight problem. Now, everything is in a state of flux. The public is changing its way of thinking about things; or rather, may be it is just beginning to do some thinking. It is beginning to realize that what is good for the public servant, in the end rounds to the good of the public itself. It is alive as never before to the waste of the empty car and the loaded car with its wheels idle. If it can be shown that more of the necessities of life and of war can be hauled if some antiquated ordinances are consigned to the ash can, to the ash can they will go.

Belt lines and freight cut-offs are needed in many instances in order that the freight traffic be not impeded by having to pass through the more or less congested streets of the larger towns. While at present, in most instances, it is almost out of the question to build such lines new, the lease for joint use of existing steam belt lines or cut-offs and the equipment of these with the necessary overhead electric structures might go a long way toward an economical solution of the problem. As it is, we have too many miles of rails in this country that do service measured in hours per month when the service ought to be measured in hours per day.

The matter of rate agreements, interchange connections, etc., with other electric and with steam roads ought not to constitute an insurmountable problem at present. Patriotism, the enthusiasm of service in a

common cause and the compulsion of state and federal authorities, all should tend to make co-operation along these lines easier than it was in former days.

Two Aspects of the Coal Supply Situation

CONTINUITY of supply and conservation in use are the essentials of the coal situation as it relates to electric railways and other fuel consumers.

Last Saturday service was discontinued in the New York subway for a short time due to a failure in the coal supply at the Fifty-ninth Street power plant. While the incident is local in character, the size of the subway system in New York and its intimate relation to the activities of the city are such that unusual attention has been attracted to this shutdown. The Public Service Commission having jurisdiction took up the matter immediately to insure against a repetition of the occurrence and is holding a hearing to locate the blame. This will be continued next week, but in the meantime the Interborough Rapid Transit Company has been ordered to bring up its reserve to 5000 tons at the Fifty-ninth Street plant within ten days and to maintain it at this safe figure. This plant contains generating equipment of about 200,000-hp. capacity, and its average daily rate of coal consumption varies from about 900 tons in summer to 1200 in winter. The reserve would, therefore, provide against a complete cessation of supply for five days more or less. Compared with the proportional supply maintained by some plants even this large reserve seems moderate, but the New York plant has exceptional opportunities for securing continuous supply, which has never before failed in the joint thirty-year life of the two Interborough power plants. Pending the reaching of a conclusion as to the blame in this case the lesson to all power plant operators is plain, namely, that continuous coal supply must be insured by all possible means, a reasonable stock in storage being essential thereto. This will be specially important during the coming winter. In next week's issue of this paper we shall give an interesting story of what the Milwaukee Electric Railway & Light Company has done in the way of providing for contingencies under present coal market conditions.

Continuity of supply of fuel, of course, comes first in order of importance, and next is conservation after the supply is insured. No matter how reasonable the price of coal may be under the restrictions of the federal coal administration, it will be a patriotic duty to use as little as possible. This week the Chamber of Commerce of the United States has issued a bulletin containing among others these suggestions to coal users: Inquire into the methods employed by your firemen and consider their methods in relation to those suggested by the United States Bureau of Mines. Learn what plants in your locality secure the best results from coal. Improve all local methods by consultation with the Bureau of Mines and study of the stoking methods recommended by the bureau. Buy your coal as near home as possible.

The Chamber's suggestions are all practicable. Railway power plant operators can follow these suggestions themselves and they can take the initiative in pushing coal-saving propaganda in their respective communities.

Fundamental Principles to Be

Observed in Preparing Fare Cases

IT IS incumbent upon every electric railway, in instituting proceedings for an advance in fares, to keep in mind that a tremendous responsibility rests upon it. A poorly-planned campaign will prejudice the company in the minds of the public and will make difficult, if not impossible, the work of placing its affairs upon a sound financial basis. It is conceivable that mismanagement of what could be made a good case will alienate the sympathy of the commission and cause a denial of the desired relief. It would be particularly unfortunate at this time to have any company, through inexperience or mismanagement, lose a proceeding for higher fares.

What are the fundamental principles which must be kept in mind in presenting applications for higher fares? We refer not so much to the requirements of technical proof imposed by public utility laws and the regulations of commissions. Behind these requirements are certain broad, fundamental economic forces which are, in the last analysis, the real factors which must be presented in proceedings of this character. Electric railway officials must keep constantly in mind that success can only be won by full and complete frankness. The company must, figuratively speaking, lay all of its cards on the table. Every fact germane to the matter at issue must be made public property. There must be no half-truths, evasions or quibbles. The undesirable features of the case, if any, must be frankly and openly admitted. Popular misconceptions must forthwith be corrected. Skillful antagonists, who seek to divert public attention with ancient municipal scandals or alleged petty grievances, must never be allowed to obscure the basic truth that operating costs are constantly mounting and the company has but two alternatives—poorer service or an equivalent increase in fares. For permanent victory the company must win its case in the court of public opinion, no matter what the technical requirements of the statute may be.

Unusual care must be given to the thorough and careful preparation of the case. Executive officials must painstakingly and carefully instruct their attorneys, accountants and other witnesses as to facts and conditions. Everyone appearing for the company must be thoroughly familiar with the case. Nothing creates so unfavorable an impression as a witness who honestly does not know the answer to a question, but who, to the average man, gives the appearance of dodging. It is not sufficient to correct a mistake in the next day's proceedings. The newspapers have already published the previous testimony and most of the public will never see the correction.

In a sense every fact dealing with current operations of an electric railway is germane to a rate case of this character. A rate case, properly presented, is a

straight-from-the-shoulder presentation of business facts in the language of business men, free from the verbiage and technicalities ordinarily attributed to lawsuits and legal papers. The company should be prepared, through its witnesses, promptly and fully to explain any feature of its operations concerning which inquiry may be made by the commission or by municipal attorneys. A prompt, frank, business-like and complete explanation of the facts is the proper policy in all proceedings of this character.

A Three-Phase Electrification

Operating Under Severe Conditions

ALTHOUGH not the latest heavy traction electrification in Italy the Mont-Cenis line is one of the most instructive, particularly in view of the increasing interest in the application of the induction motor in moving freight over mountain ranges in this country. As little has been published in this country regarding this line, and as it has been operating long enough to demonstrate its good qualities, the editors of the *ELECTRIC RAILWAY JOURNAL* recently commissioned one of its European correspondents to send them the latest available information concerning it. The result is an article published elsewhere in this issue. It is quite a coincidence that the issue contains also an important news item regarding the single-phase three-phase locomotive which is now undergoing tests by the Pennsylvania Railroad to determine its suitability for freight service over the Allegheny Mountains in Pennsylvania.

The Italian State Railways, which control the Mont-Cenis line, were pioneers in the use of the three-phase system, having electrified the Valtellina Railway just fifteen years ago. This line, however, cannot compare in severity of operating conditions with the Bardonnèche-Modane line (including the Mont-Cenis tunnel railway) on which there is an unusual combination of heavy traffic, steep grades and severe climatic conditions. However, the experience on the early line proved so satisfactory that in the following ten years the same system was adopted on several more Italian roads. In the meantime we had but one three-phase electrification in this country, the Great Northern Railway Cascade tunnel, equipped in 1909.

Certain inherent virtues of the induction motor have always made it attractive in connection with heavy traction on steep grades. It is essentially a rugged motor, and a large output can be obtained per ton of weight. The absence of a commutator is no small advantage. But above all, its splendid regenerative braking property is highly prized. On the other hand, when used for locomotive driving it requires either two overhead conductors or a phase converter on each locomotive. The recent success of the regenerative d.c. system, as on the Chicago, Milwaukee & St. Paul Railway, will no doubt influence the further progress of three-phase, but the new Pennsylvania locomotive is evidence that this progress has not yet ceased. All of this illustrates the fact that development in heavy traction is still far from stationary; it is apparently more mobile than ever.

Mont-Cenis (Italy) Railway Electrification

A Line Through the Mountains Between Italy and France on Which There are Twenty-nine Tunnels in 37 Miles—The Operating Conditions Are Unusually Severe

By LUCIEN PAHIN
Pontoise, France

DURING the period from 1912 to 1915 the Italian State Railways inaugurated electric service on the Mont-Cenis line between Bussoleno, Italy, and Modane, France. This was one of the most difficult of the European roads to operate, and it comprises the longest section of mountain line. The grades are very severe, the percentages being as follows: Bussoleno to Salbertrand, 2.7 to 3; thence to Beaulard, 1 to 1.6; thence to Bardonnèche, 2.4 to 3; beyond the latter in the tunnels and to Modane, 2.4 to 2.7. The curves have radii between 1200 and 2000 ft.

The line is single-track between Bussoleno and Salbertrand, and double-track between the latter and Modane. It is made up almost entirely of viaducts, deep grades and tunnels, the total length of the twenty-nine tunnels being 13.9 miles out of 37.2 miles; that is, more than 37 per cent of the total. The longest tunnel, under the Fréjus (Mont-Cenis) Pass, is nearly $8\frac{1}{2}$ miles long, most of the grades in it being from 2.4 to 3 per cent. This tunnel is artificially ventilated through a conduit carrying compressed air emitted through the niches provided for linemen. In spite of this the ventilation proved inadequate with increasing density of traffic under steam operation. The annual traffic on the line is more than 100,000,000 ton-miles, with a potential traffic of 280,000,000 ton-miles.

The highest point on the Mont-Cenis line is 4180 ft. above sea level, while the stations at Bardonnèche and Modane, located at the two extremities of the Fréjus

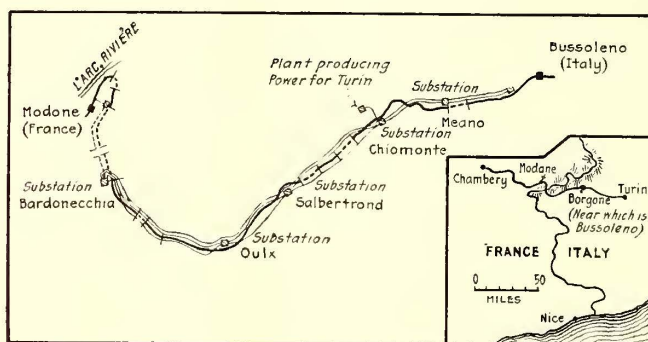
tunnel, have elevations respectively 4050 ft. and 3410 ft. Here, then, is a mountain line operating at a considerable elevation, with dense traffic and exposed in winter to snow, violent winds and great cold (minus 27 deg. C. and lower).

The decision to electrify this line was reached when it became evident that its capacity under steam operation was approaching a limit. The addition of an extra track was, of course, out of the question on account of the numerous and long tunnels. In 1911 the engineers of the Italian State Railways proceeded to design the system which has since produced excellent results, first on the Mont-Cenis line and later on other Italian lines. Electric operation was considered superior to steam in many cases on account of the greater capacity of line, higher operating speed of trains

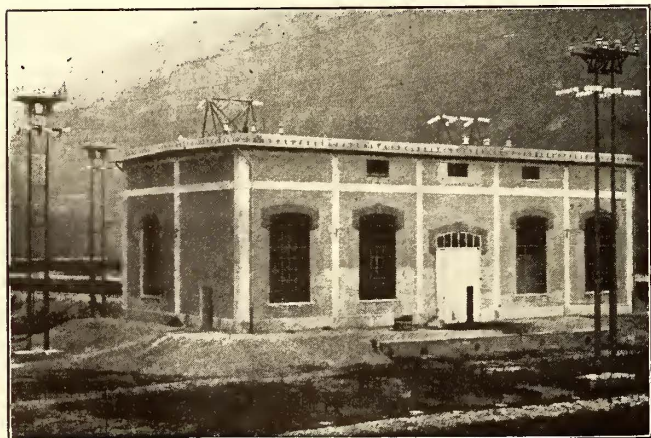
and greater regularity of operation. Three-phase current, at 16.7 cycles and 3700 volts pressure, was selected as standard. Arrangements were made with power companies in the region of the Mont-Cenis electrification for the supply of high-tension current.

PRODUCTION AND TRANSFORMATION OF CURRENT

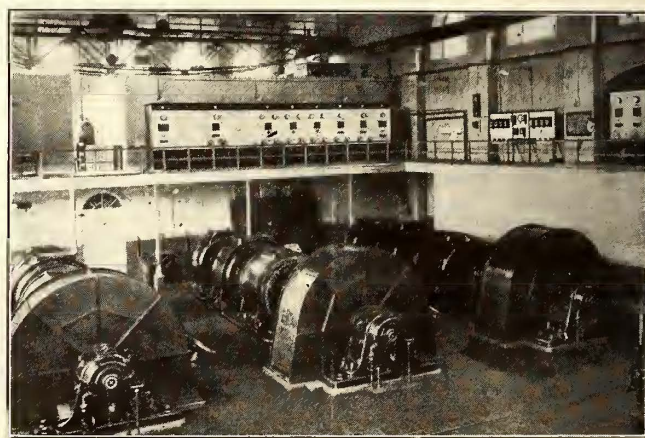
Until 1914 power was furnished in the form of three-phase current at 50,000 volts, 50 cycles, by the hydroelectric plant at Chiomonte and the steam station at Martinetto. It was transformed to lower frequency in a motor-generator substation at Bardonnèche. As the railway circuits operated in parallel with the light and



MONT-CENIS ELECTRIFICATION—OUTLINE MAPS OF LINE

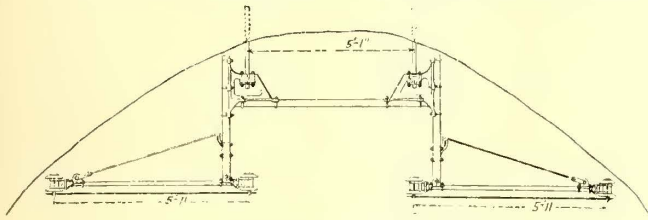


MONT-CENIS ELECTRIFICATION—VIEW OF SUBSTATION AT SALBERTRAND



MONT-CENIS ELECTRIFICATION—MOTOR-GENERATOR SUBSTATION AT BARDONNÈCHE

power circuits of the city of Turin, supplied from the plants above mentioned it was at first considered necessary to provide against interference with the operation of trains due to variations in the light and power loads. For this purpose heavy flywheels were included in the rotating elements in the Bardonnèche substation. Each motor-generator set comprised a 2500-hp.



MONT-CENIS ELECTRIFICATION—CONTACT LINE IN DOUBLE-TRACK TUNNEL

induction motor, supplied at 7000 volts and 50 cycles; a three-phase alternator producing current at 3700 volts and 16.7 cycles, and a 50-ton flywheel.

In these sets with no load or light load the speed is 500 r.p.m. It is lowered to 400 r.p.m. when the overload reaches 100 per cent. If the speed varies through the complete range in one minute each flywheel yields during this period 1000 hp.

Since July 15, 1914, the current has been furnished in normal service from the hydroelectric power plant at Acceglio, operated by the Società per la forze idrauliche della Maira. The current is delivered at 65,000 volts, 16.7 cycles, three-phase, and the voltage is lowered in static substations at Bardonnèche, Meana, Chiomonte, Salbertrand, Oulx and Bussoleno, the locations of all of which are shown on an accompanying map. The combined capacity of these substations is 22,000 kw. The 6000-kw. motor-generator substation at Bardonnèche is now held in reserve.

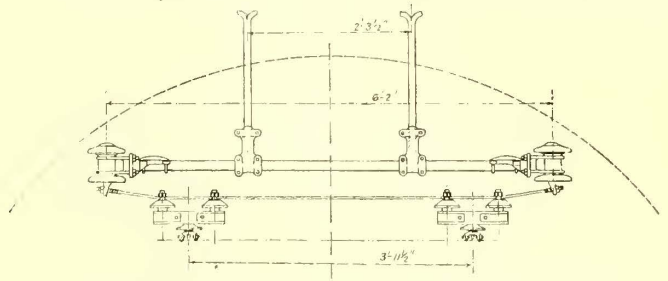
In connection with the use of the flywheel sets at Bardonnèche it may be noted that, while induction motors possess numerous virtues, such as their ability to start without auxiliary motors and to operate satisfactorily at high tension, they do not lend themselves efficiently to speed variation such as that necessary to permit the functioning of the flywheels. When the variation is produced, as in this case, by the insertion of resistance in the rotor circuits, energy is dissipated in the form of heat precisely at the moment when there is the greatest need for it. It would have been more efficient to use a second motor connected in cascade with the first to utilize the energy necessarily given out from the rotor of the first motor when the speed is reduced. This could have been done with very small loss.

FEATURES OF POWER REGENERATION

When the frequency of the current produced by the alternators falls from 16.7 to 13.3 cycles, the speed of trains en route diminishes in the same ratio. At the same time the consumption of power is diminished, on account of the lower speed of the trains climbing the grades and of the regeneration of power by those descending grades at the same time. Thus the trains en route assist the flywheels at Bardonnèche in regulating the power supply when the latter are in use.

Regeneration is permissible even when no trains are climbing grades, because automatically functioning rheostats are provided to absorb excess power. When a

train descending a grade is regenerating and there is not at the same time a train ascending a grade, the regenerated power is delivered to the substation. If the motor-generator sets are operating the alternators act as synchronous motors, and the excess power is



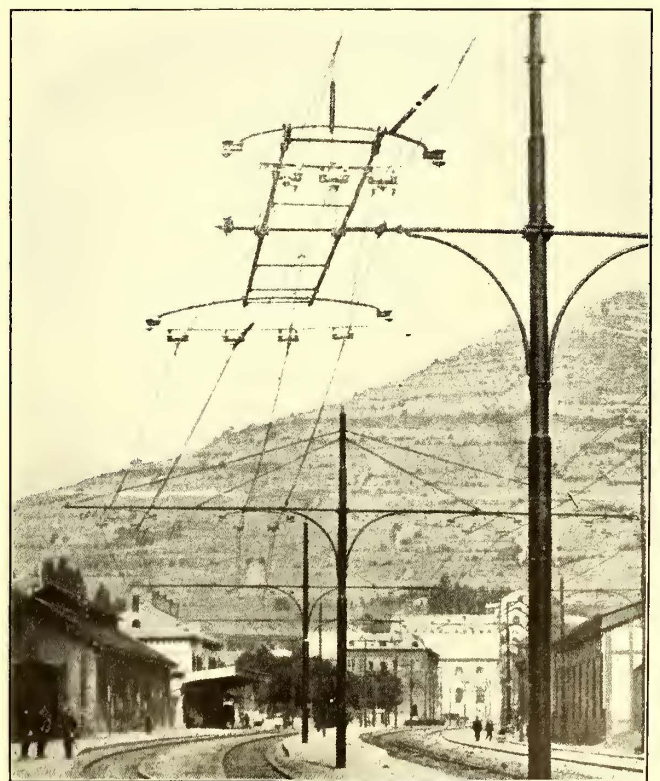
MONT-CENIS ELECTRIFICATION—CONTACT LINE IN SINGLE-TRACK TUNNEL

dissipated in the rheostats. Ordinarily the excess all goes to the rheostats.

Each rheostat, of which there are two, consists of a metallic tank connected electrically to the earth and to the rails, through which water continuously circulates. Two electrodes are immersed in the tank, their position being controlled by an oil-operated regulator identical with the type employed in controlling the speed of hydraulic turbines. The regulator is controlled by a small induction motor, and a special 5-hp. motor drives the oil pump.

For the purpose of extinguishing the arc which occurs at each immersion and withdrawal of the electrodes an oil switch in the electrode leads is opened automatically by the motion of the regulator arm, closing just before the electrodes enter the water and opening just before they leave.

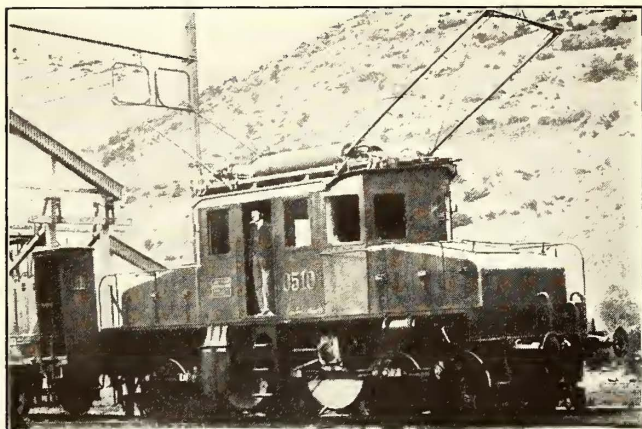
The overhead line consists of a double contact wire for each of two phases of about 200,000 circ. mil cross-



MONT-CENIS ELECTRIFICATION—STATION AND SUBSTATION AT BARDONNÈCHE

section for each track. These are suspended 19.5 ft. above the rails in open country and 14.75 ft. or less in the tunnels. The third conductor is provided by the two running rails which are electrically connected, the rails being bonded with a special cement as well as with soldered copper bonds.

In the open country the line is supported on tubular posts spaced about 65 ft. apart. In the tunnels special



MONT-CENIS ELECTRIFICATION—ONE OF THE 2000-HP. LOCOMOTIVES

brackets sealed into the roof are used. The suspension is of the transverse type. The contact wires are attached to double-petticoat insulators by means of clamps, and these insulators also are insulated from earth. The insulation is, therefore, quadruple between the two aerial phases and triple between each aerial phase and the ground. The crossings of the aerial phases, of course, require special care. A typical branchoff is shown in the illustration on page 345.

ELECTRIC LOCOMOTIVES

The locomotives used on this line have the following characteristics:

Wheel diameter	3 ft. 6 in.
Rigid wheelbase	20 ft. 1 in.
Length between bumpers	36 ft. 0 in.
Number of coupled axles	5

Each locomotive is equipped with two 1000-hp., 8-pole motors. These, by means of cranks set at 90 deg., drive the middle axle through triangular connecting rods. This axle has no lateral play, but to provide easy operation on curves a lateral play of about $\frac{3}{4}$ in. is allowed on the outside axles.

To insure continuous power supply to the motors two bow collectors are provided, each consisting of two parts, one for each of the overhead phases. From the collectors the circuit is as follows: Through impedance coils with lightning arresters in shunt, automatic circuit breaker, series transformer for measuring instruments, and main circuit breaker (which also provides for the ground phase) to the motors.

The current is fed directly to the stators of the two motors for full speed, 31 m.p.h., or to the stator of one motor only for cascade operation at half speed. In the latter case the rotor of the first motor is connected to the stator of the second, and the rotor of the latter is short-circuited through a liquid starting rheostat. The main circuit breaker also provides for a reversal of aerial phases to change the direction of motion of the locomotive.

To prevent too sudden starting of the locomotive the rate of immersion of the rheostat electrodes is limited by a relay connected to the regulator. The relay contains two windings, one carrying a constant current, the other the current flowing to the two motor stators or the secondary stator, as the case may be. The reaction between the two windings is utilized to control the rate of movement of the electrodes, and the locomotive accelerates gradually.

Two 9-kw. static transformers, 3700/125 volts, supply power for manipulation of control apparatus and for auxiliary apparatus, including air brakes, reverser, speed controller, sander, whistle, starting rheostat, ventilating motor for cooling the traction motors, lighting, etc.

RESULTS OF THE ELECTRIFICATION

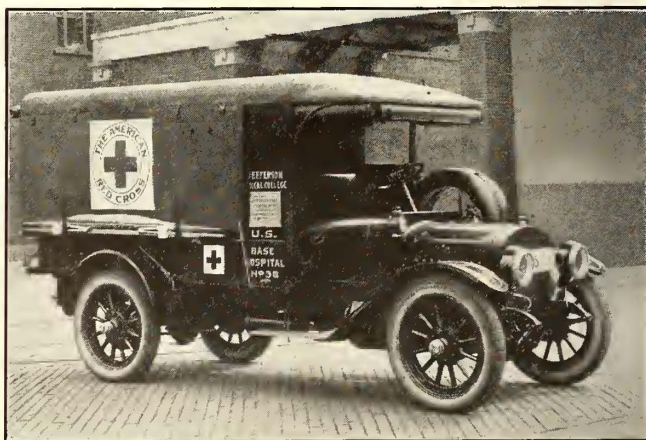
The technical and financial results so far secured on the Mont-Cenis line are excellent. The speed, the load on the trains and the number of trains have all been increased. The operating costs have been reduced due to the use of water power and regeneration.

The Italian State Railways have electrified and are electrifying other sections along similar lines. Among these are to old Giovi line, the line from Savonni to Giovi, and the Giovi extension. All of the central hydroelectric and steam stations have been joined on the high-tension side to provide against accident to one of the substations.

In closing the writer desires to express his appreciation of the courtesies extended to him by the officials of the Italian State Railways.

Philadelphia Employees Present Ambulance to Red Cross

Employees of the Philadelphia Rapid Transit Company have purchased and presented to the Jefferson Medical College Base Hospital Unit No. 38 the standard United States Army ambulance shown in the accompanying illustration. This is equipped with extra tires, stretchers, rubber blankets and linoleum floor covering.



RED CROSS AMBULANCE PRESENTED BY RAILWAY EMPLOYEES

Its interior is electrically lighted, and is provided with a special system of piping which permits of its being heated during extremely cold weather. Unit No. 38 expects to leave for France in a few days. The men have also contributed about \$1,000 to the Hahnemann Medical College Base Hospital unit.

Insuring Continuous Power Service

The Author Outlines a Study Made for a Railway Supplying Power to a Community of Moderate Size—Results Favor a Gasoline Standby Unit in This Case

By D. D. EWING

Associate Professor of Electric Railway Engineering, Purdue University, Lafayette, Ind.

THE writer recently had occasion to make a study of several methods of insuring continuity of service in a town of about 2500 inhabitants in which electric service is provided from a 33,000-volt railway transmission line. The railway company owns the local distribution system and acts as the local distributor of power service. The transmission line is fed from two plants, one 18.7 miles distant and the other about 100 miles distant in another direction.

An analysis of the interruptions in this service during the year 1916, as indicated by the charts of a graphic voltmeter, is given in Tables I, II and III. These interruptions may be divided into two classes—intentional and unexpected. Those of the first class were caused by switching, either for synchronizing purposes or to isolate a section of the line for repair. Momentary interruptions (of less than two minutes duration) constituted 52 per cent of the total. These were due to switching for synchronizing purposes mostly, and occurred in the main at about 4 a. m., or

TABLE I.—INTERRUPTIONS CLASSIFIED AS TO DURATION

Duration of Interruption, Min.	Number of Interruptions
Momentary	115
2-5	32
6-10	17
11-15	27
16-30	15
31-45	2
46-60	3
61-75	2
76-90	2
140	1
165	1
189	1
195	1
Total	219
Total (excluding momentary).....	104

just before the daily train schedule started. Obviously they are of little moment as far as the average service user is concerned. A few of the longer interruptions occurring between 4 a. m. and 8 a. m. were also due to switching, the remainder being for the most part chargeable against the transmission line. Only the longer interruptions are classified in Tables II and III.

Of the possible means of reducing the number and duration of interruptions the following were investigated: (1) Repair and betterment of existing line between the town and nearest plant. (2) Construction of duplicate line to nearest plant. (3) Installation of storage-battery standby equipment. (4) Installation of high-speed gasoline engine driving an alternator, as a standby unit.

REPAIR-OF-EXISTING-LINE PLAN

After an examination of the existing line, which has been in service for a number of years, it was decided that the replacement of 50 per cent of the poles and all of the crossarms, insulators and hardware would be necessary to put the line in first-class condition. The wire spacing on many of the old arms was insufficient

and the insulators were of an inferior grade. It was felt that 44,000-volt insulators should be used in making replacements and that the line should be still further protected from lightning trouble by installing an overhead ground wire. The rehabilitation of the line to the nearest plant would not, of course, eliminate all

TABLE II.—INTERRUPTIONS CLASSIFIED AS TO TIME OF DAY

Period of Day	Number	Time Lost, Minutes
12-4 a. m.	17	535
4-8 a. m.	24	622
8-12 a. m.	15	222
12-4 p. m.	17	233
4-8 p. m.	20	488
8-12 p. m.	11	215
Total	104	2,315

trouble in that section, nor could it in any way minimize the trouble occurring in the other portion of the line. Such rehabilitation, however, would greatly reduce the number of long interruptions due to failure in the short end of the line, and as the line can be sectionalized the opening of the section switches would localize disturbances arising in the long end. Thus it might be expected that most of the long interruptions would be eliminated by this plan.

DUPLICATE-LINE PLAN

The erection of an entirely new line 18.7 miles in length would obviate the washout troubles which hinder the operation of the present line. With it all of the interruptions of the intentional class could be elimi-

TABLE III.—INTERRUPTIONS CLASSIFIED AS TO SEASON OF YEAR

Season	Number	Time Lost, Minutes
January-March	31	1,011
April-June	20	463
July-September	33	572
October-December	20	269
Totals	104	2,315

nated, and also practically all long interruptions of the unexpected class. The cost estimates of this line given in Table IV covered the erection of 562 cedar poles 45 ft. long, 18.7 miles of three-phase line of No. 2 copper wire, and a 3/8-in. Siemens-Martin cable as a ground wire.

STORAGE-BATTERY PLAN

With a floating battery and suitable control equipment a very high degree of continuity of service could be assured. In connection with this problem, however, a standby battery was considered since it could be both

TABLE IV.—COMPARATIVE COSTS OF PLANS FOR IMPROVING CONTINUITY OF SERVICE

Plan	First Cost	Annual Charges
Repaired line	\$9,574	\$1,033
Duplicate line	38,049	5,699
Storage battery	19,460	3,288
Engine-driven generator	10,005	1,350

smaller in size and of a cheaper type; in fact, the cost of a floating battery would have been approximately 50 per cent greater than the first cost listed in Table IV. The equipment involved in the storage-battery plan

consisted of a 250-volt, pasted-plate battery with sufficient capacity to carry a 150-kw. load for an hour. In connection with this would be a 150-kva, 2200-volt, three-phase, 25-cycle synchronous motor direct connected to a 250-volt d.c. generator of the same output, with suitable control equipment, so that in case of trouble on the transmission line the local distribution would be automatically switched over to the motor-generator set, which in turn would operate with functions reversed, receiving its energy from the battery. Automatic starting of the d.c. machine was provided for in the plan. Thus the duration of the interruption would be only the few seconds required for the motor-generator set to come up to speed. This plan obviously would take care of all intentional interruptions on the transmission line without interruption on the local system, provided the substation operator received sufficient advance notice.

ENGINE-DRIVEN STANDBY UNIT

For the engine-driven standby unit a high-speed gasoline engine of the type used for railway motor cars was considered. This would be connected by a Morse "silent" chain to a 125-kva., three-phase, 750-r.p.m., 2200-volt, 25-cycle generator, and suitable control equipment. Gasoline is a far more expensive fuel than fuel oil, but fuel cost in this case would be insignificant as compared with the other charges entering the item "Annual Charges." The gasoline engine considered is much lighter, smaller and cheaper than a fuel-oil engine of the same rating. Further, it can be started up and given full load in a few seconds, while most fuel-oil engines require a starting period of something like ten minutes. While such a standby unit is not ideal it would take care of all interruptions of the intentional class and all long interruptions of the unexpected class.

COMPARISON OF PLANS

A comparison of the several plans both as to initial cost and annual charges is given in Table IV. The annual charges do not include a labor item for substation attendance since the railway service requires such an attendant anyway, although, of course, the power service should bear a proportion of such attendance charges. Proper fixed charges for the several items were included in the annual charges. The first cost estimates were made as for the first of April of the present year. While particular items have varied in price since then, the above figures are of value for comparative purposes.

In making these estimates the end in view was to provide this particular community with continuous service with a minimum outlay both for initial cost and annual charges. Viewed from this standpoint it will be noted that the rehabilitated-line plan involves the lowest initial and annual charges. The gasoline-engine plan is a close competitor. As the latter would provide a better guarantee of service it is to be recommended. Another aspect of this particular case also favors the gasoline-engine plan. The municipal ownership "bee" occasionally visits the community in question. Now, since to the layman nothing in the way of good intentions is so tangible as something that he can see, an engine-driven standby unit installed in the community would be no small argument against the plea of greater reliability which might be urged in favor of a municipal plant.

As noted above, no attempt has been made in this discussion to view the problem in hand from any stand-

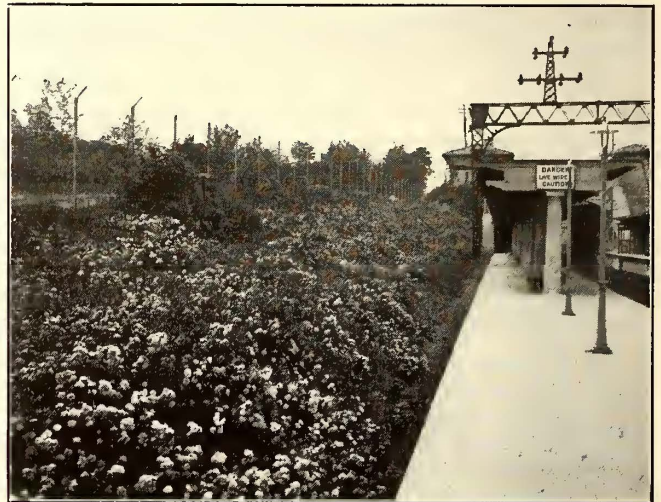
point other than that of the community affected. Obviously, before making a final decision in a problem of this kind the electric service company involved must consider other possible factors in the problem.

Practical Esthetics on the Westchester

Creeping Roses Have Been Utilized in Place of Sod to Hold Earth in the Cuts

AT a number of points on the New York, Westchester & Boston Railway the practice of planting roses to hold loose earth on sloping banks has been followed in preference to the more common plan of sodding. The rose bushes, which are of the creeping type, are planted at intervals of 8 ft., and it has been found that the growth along the surface of the ground as well as the extension of the interlacing roots is very rapid and particularly effective in preventing the soil from being washed away.

In addition, the massed bushes furnish thoroughly satisfactory results from an artistic standpoint, since



WESTCHESTER ROSE PLANTING—VIEW OF CREEPING ROSE BUSHES PLANTED TO PROTECT A SLOPING BANK BESIDE A SUBURBAN STATION PLATFORM

the growth takes place horizontally and thus presents to the eye a relatively regular surface. In the early summer, when the roses are in flower, the appearance is, of course, particularly beautiful as indicated in the accompanying illustration. This latter shows a typical installation at a suburban waiting station located in a heavy cut. Without the roses on the bank beside the platform there would have been the alternatives of taking the risk that earth would be washed down onto the platform during violent rainstorms or else providing sod, which would have required several years of growth to be satisfactory and which would have had to be made into a costly lawn to be really sightly at all seasons.

Maintenance expense for the rose bushes that have been installed is involved only to the extent of occasional attention of an expert gardener. Approximately 3200 bushes have been planted over something like 6000 sq. yd. of sloping ground at stations and in heavy cuts along the road, and the cost of upkeep on this installation amounts to \$200 per annum. This unit cost of 3 cents per square yard would, no doubt, be materially less if the installation was of larger size.

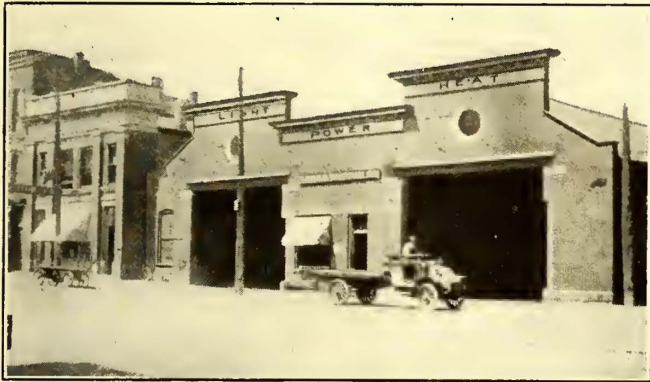
Helping Out the Passenger Earnings

The Toledo, Bowling Green & Southern Traction Company Sells Power and Heat Service and Hauls Stone for the Dixie Highway

LIKE most other interurban railways the Toledo, Bowling Green & Southern Traction Company was organized with the handling of passenger traffic as the major, if not the only, thought in mind. Its interesting "by-product" business has in the main been a later development. This railway had its start in Findlay, Ohio, as a horse-car line in 1887. It was among the early lines in the country to substitute electricity for horse motive power, the electrification having been completed in 1892. In time other lines were purchased, connecting links were constructed and in 1904 its present line to Toledo, 51 miles almost due north, was opened for business. A matter of interest in connection with the operation of the local lines in Findlay is the fact

However, even good roads soon cut out when subjected to heavy automobile traffic, so that the haulage of repair material will still constitute a very considerable freight traffic even after all of the old dirt roads have been improved.

The regular freight schedule consists of three locals and one through freight each way per day. This makes package hauling very expeditious via the interurban. Through carload freight is hauled between Dayton and Toledo, and between Dayton and Detroit, the Toledo, Bowling Green & Southern forming a connecting link between the Western Ohio Railway and Toledo. Carloads of assembled automobiles form no inconsiderable part of the southbound through freight. An illustra-



T., B. G. & S. T. CO.—COMBINED CARHOUSE AND FREIGHT HOUSE AT FINDLAY



T., B. G. & S. T. CO.—FREIGHT TERMINAL AT TOLEDO, SHOWING AUTOMOBILE LOADING PLATFORM

that from the first the cars have been operated one-man pay-as-you-enter.

FREIGHT TRAFFIC

Freight haulage was begun in a small way in 1906, although in starting it the company had little thought that it would ever assume its present proportions. As the line passes through the richest farming country of Ohio, farm products are important items in the freight traffic. Among other things about 700 carloads of sugar beets are hauled annually from points along the line to Toledo, where they are passed on to the Toledo Terminal & Belt Railway, a steam line with which the company has an interchange agreement. To facilitate the loading of agricultural products sidings are located every few miles along the route. Several large stone quarries are located along the line and during road-making season from fifteen to twenty-five carloads of crushed stone are hauled daily. Some of this stone is also hauled for steam road interchange. For road making the stone is hauled from the quarry to sidings near which road-making contractors are at work. On large jobs temporary sidings are usually constructed. An accompanying illustration shows a road-material mixing plant temporarily located at Mortimer on the Dixie Highway. At first thought it might seem that the haulage of road-making materials would be only a temporary traffic.

tion shows the auto loading platform at the Toledo freight terminal. Three machines are loaded into one car, and during the selling season about one car per day is received from the Overland company at Toledo. End opening box cars have been provided especially for this traffic.

FREIGHT EQUIPMENT

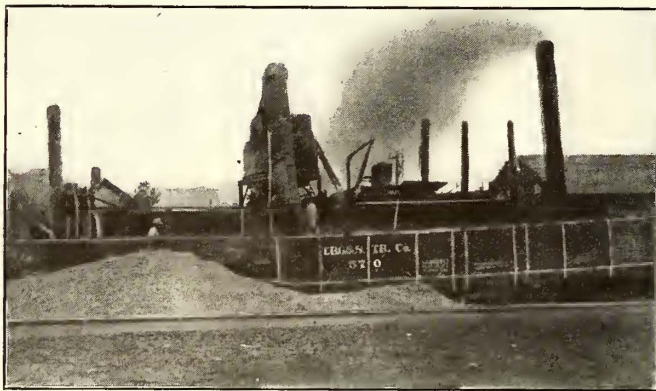
At present the road is handling about 2000 carloads of freight per year. The new-business end of the work is carried on by solicitors who work along the same lines as do steam road solicitors. The freight-hauling equipment consists of thirty-one cars and one 25-ton locomotive. Seven of the cars are equipped with motors. Two of these are new steel cars and are virtually locomotives as they are able to haul three or four loaded trailers. The road is fortunate in that it is permitted to haul steam rolling stock in the streets of the towns through which it passes.

POWER SALES BUSINESS

Ever since the electrification of the local lines in Findlay the company has conducted a retail power business at that place. At present the average daily load of 60-cycle power is about 400 kw., and the business is growing rapidly. Short-time peaks run up much higher than the average. Twenty-five cycle power from the

railway transmission line is sold wholesale to the North Baltimore Service Company, a stock concern which owns and operates a distribution system furnishing energy to several small towns along the railway. It has been the feeling of the railway officials that in small towns it is more satisfactory to furnish energy wholesale to local distributors than for the railway to act as retailer.

The route passes through a wing of the Ohio oil fields, and at present several operators are using 600-volt d.c. energy from the trolley for pumping purposes. The oil-bearing rock, or "sand" as it is called, is about 1500 ft. below the surface. The pump located at the bottom of the well is operated by means of rodding, the upper end of which is attached either to a walking beam or a pump jack. In one instance a 7½-hp. motor is used to operate a walking-beam outfit. While limited in possibilities, this type of load is very satisfactory as the pumps run twenty-four hours per day. According to the oil operators electric power is very much more satisfactory than the gas engines formerly used. A motor-pumped well has operated continuously for five months without other attention than oiling, while engine-driven pumps will often average a rod breakage every two weeks. The



T. B. G. & S. T. CO.—ROAD MATERIAL MIXING PLANT ON THE DIXIE HIGHWAY

uniformity of speed accounts for the fewer breakages with electric power.

Another interesting power application is the electrification of the buildings on a farm located near one of the substations. The returns from the energy sale here are, of course, small, amounting to between \$1.50 and \$2 per month. The farmer paid for the installation of the service complete which cost him about \$480, which is less than the cost of an isolated plant capable of giving the same service. Obviously the railway power has everything in its favor from the standpoint of convenience in this case.

POWER RATES AND EQUIPMENT

The company's power rate schedule classifies rates as "retail commercial," "wholesale commercial" and "power." If a consumer uses less than 300 kw.-hr. per month he comes under the first class, for which a straight rate of 7 cents is charged. The second class covers consumers using between 300 and 1000 kw.-hr. per month. The rate for this class falls in a sliding scale from 7 cents to 4 cents for the last hundred of the thousand. Large users pay according to the connected load and monthly consumption, the minimum rate being 1.9 cent per kilowatt-hour. Five per cent discount is allowed if the bills are paid within ten days.

The power station is located at Findlay and energy

is furnished to three substations located along the line from a 20,000-volt transmission line. Each substation is equipped with one 400-kw. converter. The generating equipment consists of two 1000-kw., 25-cycle, three-phase generators direct-connected to McIntosh-Seymour cross-compound engines, and a 1000-kw., GE, 60-cycle turbo-generator. The turbine set is a recent addition necessitated by the rapidly growing power load. In normal operation the turbine set is operated in parallel with one of the engine-driven generators, the two being tied together by two 300-kw. frequency changers operated in parallel. This rather unique combination works very satisfactorily, an interesting feature being that the turbine, because of the greater kinetic energy of its moving parts and some difference in the sensibility of its governor as compared with the engine governor, absorbs all of the sudden load peaks and permits the engine to operate under a practically constant load. In the winter season the engines are run non-condensing, the exhaust steam being used to operate a central heating system. The turbine has a bleeder connection for the same purpose. A locomotive crane is used to transfer coal either from the cars to the storage pit or direct to the boiler bunkers. It was installed about three years ago and according to the superintendent of power, Daniel Riedel, it has more than paid for itself.

The general manager of this property, C. F. Smith, has been with this road ever since it started and is the only man of the pioneer organization still alive.

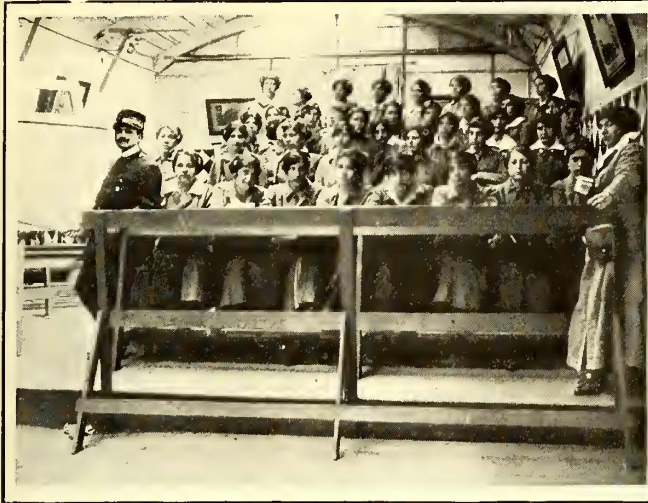
American Engineering Service Committee

The Engineering Council, composed of representatives of four leading technical societies, has appointed an "American Engineering Service Committee." This comprises five members representing the same number of engineering societies, with George J. Foran, International Steam Pump Company, as chairman, and A. S. McAllister, formerly editor of *Electrical World*, secretary. It is expected that the committee will complete a tabulation of all engineers in the United States already begun by the separate societies. At present it is devoting itself to procuring men for special government service.

The above is separate from the council's war committee of technical societies, of which H. W. Buck, consulting engineer, New York City, is chairman. This was appointed to assist any organization in Washington in bringing to the attention of the engineers of the country the necessity for thought and help in the numerous problems that arise. The office of the council and of its committees is at 29 West Thirty-ninth Street, New York City.

An Attractive Time-Table Cabinet

A compact and convenient time-table rack is in service at the main offices of the Springfield (Mass.) Street Railway. The rack is mounted in the corridor at the main entrance beside a seat used by persons waiting for appointments. It contains fifty-six pockets, each holding about twenty folders. The rack is composed of ¾-in. wood stock, 6 ft. 4 in. x 3 ft. 2¾ in. in dimensions, and occupies no space which would be valuable for other uses.



GROUP OF STUDENTS RECEIVING INSTRUCTION, AND CLASS WHICH HAS COMPLETED THE COURSE AND IS READY FOR WORK

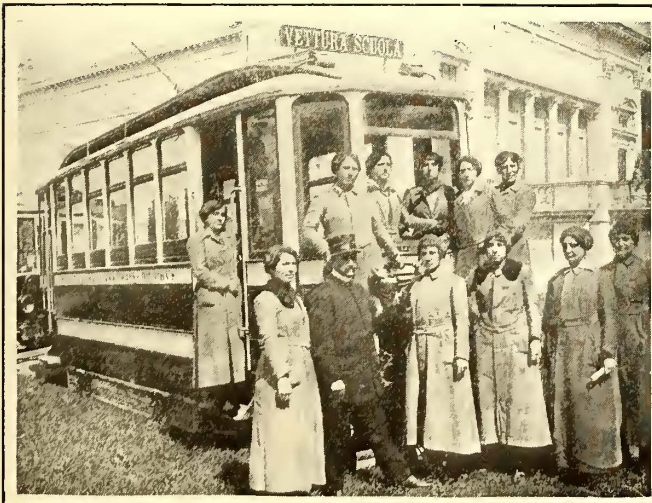
Motorwomen a Success in Rome, Italy

Women Conductors After Special Training Are Found to Be Well Qualified for Car Operation Also

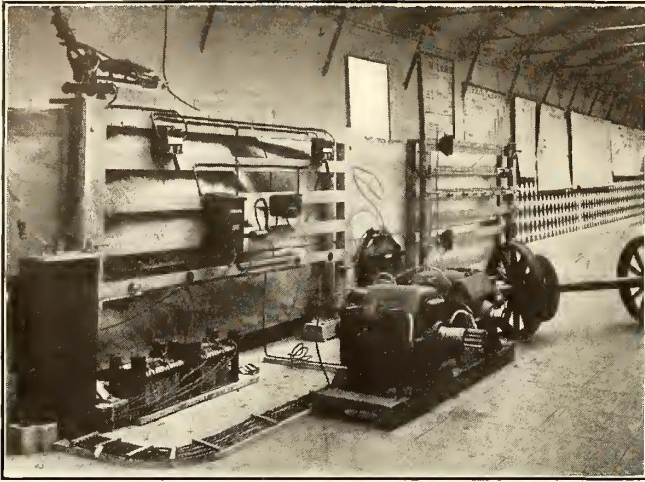
WHILE the Società Romana Tramways-Omnibus was the first company in Italy to employ women as conductors on tramway cars (see *ELECTRIC RAILWAY JOURNAL*, Aug. 7, 1915), it is not certain that it was the first to make use of them to operate these vehicles, because it was only a short time ago, and not until two years after their employment in the first-named capacity, that they made their advent as motorwomen. The project had been regarded with hesitation because of the steep inclines on some of the company's routes, such as do not exist on the trunk lines of any other Italian city. Moreover, the rolling stock, most of which has been in use for many years, is not furnished with air brakes, except in the case of the newer equipment, and the physical strength requisite to operate the hand brakes was thought beyond that of most women.

The experiment was made, however, and the results have justified it. After 100 days at the school of instruction, the pupil motorwomen of the company are prepared for service on any line and with any type of equipment, and the management says they are found more reliable than the men. They work without excessive fatigue.

Photographs reproduced herewith show the first sixteen motorwomen during the period of theoretical instruction, in the period of practical in-



STUDENTS BEING SHOWN THE PRACTICAL DETAILS OF CAR, AND CLASS BEING INSTRUCTED ON CAR UNDER SERVICE CONDITIONS



DEMONSTRATION EQUIPMENT IN THE INSTRUCTION SCHOOL

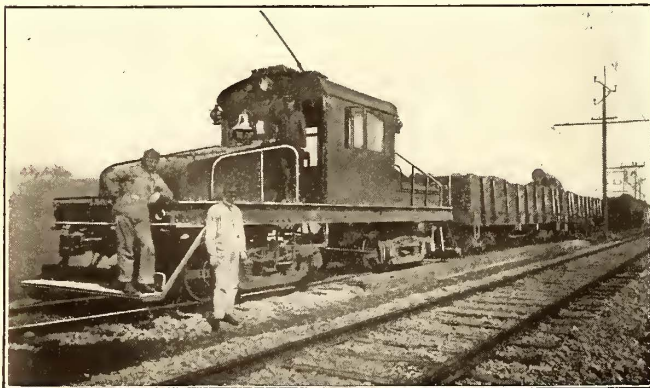
struction and after passing the final examination. The pupils are taken from the ranks of the women conductors and thus are already accustomed to railway service. It will be seen by comparison of the illustration shown herewith and those used in the previous article referred to that their uniform is different from that of the conductors, a style of garment being necessary that would obviate the danger of accident from the brake handle catching the clothing. The headgear is rendered less feminine in appearance, without losing its becomingness, by means of the throat strap.

The remaining photograph shows a corner of the instruction school, where the equipment and mechanism of the cars are explained by means of actual parts, showing the scheme of the electric circuits for the motors and the lamps and of the pneumatic circuit for the brakes.

A New Interurban Which Co-operates with Rock Island Railroad

The Kansas City, Kaw Valley & Western Railway Is Developing Freight and Passenger Traffic Rapidly in Eastern Kansas, Immediately West of Kansas City, Mo.

ULTIMATELY the Kansas City, Kaw Valley & Western Railway will operate a total of 75 miles of main line, from Kansas City, Mo., to Topeka, Kan., passing through Kansas City, Kan., Bonner Springs and Lawrence. At present, Lawrence is the western terminus,



ONE OF TWO ELECTRIC LOCOMOTIVES ON SERVICE ON K. C., K. V. & W. RAILWAY, BONNER SPRINGS, KAN.

two-thirds of the line thus being completed. This is the first step in the establishment of a high-speed interurban service efficiently to care for a rich territory. Kansas City, Mo., is famous as a center for the accumulation of wheat, corn and oats, and also as a distributing point for cereals consumed in the South and in foreign markets. An unusually large flow of interurban traffic radiates out of and into Kansas City to and from the surrounding farming and stock-raising districts of Kansas. This extensive service is furnished by six railway companies.

The passenger service of the K. C., K. V. & W. Ry. at present consists of an hourly local service from Kansas City, Mo., to Lawrence, Kan., between 6.30 a. m. and 11.30 p. m., practically two hours being required for the trip. When the road is extended to Topeka a limited service will be established. Passenger cars leave the center of the business district of Kansas City and pass through Kansas City, Kan., both over the tracks of the Kansas City Railways, to the city limits, where the interurban company's own line is reached. In addi-



PASSENGER CAR OF K. C., K. V. & W. RY. LOADING IN BUSINESS DISTRICT OF KANSAS CITY, MO.

tion to its passenger traffic the company also handles a considerable freight business, arrangements having been made with the Chicago, Rock Island & Pacific Railroad whereby the interurban handles local freight consigned over the Rock Island for points between Kansas City and Topeka.

In passenger service the company has seven steel interurban cars of the center-entrance type, manufactured by the Cincinnati Car Company. These weigh, completely equipped, 52,000 lb. each, and have seating capacity for sixty passengers. They have quadruple Westinghouse 306 CV motor equipments, 65-hp., with 26 to 58 gear ratio, and single-end type HL control, with bus-line and train-line attachments. The trucks are of Baldwin make, with 6-ft. 6-in. wheelbase and 34-in. wheels. The air brakes are Westinghouse S. M. E., arranged for two-car operation, and the couplers are Tomlinson, Form 8, of the air-connecting type. For the freight business two electric locomotives are in use at present, the underframing and cabs of which were built by the railway company. Each locomotive is equipped with four Westinghouse 75-hp. motors, type 318 C, with a gear ratio of 16 to 73 and double-end control. Westinghouse type AMM brakes, with motorman's valves, St. Louis Car Company trucks with 6-ft. 8-in. wheelbase and 33-in. wheels, and Tomlinson Form 12 M. C. B. couplers, are also features. The

locomotives are 31 ft. over bumpers, weigh each, complete, 36,800 lb., and are capable of handling 3000 tons trailing load on level tangent track.

POWER SUPPLY

Current for operating the interurban road is purchased from the city of Kansas City, Kan., at 6600 volts, three phase, 60 cycles. At Muncie, Kan., about 4 miles from the city, the voltage is raised for transmission to substations at Mahon and Leroy. Details of the substation equipment were given in the issue of the ELECTRIC RAILWAY JOURNAL for June 9, 1917.

Offering a Fair Swap

Identical Interests

The interests of the City of Akron and of this company are identical.

Without the public utilities supplied by the company the marvelous growth and industrial development of the city would have been impossible. Without the enterprise and success which the people have enjoyed the company could not give the transportation, light and power service it does. Pulling together, the people and the company will make Akron one of the very great cities of the country in the course of a few years. And there is absolutely no reason why they should pull in opposite directions.

One of the things the people of Akron have the right to insist upon is GOOD SERVICE from the company in all of its fields of activity. This is the thing the company is most anxious to give—the thing to which it is directing all of the skill and energy of its officers and employes.

A present essential to GOOD SERVICE in the transportation department is a large, modern equipped, safe and convenient Interurban Terminal. Without it the company cannot give GOOD SERVICE to the 12,500 people who enter and leave Akron every day on its interurban trains. This volume of passenger traffic cannot be safely, cleanly and conveniently handled on the public streets—especially on streets that are already congested with other traffic.

Because of this condition we are asking the city to make an exchange of a strip of property one block in length, in order that we may have room to park our interurban trains on private property. We need certain land now dedicated as a street, but which has not been used as such for the past 39 years. In exchange we offer another strip of land which we will dedicate as a street that can be used as a public thoroughfare. It is our purpose to build sidewalks along this street, and to pave it from curb to curb, making a modern thoroughfare of the best type.

Does it strike YOU that this is a fair swap? Would YOU accept a brand new Packard in exchange for a worn out furrer?

If YOU feel that YOU will benefit by the establishment of a safe and comfortable and convenient station for interurban traffic, will you please suggest to your councilman that you would like to have him ratify the proposed trade of property? That is now the only thing that stands in the way of BETTER SERVICE in transportation.

The Northern Ohio Traction & Light Co.

The Northern Ohio Traction & Light Company, Akron, Ohio, is conducting its affairs with municipalities on the basis of equity, rather than on the authority of any right or power that may be given it by law. In this way the company proposes to establish friendly relations which will be of the greatest advantage to both the company and the public. At the present time the company needs a strip of land, belonging to the city of Akron, on which to park its interurban cars near the new terminal being erected. Instead of endeavoring to force negotiations, a proposition has been made to the city for the exchange of another piece of land which will be of more value for public purposes than the one the railway needs. The advantages of this exchange have been set forth in an advertisement in the local papers, as well as the policy of the company with reference to co-operation between utilities and municipalities or the public. The advertisement is shown in the accompanying illustration.

ADVERTISEMENT OFFERING TO SWAP LAND

advertisement in the local papers, as well as the policy of the company with reference to co-operation between utilities and municipalities or the public. The advertisement is shown in the accompanying illustration.

New York Association Committee Appointments

Wilbur C. Fisk, president New York Electric Railway Association, has announced the following committee appointments for the coming year:

Committee on Standards: W. G. Gove, Brooklyn, N. Y., chairman; J. S. McWhirter, New York City; W. J. Harvie, Syracuse, N. Y.; B. Penoyer, Schenectady, N. Y.; J. P. Ripley, New York City.

Committee on Military Operation: James P. Barnes, Schenectady, N. Y., chairman; J. E. Hewes, Rensselaer, N. Y.; J. J. Dempsey, Brooklyn, N. Y.; T. C. Cherry, Syracuse, N. Y.; James McCrea, New York City.

Committee on Membership: James F. Hamilton, Rochester, N. Y., chairman; B. A. Hegeman, New York

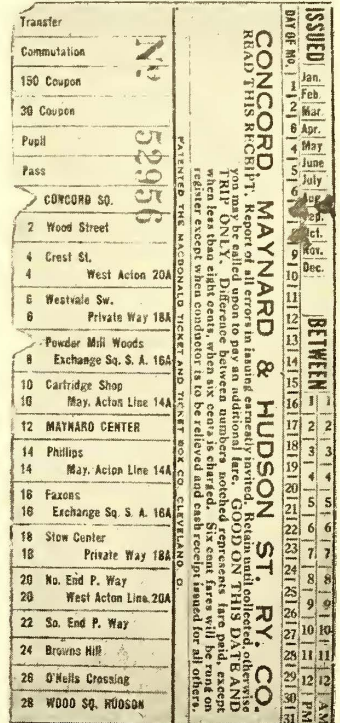
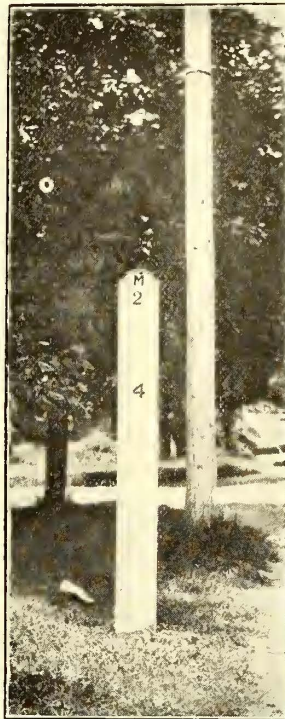
City; James P. Barnes, Schenectady, N. Y.; J. J. Dempsey, Brooklyn, N. Y.; W. H. Collins, Gloversville, N. Y.

Copper Zones in Massachusetts

Method of Indicating Limits and Collecting Fares on Concord Line

THE Concord, Maynard & Hudson Street Railway on July 1 began a system of fare collections on the basis of 1-mile zones of 2 cents each, with a minimum fare of 6 cents, under the approval of the Massachusetts Public Service Commission, which has sanctioned this schedule for a six-months period.

The main line is approximately 14 miles in length, the termini being Concord and Hudson, and a branch extends about 5 miles from Maynard to West Acton.



MILE POST AND FARE RECEIPT USED WITH ZONE SYSTEM

At exactly each mile, measured from the Concord end of the line, is a mile board which states the miles distant from that terminus, and below, the figure representing the cash fare at the 2-cent rate. The boards are 8-in. x 1.5-in. spruce plank, about 6 ft. high above the ground, except that at locations in the centers of the towns the face of a telephone or electric light pole is utilized, instead of a special mile post. The lettering is black on white background, and of neat appearance.

In its collections of fares the company uses a system of fare receipts, furnished by the MacDonald Ticket & Ticket Box Company, Cleveland, Ohio, and consisting of duplicate fare receipts showing date, mile points and fares, the limits for each passenger being notched into the main portion of the slip which is given to its passenger, to be surrendered at destination. These fare receipts, with the stubs turned in by the conductors, are checked by the company.

The early difficulties arising from the conductors having to explain the system are being overcome, and

the public is taking kindly to it inasmuch as it more nearly equalizes the burden on short and long-haul riders. The increased revenue expected from the system is based on the slightly increased through fares, rather on the short rides, which remain, as before, a 6-cent minimum. C. H. Persons, president of the road, hopes that from an experience of several months a substantial gain in gross revenue will be indicated.

The railway issues workmen's tickets for daily use (fifty-two rides per month), based on 75 per cent of the regular fare, and also 150-mile mileage books at \$2.80, a saving to the passenger of 6 2/3 per cent on the regular rate. It has also filed a petition with the Public Service Commission for permission to operate one-man cars on its branch line.

Fare Hearings Continued at Albany

Five More Companies, Asking for Increased Fares, Present Their Cases Before Up-State New York Commission

THE hearings before the Public Service Commission for the Second District of New York on the applications of twenty-eight up-state electric railways for an increase in fares were resumed on Aug. 27. On that date testimony was taken in the case of the Hornell Traction Company which seeks to establish a 6-cent fare on each of its lines. Robert W. Bull, secretary and treasurer of the company, presented the company's case, speaking at length of the management during the past three years.

The Hornell Traction Company was organized in 1892. It operates 10.88 miles of line. The total capitalization of the company is \$270,000. The replacement value of the company's property is fixed at \$300,000. Figures submitted to the commission showed that the road was operated with a profit until 1913. From then until the present time it has been operated at a deficit which last year was in the vicinity of \$6,000. No dividends have been paid since 1913.

Henry A. Bull, counsel for the company, stated that the matter of increasing fares had been taken up by the municipal authorities of Hornell and that the necessity for the company increasing its rate of fare was generally realized by its patrons. No one appeared in opposition to the application. The commission reserved its decision in the case.

Testimony on the applications of three Long Island companies for 6-cent fares, the Glen Cove Railroad, the Huntington Railroad and the Northport Traction Company, was heard on Aug. 29. According to reports filed with the commission the Northport Traction Company has not earned operating expenses since 1915. In 1916 it operated at a loss of 1.6 cents per car-mile. The Huntington Railroad has earned the interest on its bonds only one year since 1909 and in 1916 operated at a loss of 2.8 cents per car-mile. None of the companies has been able to pay dividends.

The application of the Ithaca Traction Corporation was heard on Aug. 30. The company having been reorganized in 1914 and a valuation having also been made by the commission, no question was involved about stock not entitled to consideration. The company earned only 2.4 per cent in 1914 on the commission's valuation, but increased sale of steam for use in salt production

increased its earnings in 1915 to 3.2 per cent and in 1916 to 3.4 per cent. The company, however, has paid no dividends since 1908.

Witnesses testified that although additional funds had been needed for various improvements in service it had been unable to procure the capital by the sale of bonds. The company's passenger revenue has increased less than 2 per cent since 1914, and operating expenses have increased more than 27 per cent in the same period. The company has been especially hard hit by the war since a large part of its traffic comes from students of Cornell University, many of whom have enlisted.

NO HOLD-UP FOR TEST CASE

The commission denied the request of Corporation Counsel Richard C. Drummond of Auburn that a test case be heard in the matter of the 6-cent fare petitions now pending at Albany. As noted in a recent issue, Mr. Drummond asked that the Schenectady Railway case be first disposed of, the idea being that the questions raised would be reviewed by the Court of Appeals before hearings were held in the other cases.

In denying this request from the conference of mayors for the cities concerned, the commission stated that it did not feel that it could properly agree to the suggestion that the Schenectady case should be the first heard. As a matter of fact, several other cases involving very nearly the precise questions of law which will come up in this Schenectady case have already been heard, although not yet decided, by the commission. These were noted in the ELECTRIC RAILWAY JOURNAL of July 28, page 146.

The commission was unable to see why any one of these cases would not serve as a suitable vehicle for arriving at a prompt judicial determination of the question of the commission's right to approve of increases in fare where special franchise conditions are involved. Apart from that, however, it did not seem to the commission to be either fair or in accordance with orderly procedure that it should indefinitely delay its decisions in a large number of cases which do not involve the particular question above referred to, and as to its jurisdiction over which the commission entertains no doubt whatsoever. In conclusion, therefore, the commission stated that it believed it should proceed as expeditiously as possible with its hearings in the last-mentioned cases.

Multiplicity of Uses for Electricity

Under the title "More than 3000 Uses for Electricity" the Society for Electrical Development after an exhaustive research has recently issued a booklet listing these applications, totaling 3000 and embracing the operations in 109 trades and industries. The booklet has been sent free to all members of the society.

"More than 3000 Uses for Electricity" is a complete, up-to-date guide for sales managers, contractors and all sellers of electric service. It reminds them at a glance of new possibilities for the sale of additional energy in their localities. In these days every trade and industry is giving special attention to modernizing its equipment on a basis which is both more efficient and more productive of profits.

This booklet is one of a carefully planned series to be issued in connection with The Society for Electrical Development's "Keep Business Going" campaign.

Coasting Records as an Aid to Faster Schedules

Within a Few Months After Installation of Coasting Recorders, the Pacific Electric Railway Began to Secure More Mileage Per Car on Several Lines

THE first year's experiences of the Pacific Electric Railway with the coasting recorder are of exceptional interest because of the diversity of this company's lines and of the service given over them. The interurban lines, for example, vary from what is practically city rapid transit to the magnificent high-speed service to San Bernardino, 58 miles from Los Angeles. In connection with these lines are various branches and city networks, and on nearly all the trackage there is an average growing volume of express cars and electric locomotive freight.

The large proportion of big car and train service on the Pacific Electric Railway makes the possibilities of energy and brakeshoe savings especially attractive, but the company is finding the coasting recorder also valuable as a means for taking up the slack in the line. It rightly regards the percentage of coasting obtained as an index of efficiency in operation. When the system of instruction and recording has developed the latent skill of the motormen, existing schedules are analyzed to see to what extent speeds may be raised and car and platform expense reduced accordingly. Naturally, this increase in running speed cuts the percentage of coasting, but the figures achieved by those making the best records indicate that the possibilities of coasting are far from exhausted.

All types of cars of the Pacific Electric Railway, except the locomotives of non-schedule freight trains, are equipped with 600 Rico coasting recorders, which were applied during the early part of 1916. Previous to the use of the recorder the men were informed at meetings of its purposes, how to make records, where to key in, etc., in addition to getting the usual pointers on the best way to handle the car from the company standpoint of "Safety, first; schedules, second; coasting, third."

From the first, the men have taken a keen interest in the coasting records. As the dispatching system keeps the men closely to their time points there is no opportunity for low-coasting motormen to cast aspersions on the performances of high coasters. However, each motorman watches his records carefully and does not fail to record his opinion of his car or of exceptional running conditions, should he fall below par.

HOW THE RECORDS ARE CLASSIFIED

The coasting records are classified by the efficiency department, which comprises a chief clerk, four clerks, a stenographer and the department head, who has also other duties. In compiling the records use is made of a special type Burroughs adding machine, which adds running time and coasting time simultaneously. Percentages are determined with a slide rule.

Mimeograph sheets are prepared to show weekly comparisons of men on the same line, of the lines in a division and of the divisions as a whole. On these the names of the men, lines and divisions above the average are printed in capital letters—a little psychological touch.

All recorder tapes are carefully scanned not only for reports of equipment defects but also for excessive, insufficient and erratic coasting. Such data are conveyed to the mechanical department on the form reproduced.

Because of the complex conditions on the Pacific Electric system, it is difficult to say just what the coasting recorders have saved in energy or brakeshoes, but the energy saving alone would pay for the recorders in two years. The saving in maintenance is still less tangible, but there is no doubt that lower maintenance has resulted. Still more important are the changes in schedule

PACIFIC ELECTRIC RAILWAY COMPANY EFFICIENCY BUREAU							
TO THE MECHANICAL SUPERINTENDENT:							
Coasting Recorders on following cars, as indicated by Coasting Records of _____ 191____ are reported to Mechanical Department for immediate attention.							
Four Blown	Clock Run Down	Tape Needs Renewing	Tape Stuck	Excess Coasting	Insufficient Coasting	Erratic Coasting	Misc
CHIEF EFFICIENCY BUREAU							
NOTE: The above information telephoned _____, Q1 _____, to shop.							

COASTING RECORDS—FORM USED FOR ORDERING REPAIRS

speeds fostered by the use of the coasting recorder. Several examples follow:

Line A formerly had sixteen cars operating on an average headway of five minutes. As the coasting average went up to 40 per cent and more, it was found feasible by May, 1916 (following two months' experience), to increase the schedule speed about 10 per cent, which meant cutting running time from thirty minutes to twenty-seven minutes. This gave the company the option of increasing the service or saving one car and two crews. After the change was made the coasting dropped to an average of 25 per cent, but even this was far in excess of what had been accomplished before the use of recorders. By April 21 the average had risen to 27 per cent. However, the real possibilities are indicated by the top-notch man, who showed 47 per cent coasting under the faster schedule!

Line B, which is operated on a forty-minute headway, was speeded up so that four cars would do the work of five. Despite this, the average coasting dropped from 44 per cent only to 32 per cent and is climbing upward again.

On Line C, with fifteen to twenty minute headways and trains of one to three cars, it was not found practicable to reduce the number of trains, but the running time of certain extra runs was shortened. On these runs the coasting average dropped from 43 per cent to

COASTING RECORDS—TYPICAL TABLES USED FOR COMPARISON

PACIFIC ELECTRIC RAILWAY COMPANY,
EFFICIENCY BUREAU.
Motormen's Coasting Percentages By Divisions.
Week Ending Nov. 21, 1916.

	Percentage	
	This week.	Last week.
1 Northern Division	32.2	31.8
2 Eastern Division	29.8	29.8
3 Southern Division	27.5	28.1
4 Western Division	26.2	27.3
Average entire system	29.2	29.5

PACIFIC ELECTRIC RAILWAY COMPANY,
EFFICIENCY BUREAU.
Motormen's Coasting Percentages By Lines,
Week Ending Nov. 21, 1916.
NORTHERN DIVISION.

Line	Percentage	
	This week.	Last week.
1 Glendale-Burbank	40.3	39.9
2 Sierra Madre	37.9	38.0
3 Oak Knoll	37.5	36.4
4 South Loop, Pasadena local	36.9	36.6
5 North Loop, Pasadena local	35.8	35.4
6 San Gabriel	35.4	36.1
7 Pasadena Short	33.6	33.2
8 South Pasadena-Watts	33.3	34.0
9 Express	33.3	35.6
10 Lake Avenue, Pasadena local	33.1	32.9
11 City Limits, Pasadena local	32.4	31.5
12 Glendora	32.2	32.1
13 Altadena, Pasadena local	30.7	31.6
14 Lamanda Park, Pasadena local	28.2	25.1
15 Edendale	28.0	27.7
16 Serra Vista	27.8	29.3
17 San Bernardino	26.8	26.3
18 Pomona-Ontario	26.4	24.5
19 Shore and Depot	25.6	27.4
20 San Dimas	25.5	24.6
21 Pomona Locals	24.2	21.5
22 Euclid Avenue	19.5	20.5
Average regular motormen	32.4	32.7
Average extra motormen	27.2	26.4
Average all motormen	32.2	31.8

29 per cent, but as the top-notchers to-day are getting 43 per cent, there is still plenty of room for coasting under the new conditions.

The case of the Hollywood local service is of peculiar interest because of the jitneys. On this line the slack revealed by the recorders plus additional cars made a service so efficient that the jitney buses one by one quit the field. They could not beat a once-a-minute service over the main part of the line. The increase in speed was 7 per cent.

Taking the performance of the top-notch coasters as a criterion of what can be accomplished by the majority, the company began on March 8, 1917, a survey of its lines to see what could be done to bring the low men up, particularly to determine to what extent some runs average higher than others. In this survey, the actual

running time was checked against schedule time, coasting time, number of stops, length of stops and number of passengers for a majority of the trips throughout the day. Instructors also rode the lines in the course of this survey.

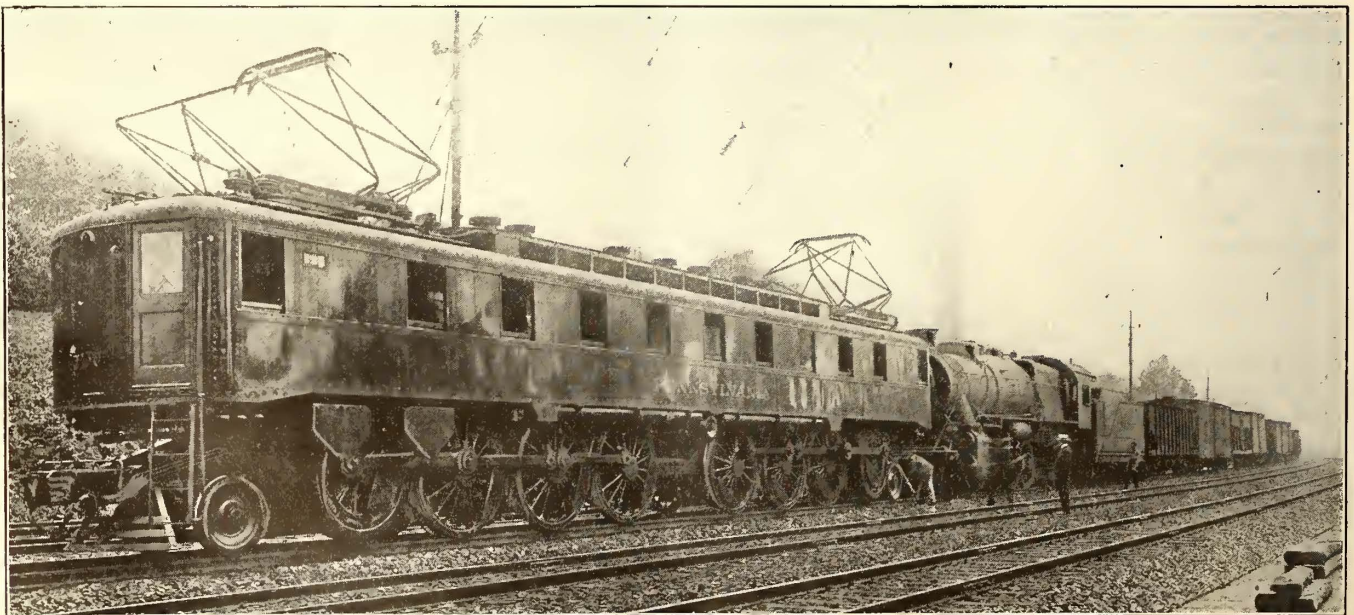
This intensive cultivation immediately showed excellent results. Thus the Western Division, which was the first to be surveyed, showed for the week ended March 7 an average coasting of 27.4 per cent; yet by April 30 the average had risen to 31.8 per cent. The personal instruction and the moral effect of seeing men use stop watches and counters led the motormen on this division to jump from fourth place to first. The Hollywood jitney-figuring line, which is in this division, climbed from an average of 22.1 per cent on March 7 to 27.2 per cent on April 30.

These encouraging results indicate that intensive personal instruction is an important factor in attaining and retaining a high standard of operating efficiency.

Pennsylvania Freight Locomotive Develops 7000 Hp.

Tests of the Pennsylvania Railroad's new freight locomotive were made on the Paoli division of the main line electrified section on Aug. 24, 1917. The illustration shows the locomotive hauling a train weighing nearly 4000 tons and composed of sixty cars and an idle steam locomotive. While the rated capacity of the locomotive is 4800 hp. the maximum horsepower developed was 7000.

The mechanical parts of the locomotive were built by the Pennsylvania Railroad and the electrical equipment was supplied at East Pittsburgh by the Westinghouse Electric & Manufacturing Company. Details of the construction of the locomotive were given in the June 9, 1917, issue of the ELECTRIC RAILWAY JOURNAL, page 1048. This is the first locomotive of its type and is designed for use on the Altoona grade electrification of the Pennsylvania Railroad between Johnstown and Altoona in Pennsylvania. This route includes the famous Horseshoe Curve and many heavy grades, the maximum being a 12-mile stretch at 2 per cent.



PENNSYLVANIA RAILROAD'S NEW ELECTRIC FREIGHT LOCOMOTIVE DRAWING A 4000-TON TRAIN

COMMUNICATION

Electric Railways and Marketing of Foodstuffs

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF MARKETS

WASHINGTON, D. C., Aug. 24, 1917.

To the Editors:

We have read with interest your comments, on page 214 of the *ELECTRIC RAILWAY JOURNAL* of Aug. 11, 1917, concerning the bureau's article entitled "Possibilities of a Market Train Service." Our study of this subject leads us to the conclusion that those cities which are termini of many of the leading electric lines of the country need more joint terminals, particularly terminals that serve or at least are immediately adjacent to the cities' markets. Doubtless the present war emergency will give impetus to movements of this kind.

We believe that one of the essential things to-day in the distribution of marketing of foodstuffs in all of our large cities is a wholesale terminal market provided with ample cold and common storage facilities, to which all of the rail carriers should have access on equal terms. Whether or not the term "rail carriers" should include the interurban electric lines, would appear to depend very largely upon the character of the freight traffic of such lines. If they handle carload shipments of perishable commodities that will be sold at wholesale, their cars should reach the wholesale terminal market. In view of the fact that the greater portion of their traffic to-day appears to be less-than-carload shipments that will be sold largely at retail, some plan ought to be put into effect whereby the cars carrying such shipments can run directly to the retail market, where their contents can be unloaded and placed on sale without the necessity for their being hauled long distances by wagons or auto trucks from the terminals of the electric lines. There are many difficulties in the way of perfecting plans of this kind, but the difficulties should not be regarded as insuperable obstacles. One of the principal difficulties is the increasing population of our cities, with consequent increasing congestion of street traffic and increasing prices of property. But we should look to the welfare of our cities in the next generation, and not merely to their immediate welfare at this time, and a beginning should be made now of plans for the relatively more efficient and more economical provisioning of our cities than is possible under existing conditions.

CHARLES J. BRAND, Chief of Bureau.

H. M. Byllesby & Company, Chicago, Ill., are distributing a pamphlet entitled "Rational Public Ownership," a reprint of a lecture delivered by W. H. Hodge of the company at Harvard University to the students of the Graduate Business School. It describes a movement which has for its aim the bringing of the public and the companies into closer harmony by providing for the ownership of the securities of a public utility by the customers in the territory which the public service company serves. This plan, already in effect at more than half of the Byllesby properties, is being extended as rapidly as possible to all of them. It has been described in detail previously in this paper.

AMERICAN ASSOCIATION NEWS

Committee on National Defense Loses Head

On account of the appointment of Gen. George H. Harries to be brigadier-general in command of the National Guard of Nebraska, he has been obliged to resign his chairmanship of the committee on national defense. His successor has not yet been appointed.

Engineering Association Nominations

The Engineering Association committee on nominations has presented a report as required by the constitution, retaining the list of officers and executive committee members as at present except as affected by the resignation of First Vice-President G. W. Palmer, Jr. The nominations are: President, F. R. Phillips, Pittsburgh, Pa.; first vice-president, W. G. Gove, Brooklyn, N. Y.; second vice-president, E. R. Hill, New York City; third vice-president, C. S. Kimball, Washington, D. C.; secretary-treasurer, E. B. Burritt, New York City; members of executive committee, C. L. Cadle, Rochester, N. Y.; C. F. Bedwell, Newark, N. J.; J. W. Welsh, Pittsburgh, Pa., and J. M. Waldron, New York City.

Auditing Department Has the Floor at Manila Meeting

The Manila section held its thirtieth meeting on July 10. The paper of the evening was by D. M. Shaw, auditor Manila Electric Railroad & Light Company, on the topic "The Relation Between the Auditing and Other Departments." Five men were elected to membership in the railway division of the section, four from the motor and one from the stores department. Fifty-five members attended the meeting.

Among the many interesting things which Mr. Shaw said the following abstracts are typical:

The art of accounting is commonly thought to include only making a record of facts. But it is more than bookkeeping. It is not the act of making records but rather the art of learning the facts which bookkeeping is supposed to record. The work of the accountant is almost entirely governed by judgment, which is acquired through experience in actual business or in dealing with imaginary cases which might arise in business.

Among the things which the accountant should do are these: Prepare accounting forms for his own use and that of other departments; examine office routine of all departments to insure economy and the correct making of returns; assist in preparing estimates for proposed work; insure the receipt of materials ordered by the purchasing department and check invoices relating thereto; check and price requisitions from the stores department; keep such detailed accounts as will show at any time the amounts of materials in store; keep running inventory of material in hand; check time records, make up necessary pay-rolls and see that men are promptly paid; compile monthly statistics to show true status of the company's affairs; tabulate data for the guidance of department heads, etc.

In the discussion C. H. Van Hoven, claim agent, referred to the accounting department as the corporation scales upon which the corporation weighs itself frequently to learn whether it is gaining or losing weight.

EQUIPMENT and MAINTENANCE

HAVE YOU A GOOD WAY
OF DOING A JOB?

—*Pass It Along*

Read in This Issue :

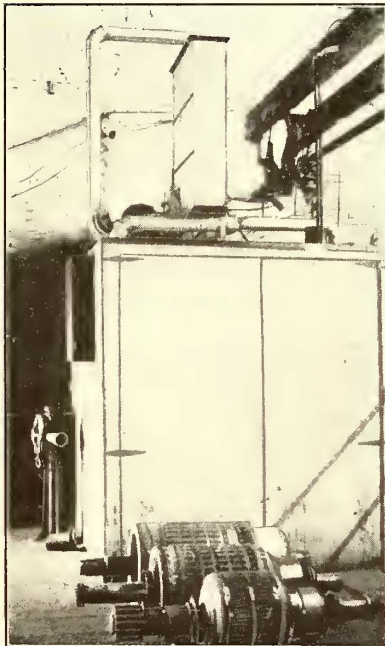
How A. W. Reddersen Bakes Armatures and Field Coils

Oven for Baking Motor Coils

BY ARTHUR W. REDDERSEN

Superintendent Motive Power Fort Wayne & Northern Indiana
Traction Company

A specially-designed hot-air oven for baking armatures and field coils has recently been installed in the shops of this company with successful results. The hot air is supplied to a large galvanized baking oven with the help of an ordinary motor-driven blacksmith's



HOT AIR BAKING OVEN FOR DRYING
ARMATURES AND FIELD COILS

forge blower and four sets of electric heating coils. These coils are inserted in a galvanized-iron case lined with asbestos and mounted on top of the oven as shown in the illustration. They are connected up so that it is possible to take the top off the case and lift all heaters out for repair. Air from the blower, which is also mounted on top of the oven, is forced into the top of the case containing the heaters through a 4-in. galvanized-iron duct, and after passing through the heater it is directed into

the top of the oven at two opposite corners. The intake side of the blower is connected with two 4-in. air ducts leading from the bottom of the oven so that the larger part of the air circulated is used over and over again.

Current for the electric heaters is taken from the 600-volt trolley circuit, while the blower motor is operated off the lighting circuit. The degree of heat inside the oven is regulated by a damper in the air duct and by the control on the heaters, from one to four of which can be connected in the circuit. The blower is operated at a constant speed. With all four heaters in operation, a temperature of 185 deg. Fahr. is readily maintained.

The oven is 6 ft. square on the inside, 8 ft. high and is constructed with double galvanized iron walls with a 4-in. air space between filled with asbestos paper. Entrance to the oven is made through large double

doors which open up the entire front. There is sufficient space to bake at one time four 100-hp. armatures and several field coils placed on top of them. With all four heaters on and the air damper about one-half open, the armatures are maintained at a temperature of 176 deg. for a period of fifteen hours.

Safety First at the Switchboard

Switches on Multiple Feeders Should Be Marked
When Circuit Breakers Do Not Furnish
Complete Protection

BY G. H. MCKELWAY

Engineer of Distribution Brooklyn Rapid Transit System

Many railway switchboards are composed of panels upon each of which are mounted two feeder switches and but a single circuit breaker as shown in the diagram. This is a safe and comparatively cheap method of construction when there is only one power house or sub-station feeding each line.

When, however, one or both of the feeders on the panel supply current to a line which also obtains power

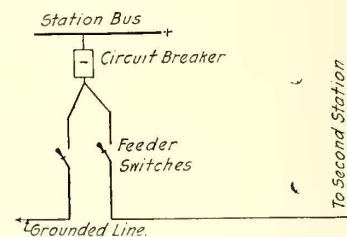


DIAGRAM SHOWING FEEDER SWITCHES WHICH SHOULD BE
MARKED TO CAUTION OPERATOR

from another station, there is a very different condition to be met. A ground on one of the feeders on the panel may be heavy enough to open the circuit breaker on that panel, but this will not kill the line as the current will feed through the bus connections between the switches and the circuit breaker and the grounded line will receive current from the ungrounded one on the same panel. Often the ground will be so far from the second station that the resistance in the line will limit the current to an amount below that required to blow the breaker in the distance station, although it will amount to several hundred amperes. The only way, then, to break the circuit and clear the grounded line, except by telephoning to the other station, a method too long to be thought of in an emergency, is by pulling the switches on the panel. To break such a current means that a heavy arc will be drawn when the switches are opened and the work must be done quickly and carefully or

both the switches and the station attendant will be injured by the arc.

In order to warn the men of their danger when opening such switches and to make sure that the switches are properly opened, it is the practice of one large company to have all of the switch handles of such multiple feeders painted with red stripes, so that there is now no excuse for an attendant making a mistake in opening them. Results have shown that this "safety first" suggestion has been followed with much fewer accidents to both men and equipment than there were before it was put in force.

Kerosene-Electric Car Having a Large Reserve Power

New Type of Gas Generator Makes the Kerosene-Electric Car Practical—Standard Railway Motors and Control Used

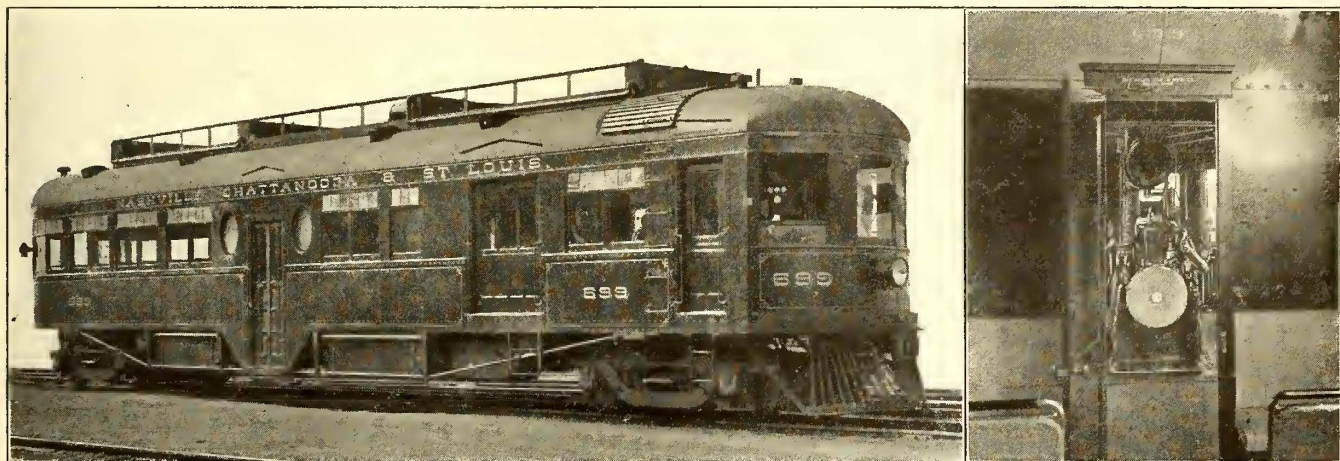
On Aug. 22, 1917, a kerosene-electric combination locomotive and passenger car, known as the Beach oil-electric car, was given a test run between Newark and Trenton, N. J. This car is the first of its kind and thus far has proved to be a success. The source of power is kerosene oil, which is converted into a gas by means of

paratus may help greatly in solving their fuel problem.

At the engine the gas is mixed with air in the proportion of one part gas to six parts air. This mixture is said to contain 98 per cent of the heating value of the kerosene oil and to burn in the engine cylinders without smoke or any other deposits. The rating of the engine is 150 hp. and its speed is 1000 r.p.m.

The electrical equipment is operated at 250 volts instead of the usual 600 volts, but otherwise it is essentially standard railway apparatus which has already been tried out in years of successful operation. This is an important feature since new maintenance troubles are not likely to develop, and it is equipment which railway men know how to operate and maintain. The engine is direct-connected to a Westinghouse 100-kw., 250-volt generator, and the current is fed to the motors through the Westinghouse standard HL control, which with slight additions has been made to handle a storage battery in parallel with the generator. The storage battery is also used to start the engine by driving the generator, to which it is connected as a motor.

Completely equipped, the car weighs 56½ tons, it accelerates at 0.8 m.p.h.p.s. and has a running speed of 45 m.p.h. It requires 140 hp. to operate a car of this weight at 45 m.p.h. and 340 hp. to accelerate it at 0.8 m.p.h.p.s. As previously mentioned the engine develops



GENERAL VIEW OF KEROSENE-ELECTRIC CAR AND NEAR VIEW OF THE 150-HP. ENGINE WHICH DRIVES IT

a special gas generator. It is then fed to an eight-cylinder 4-cycle high-speed engine of the marine-gasoline type, in which it is ignited by electric spark plugs as in the ordinary automobile engine. This engine drives an electric generator which supplies current to standard railway motors through regular railway control apparatus, there being a storage battery floating on the line to smooth out the load on the generator.

The most novel feature of the equipment is the kerosene-gas generator which was developed especially for this car. In this generator the kerosene oil is brought in contact with a porous material at a temperature of about 1300 deg. Fahr., at which temperature it is possible to transform the oil to a permanent fixed gas without depositing tar or other carbon products in the generator. The development of a gas generator, which will completely gasify kerosene oil so that it can be used in a high-speed engine of the common automobile type, is considered so important that representatives of United States and British navies who were present at the trial run are investigating the subject, believing that the ap-

150 hp. so when the car is traveling at a uniform speed of 45 m.p.h. the surplus power, or 10 hp., is used to charge the storage battery. There is a limit switch which automatically cuts out the storage battery when it is completely charged. During acceleration the storage battery discharges and supplies the difference between the 340 hp. required and the 150 hp. furnished by the generator, or 190 hp.

The battery consists of 128 cells, giving a total voltage of 250. It is connected in parallel with the generator, which is differentially compounded so that the voltage falls off as the load increases. When the load increases beyond the rated capacity of the generator the voltage falls slightly below 250, and the battery begins to discharge. The generator is compounded so that its voltage characteristic is the same as that of the battery, hence the voltages of the two are always equal and they operate readily in parallel, the battery taking all of the load above the rated capacity of the generator. The battery is capable of delivering 400 hp. for five minutes, 210 hp. for fifteen minutes, 93 hp. for one hour

and 30 hp. for five hours. This power, in addition to the 150 hp. developed by the generator, gives the car abundant power for acceleration and negotiating heavy grades. There is a 75-hp. Westinghouse No. 342 railway series motor geared to each axle. These are stand- and railway type motors but are wound for 250 instead of 600 volts.

The body of the car, which was built by the Niles Car & Manufacturing Company, is entirely of steel with the exception of the interior trim, sashes and doors, which are mahogany. It is 59 ft. long and is divided into four compartments: an engine room, 12 ft. 5 in. long; a baggage room 7 ft. 5 in. long with folding seats for four persons, a negro or smoking compartment 10 ft. long with seats for eighteen people, and a main passenger compartment 25 ft. 6 in. long seating fifty-three people, making a total capacity of seventy-five. The car is heated with hot water from the engines which is by-passed when not wanted.

Baldwin double trucks of the equalized high-speed type with 7-ft. 3-in. wheelbase, Westinghouse straight and automatic air brakes, 33-in. M. C. B. rolled-steel wheels and 5-in. x 9-in. M. C. B. journals are used.

The car was developed by the Electric Car & Locomotive Corporation of New York, and has been tried out on the Nashville, Chattanooga & St. Louis Railway, where it is to be used. On this road the operating costs were as follows:

Wages	7.5	Cents
Fuel and lubricants	4.0	
Repairs and supplies	3.5	
Depreciation	3.85	
Total cost	18.85	

The service upon which these figures were obtained consists of one stop for every 2 miles and a continuous equivalent grade of 0.3 per cent. Running on straight level track the car goes 2½ miles per gallon of fuel.

Of course the field of a car such as this for electric railway operation is only at locations where the density of traffic is not great enough to pay to install overhead or third-rail construction with the necessary arrangements for supplying power. This car is built according to steam railroad standards and is thus heavier than would be necessary for some electric railway purposes. Lighter weight designs, however, are now in the course of construction.

Reducing Pin Wear and Truck Noise

BY G. J. SMITH

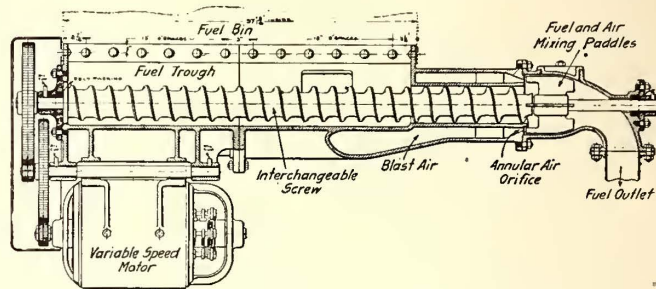
Superintendent of Rolling Stock and Shops, Kansas City (Mo.) Railways

On all of our trucks we have adopted the practice of placing a coil spring under the nut on all bolts which perform the functions of pins, as, for example, those in the brake-hanger links, pull-rod jaws, etc. These springs are generally made of 3/16-in. or ¼-in. round spring steel and are oil tempered. They are compressed until practically solid. The breakage of springs is almost negligible, and the wear on pins is reduced considerably. Also, the parts are constantly and firmly held together, thus entirely eliminating any tendency to rattle. On the new types of trucks these springs are in many cases furnished by the manufacturers.

Burning Powdered Coal

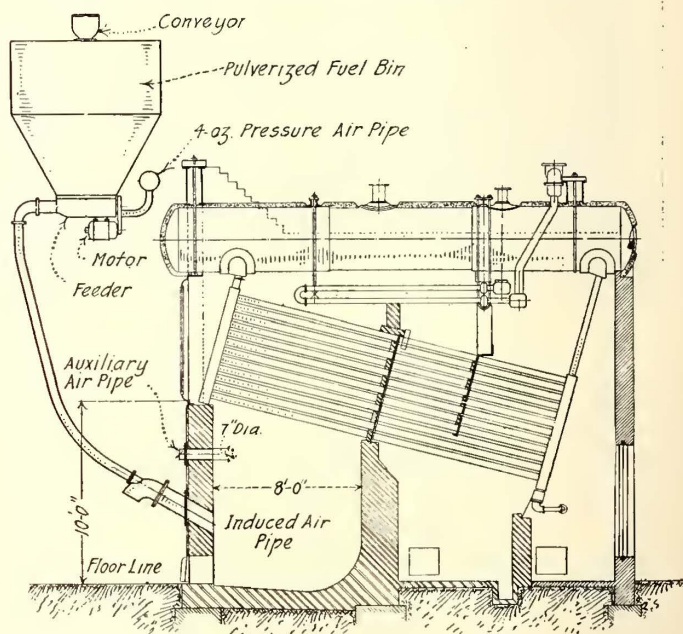
Pulverized Coal at \$3 per Ton Is Said to Be Equivalent to Fuel Oil at 1½ Cents per Gallon

That there is available a large amount of low-grade fuel and mine waste rich in fuel value which could be used in addition to the developed sources of high-grade coal is pointed out in an article by V. Z. Caracristi, vice-president Locomotive Pulverized Fuel Company, in the September issue of the *General Electric Review*. He points out that this fuel has not been developed



SECTIONAL VIEW OF PULVERIZED FUEL FEEDER

more extensively because high-grade fuels have in the past been available at reasonable cost, so that the development work necessary to produce satisfactory apparatus for burning the low-grade fuel has not been done. The use of pulverized fuel in plants of sufficient size to warrant the necessary expenditure is justified by the following considerations: The boilers can be



B. & W. TYPE BOILER SHOWING APPLICATION OF APPARATUS FOR USING PULVERIZED FUEL

forced materially without loss of combustion efficiency; full steam pressure can be maintained under overload conditions, and heavy overloads can be taken on quickly; greater heating value per cubic foot of furnace volume can be had; clinkering of coal grates, draft blowers, banked fires and the smoke nuisance are eliminated; the initial boiler plant investment is reduced through the use of less heating surface in the boilers, and the

size of boiler house, the height of stacks, and the cost of firing and ashes handling are reduced.

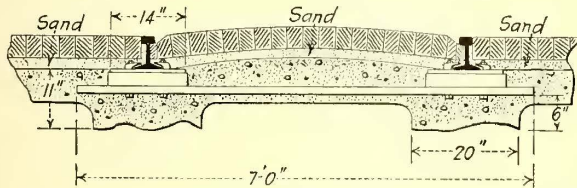
On the other hand, certain disadvantages are met in the expense of preparing the fuel, as follows: The expense of crushing and drying the coal and freeing it from stray iron and elevating it to bins preparatory to pulverizing, the cost of power for pulverizing and the maintenance of necessary equipment.

Much has yet to be done in developing equipment required for drying and pulverized fuel, but it is said that the cost under present commercial conditions is not prohibitive. The cost of pulverizing coal at \$3 per ton has been found under some conditions to be comparable with that of fuel oil at 1½ cents per gallon.

Asphalt Cushion Is Principal Feature of New Mechanical Tie

Combination Wood Block and Steel Rail Support Claimed to Lessen First Cost and Greatly Reduce Maintenance—Installations Made in Dayton, Ohio

A suitable cushioning of the rails in combination with a construction which assures the maintenance of the rails at proper gage and alignment are the particular features embodied in a combination wood and steel mechanical tie manufactured by the Dayton Mechanical Tie Company of Dayton, Ohio. The accompanying illustrations show an installation in the course of construction as it was recently made on North Jefferson Street, in Dayton, by the People's Railway Company.



CROSS SECTION OF TRACK CONSTRUCTION USED IN DAYTON WITH MECHANICAL TIE

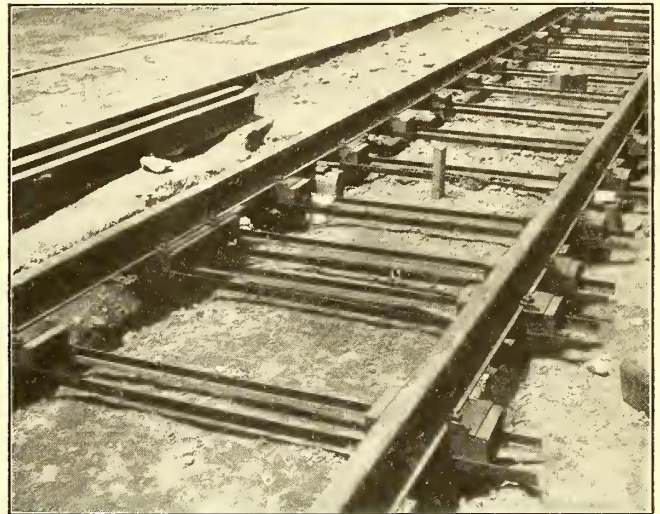
This new tie is made up with two wood blocks held in position by metal forms and embedded in a cushion of asphalt. The wood blocks are the immediate support for the rails, and are fastened to them by clips and bolts extending through the blocks and steel forms. The two iron containers holding the blocks and asphalt are held at proper spacing by two angle irons.

For use at rail joints a special tie is made up with two pairs of the angle irons and a longitudinal wood block extending underneath the joint at one or both ends of the tie, depending on whether the joints are being laid opposite or staggered. The ordinary mechanical tie and the joint tie are both clearly shown in the photographs.

In new open-track work it is the idea of the manufacturer that the tie will be molded in concrete and allowed to season before placing in the track. In replacing wooden ties in old track with the mechanical ties the latter are suspended in proper position in earth trenches across the roadbed, which serve also as the forms for pouring the concrete on the job. After this has thoroughly set, gravel is tamped underneath the portions directly below the rails, thus bringing the

ties into bearing and placing them in service. In paved streets, in city work, the method specified for the installation of the mechanical tie is to dig a trench 6 in. deep and 20 in. wide under each rail. The rail is blocked up to surface and the mechanical tie bolted to it. The concrete is then poured, filling in the space up to the base of the rail.

The asphalt cushion underneath the wood blocks absorbs the hammer blow of the rolling stock moving over the track, and thus preserves the concrete from disintegration. The theory which has caused the manufacturer to use this asphalt cushion is that a constant hammering directly upon concrete, no matter how slight, will eventually powder and wear away this non-resilient substance. If this hammering, however, is absorbed by a struction which has a resilient cushion such as the asphalt beneath the wood blocks, then it is claimed that no amount of hammering or movement of rolling stock over the rail will cause any deterioration of the concrete base.



MECHANICAL TIE FASTENED TO RAIL AND BLOCKED UP READY FOR POURING CONCRETE

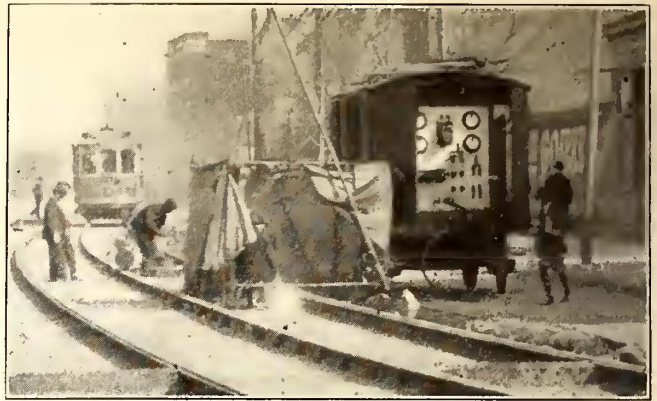
Another advantage claimed for the mechanical tie is that the spikes used in ordinary wood tie construction are replaced by ¾-in. bolts. In contrast to the spike, this bolt cannot pull out or work loose without first breaking. It cannot work away from gage because it is held in place by the steel angle irons. It cannot rust out because it is embedded in asphalt and concrete. The two bolt holes through the wood blocks are so spaced as to allow just sufficient space for the rail base to set between the bolts. This arrangement, it is claimed, will not permit the rail to move from gage without jumping straight up and over the bolts (a physical impossibility) even though the nut and clip should work loose. The blocks used are 4-in. x 8-in. x 14-in. selected white oak, and these, when embedded in asphalt and concrete, it is claimed, will last indefinitely without decay. There is also no respiking to impair their life.

The possibility that the angle iron will bend and throw the rails out of gage owing to the track becoming centerbound is eliminated by removing the cause. In the construction recommended for use with this tie the latter bears upon the roadbed under the rail and

for a few inches on each side only, but the angle-iron crosspieces are kept free, and serve simply as the means of holding the wood blocks to gage. This is the condition in open trackwork. In paved streets, the trenches, filled with concrete, are located underneath the rails where the weight comes. A trench 6 in. deep brings the surface of the ground upon which the concrete in the trench bears at a depth of about 18 in. below the top of the rail. This is ordinarily below the frost line, and when under pavement it is also below the softening of the earth by weather. Thus the likelihood of the ties sinking below the original level, causing center-binding of the tracks, is very remote.

If it becomes necessary to renew the wooden blocks used in the mechanical tie in tracks in paved streets, this is done by first removing the pavement directly above the blocks and for about 18 in. at the outer end. The bolts are then removed, which permits the wood block and iron container to be slid out from under the rail.

A new block, embedded in the asphalt, is then prepared, bored to fit the base of the rail, and returned



WELDING OUTFIT IN OPERATION—A BASE WELD IS BEING MADE

Experiment in Welding Mechanical Track Joints

An Attempt to Combine the Virtues of Electrically-Welded and Mechanical Joints

BY MARTIN SCHREIBER

Chief Engineer Public Service Railway, Newark, N. J.

At a recent convention of the American Electric Railway Engineering Association the writer was impressed, while examining the exhibits of track joints, with the fact that development in this field has been along two general lines, namely, mechanical joints and welded joints. Each of these has been developed to a considerable state of perfection, but each has its limitations. In the mechanical joints it is difficult to utilize the full strength of the material in the plates, due to irregularities in the surfaces which are supposed to be in contact. In the welded joints, dependence is placed largely upon welded areas, and again the full mechanical strength of the plate cannot be utilized.

As the merits of each type of joint were so great it was thought that possibly they could be combined in a single joint, and accordingly the first opportunity was taken to carry out this idea in an experimental way. For this experiment, Continuous rail joints were selected. The upper edges of the plates were welded to the under side of the rail heads by the Atlantic Welding Corporation's process, and a spot weld was also made between the plate and the rail base. A photograph of a sample joint is reproduced herewith.

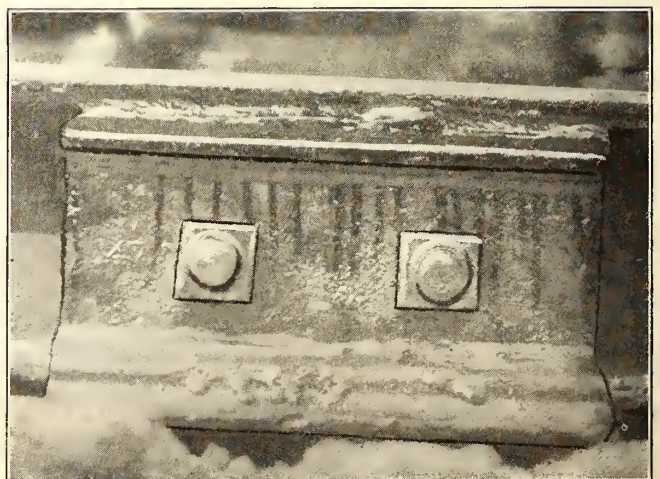


POURING CONCRETE AROUND DAYTON MECHANICAL TIES

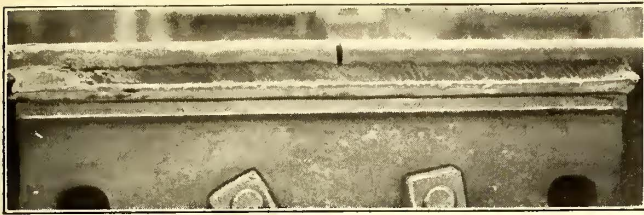
to the place occupied by the old block. The bolts are then inserted and tightened, and the opening is ready for restoring the paving. This replacement work can be done by one man in a day or less, whereas the replacement of a wooden tie in concrete foundation will require the work of several men for probably a longer time. Owing to the careful selection of the sound white oak blocks used in connection with the mechanical ties, these replacement features from wear or decay are claimed to be remote possibilities.

New Insulating Tape Made by Special Process

To meet the scarcity of woven tapes for insulating purposes a new kind of cambric tape has been developed which has a fast edge even though it is not woven. This tape, which is known as "Fastej" is made by Freyberg Brothers, Inc., New York City, and a special process is used which prevents the edges from unraveling. The tape is said to have the same mechanical and electrical properties as the woven type, and it is somewhat cheaper to manufacture. It can be made in any desired width, and while it can be secured in several thicknesses, 6 mils is the thickness most generally used.



12-IN. RAIL JOINT ELECTRICALLY WELDED TO HEAD AND BASE OF RAIL



HEAD WELD IN 16-IN. EXPERIMENTAL RAIL JOINT

It seemed reasonable to suppose that if the plate metal were used to the maximum advantage it might be possible to shorten the plates of the Continuous joint from 24 or 26 in., as had been standard with this company before. To test out this point twelve joints 16 in. in length were installed, and also one 24 in. long and one 12 in. long. These have been in the track in Newark, on South Orange Avenue, between Brookdale Avenue and Boyden Street, since last April. We hope from the experiment to learn what will be the best length of joint, although data obtained from such a small number cannot be entirely conclusive.

So far the joints have done very well, and electrical tests made upon them show an average conductance 19 per cent greater than that of an equivalent length of solid rail. Electrically, therefore, the joints leave little to be desired. The cost of these experimental joints was, of course, considerably higher than that of joints put in in large numbers, but it is believed that on a large scale this cost would not be prohibitive, especially if it proves that a very short joint will do the work.

A photograph, reproduced on page 362, shows the welding apparatus at work, and in the one above is seen a seam weld under the rail head.

Emergency Storage of Coal

Coal Unloaded and Stored in Large Quantities Without Special Equipment

As many railways are now considering the storage of coal on a much larger scale than ever before practised, the method used by the Virginia Railway & Power Company, Richmond, Va., for unloading coal for emergency storage is of interest. An ordinary track is first laid on the ground on which the coal is to be stored, and the coal in hopper-bottom cars is run onto this track and dumped. To spread out the coal and clear the track for the car to pass over an 8-in. x 8-in. timber is placed in front of the rear trucks.

When covered up to the top of the rails the track is jacked up until it rests on top of the coal. It is then ready for another layer. In this manner coal is stored to a depth of 10 ft. or 15 ft., the danger of spontaneous combustion preventing the use of a larger pile. When one pile is completed the track is shifted to the ground alongside of the first pile and the process is repeated.

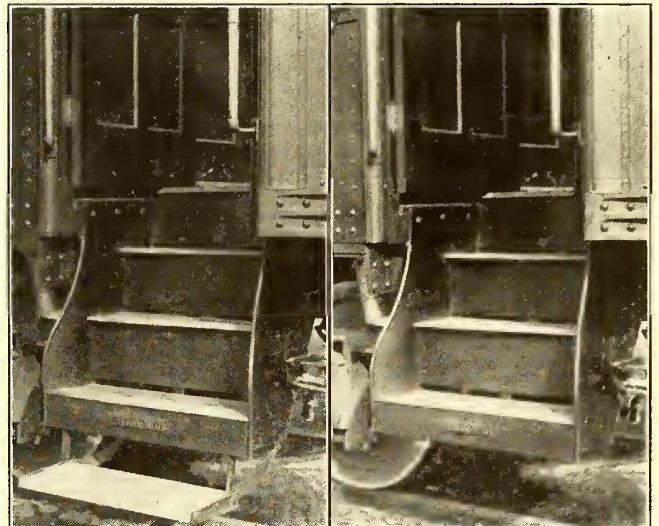
The controller of coal mines has sent out a letter to the mayors of all principal towns in Great Britain urging the organization of committees for the distribution of coal during the coming winter. It was suggested that each committee consist of the mayor or deputy, the chief constable, a coal merchant, a representative of each railway and canal, and a secretary.

Safety Step for Interurban Cars

Step Lowered by Compressed Air and Raised by Counterweight as Soon as Car Starts

A safety car step, especially designed for interurban service, has been in successful operation for some time on the Piedmont & Northern Railway, Charlotte, N. C. The step is pneumatically operated, but is different from the apparatus in common use in that the step will return automatically to its raised position as soon as the car starts. In addition to this the step cannot be lowered until the car is at a standstill.

The step operates in the following manner: When the train comes to a complete stop the conductor or porter on the train presses a foot lever or button, thus applying the air pressure to an operating cylinder which forces the step into the lower or alighting position. At the same time air is admitted to a smaller cylinder which forces a small cam down on top of the car axle. As long as the car remains at rest the step is held in the alighting position by the air pressure, but when the axle of the car turns the little cam on



PNEUMATICALLY OPERATED SAFETY STEP IN LOWERED AND RAISED POSITIONS

top of the axle is rolled off. This automatically releases the air pressure which holds the step, and the latter under the influence of a counterweight is carried back to its upper position where it is housed under the first stationary step of the car. The air pressure can also be released by the conductor by pressing a release lever in the housing of the trapdoor, and the closing of the trapdoor will accomplish the same purpose. The novel feature of the device is that it is not really left to an employee to put the step up before the train starts, as the automatic release on the axle cannot fail to take care of the step when the car moves. As the step is returned to its raised position by a counterweight, it will not operate if the passenger has his weight on it. This avoids throwing a passenger who is trying to alight when the step starts to raise.

While this step was designed especially for interurban cars or steam roads where a stepping box is commonly used, the manufacturers, the Blake Car Step Works, Charlotte, N. C., believe that by slight changes in the operating mechanism it can be made suitable for application on city cars.

London Letter

Glasgow Trams Have Prosperous Year—Leeds to Have Women Inspectors—London County Council Tramways Show Estimated Surplus of Only £8,593

(From Our Regular Correspondent)

The Glasgow Corporation Tramways accounts for the year ended May 31 show that the net surplus to be paid over to the common good amounts to £160,984, the largest sum that has been available for this purpose since 1894, when the tramway system was municipalized. Previous to this year the highest contribution to that fund was in 1911, when the amount was £68,678. Last year £43,548 was paid to the common good. The gross revenue for the year shows an increase of £100,212, compared with that of the previous year, while the average traffic revenue per car-mile has increased from 11.049*d.* to 11.592*d.* Working expenses, including expenditure incurred on account of the war, increased by £52,414. Allowances paid to dependents of employees in the service amounted to £71,576. The sum of £31,000 has been placed to the credit of the fund under which, since 1914, the tramways department has carried on its own third-party risks. Claims and other expenses during the year amounted to £37,017, and the balance at the credit of the fund on May 31 was £12,696. There are now 1514 women conductors and 203 women drivers in the department, and at the depots 450 women are employed in the cleaning of the cars. The total number of employees who have joined the colors since the outbreak of war is 3129. Of that number reports have been received of the death of 291.

The Leeds Corporation tramways committee has decided to appoint six women inspectors on the cars, subject to the approval of the City Council. They will be selected, it is understood, from a number of the women who were among the first to appear as conductors. The women will be supplemental to the existing staff of inspectors, which has been reduced by four or five owing to war-time demands. Their duties will be confined to the inspection of tickets and the supervision of the conductors, who are nearly all women. This step has received the approval of the general purposes committee "as a war measure." In its decision on this matter the committee had in mind the fact that not only is an increased measure of inspection desirable, but that in practically all establishments to which women have been introduced in large numbers since the outbreak of war, a system of women inspectors, while not always popular at first, has been completely justified.

For the second half of 1916 the final dividend on the 6 per cent income bonds of the Underground Electric Railways was 2 per cent only, making 5 per cent for the year, as against the full 6 per cent paid for the three previous years. The interim dividend for the last half year is at the rate of 4 per cent per annum only, and considerable disappointment has been occasioned thereby. The Underground is a holding company, with a controlling interest in the various tube railways of London, the Metropolitan District Railway, and the London General Omnibus Company. The company is the holder of the whole of the ordinary capital of the London General, and an explanation for the reduced income bond dividend is doubtless that the Omnibus Company is only paying at the rate of 4 per cent, as compared with 5 per cent a year ago. With regard to the distributions of the others of the Underground group there is little to be said as they are exactly the same as a year ago.

The tramways in London, with the exception of about 2 miles, are owned by the London County Council, and it is worth noting that the lines on Blackfriars Bridge, although worked by the Council, belong to the City Corporation. At a recent meeting of the Council reports dealing with the tramways were presented from both the finance and the highways committees. These show that on the basis of the annual estimates submitted the results of the working of the tramways for 1917-1918 indicated a net estimated deficiency on revenue account of £89,402. Owing to circumstances

which have arisen since the estimates were prepared, however, there will now be an estimated surplus of £8,598 instead of the deficiency anticipated. The tramways have a length of 149 street-miles, and the accounts for 1916-1917 show an income of £2,552,204. The working expenses (including war service allowances) came to £1,817,694, thus showing a surplus on the year's working of £734,510. The number of passengers carried during the year was 586,127,976, and the number of car-miles run 49,478,973. The corresponding figures for 1915-1916 were 545,423,397 and 47,879,675, respectively. The highways committee says that it has decided that the time of issue of workmen's tickets on all-night cars on down journeys shall be fixed to commence at 3 a. m. from the central terminals. Such tickets are not to be issued after 7.30 a. m. The committee further reports that it has arranged for the issue of transfer tickets on the cars only where there are no direct services and these will be available for change of cars at specified points only.

The final important section of the boring for the Post Office Railway has been completed. This is the parcels tube which is eventually to link up the big district offices of London. It will save a great deal of the mail van traffic on the streets. There is now a boring right through from Paddington, the western end of the undertaking, below the Western District office in Wimpole Street, and the West Central District office, to Mount Pleasant. On some of the remaining sections there are small points where further boring remains to be done. It is the policy of the post office, in view of the shortage of labor and materials, to do only what is essential. The entire suspension of work on the tunnel would at an earlier stage have considerably increased the outlay on construction in the long run, but the work was slowed down. The expenditure upon the undertaking so far approaches £600,000. The boring work has been carried out by means of the Greathead shield, with the assistance of compressed air where special difficulties were encountered. The laying of the rails and the installation of electric equipment will probably be postponed till after the war.

The Glasgow Corporation is discussing a proposed new tramway comforts scheme to take the place of the prize lottery drawing which was discontinued as illegal. The plan proposed provides that war comfort tickets be sold by conductors to the public at 1 penny each. A draw will take place each Monday, the number of tickets to be drawn depending on the number sold. The holders of the tickets bearing the numbers drawn will be entitled to select from a list exhibited on the cars the comforts funds to be benefited. The holder of the ticket bearing the first number drawn will have the first choice, and will have the disposal of the largest percentage of the receipts. The tramways committee has approved of the scheme, and recommended that a special sub-committee be appointed to carry out the arrangements, and that the town clerk be instructed to communicate the foregoing to the Secretary for Scotland. No decision has yet been reached.

The manager of the Keighley Corporation Tramways expresses, in his annual report, the belief that if inter-running between the Keighley and the Bradford tramways is brought about in the near future the benefits that must accrue to the Keighley tramways department by having about 9 miles more tramway track added to the section will be so great as to put the department on a thoroughly satisfactory basis. There are many instances in other parts of the country, he says, to show that a tramways system which is less than 6 miles in length—if an average is taken over a number of years—can never be made to pay. Immediately, however, it is increased to something approaching 12 miles, things automatically begin to adjust themselves on a paying basis.

Prof. Sir Richard Lodge, in his award as arbitrator in the Edinburgh tramways dispute, has decided that a war bonus of 5*s.* a week shall be paid to pointsmen, drivers, conductors, regulators, depot staff and pit and pulley greasers. A bonus of 2*s.* 6*d.* is to be paid to conductresses, and one of 1*s.* 6*d.* to boys under eighteen years of age. Time-and-a-half rates are to be paid for Sunday duty, except to those receiving a weekly wage.

A. C. S.

News of Electric Railways

Traffic and Transportation

Financial and Corporate

Personal Mention

Construction News

St. Louis Settlement Protests

Many Objectors Heard at Third Session on St. Louis Franchise Compromise—Civic League Protests Second Plan

A third public hearing on the two proposed ordinances providing for settlement of the mill tax and franchise differences between the city and the United Railways, St. Louis, Mo., was held on Aug. 22 in the chamber of the Board of Aldermen. The first ordinance is known as the partnership plan. The second ordinance does not provide for partnership, but fixes a tax on the gross receipts of the company.

The hearing on Aug. 22 was the longest and liveliest of the three that have been conducted. Opponents of the bills were in the majority, and most of them urged objections to specific provisions. The advocates of the compromise suggested some form of adjustment to overcome the objections, if possible. In all, sixteen speakers were heard by the committee, ten of them opposing the measures until amendments shall have been made, while six of the speakers thought the bills should be adopted as they are, or should be passed with only slight modifications. The largest delegation of speakers was from the Central Trades & Labor Union, which some time ago adopted resolutions opposing the passage of either bill. The argument of the labor men on Aug. 22 was supplementary to the position taken in the resolutions adopted by their body at a recent meeting.

CIVIC LEAGUE REPORTS ON SECOND ORDINANCE

The report of the special committee of the Civic League on the second ordinance was made public on Aug. 19. This report was prepared by William F. Woerner, author of the mill tax ordinance and former member of the Missouri Public Service Commission; Joseph L. Hornsby, former chairman of the St. Louis Public Service Commission; Frank P. Crunden, former member of the City Council, and Charles W. Bates, former city counselor. Lambert E. Walther, former city counselor, who was a member of the committee which prepared the report on the first ordinance, resigned on account of having been employed to represent some of the preferred stockholders of the railway. Louis F. Budenz, secretary of the Civic League, in making public the report, stated that he was authorized to announce that Mr. Walther agreed with its provisions. The league also gave out an analysis of some features of the proposed ordinances by Delos F. Wilcox of New York, former franchise expert for the Public Service Commission for the First District of New York. Mr. Wilcox expressed the opinion that the ordinances would give the company the upper hand in the important Board of Control which would pass upon extensions and conditions of service.

The committee of the Civic League prefaced its report by saying that "while the second proposed compromise ordinance is an improvement upon the first one in that it eliminated some of the objectionable features pointed out by the committee, it retains others, among them the fundamental vice heretofore pointed out by us." The committee said that the city should make a law, not a contract. It should not put itself on an equality with its public utilities, but remain the sovereign. In addition to protesting against a contractual ordinance, which could not be changed in any manner during the fifty-year period, the committee called attention to other provisions of the ordinance which it considers to be defects. Among these are the provision for establishing a valuation of \$60,000,000 for United Railways properties without a survey, and the provision requiring people who desire extensions of certain lines to furnish the money for building them.

Arbitration of Key Route Wages

Company Unable to Pay More to Men Unless Means Are Found to Increase Its Earnings —Arbitrators Selected

Through an agreement to arbitrate the wage demands of the union, the threatened strike on the electric railway and ferry lines of the San Francisco-Oakland Terminal Railways, Oakland, Cal., known as the Key Route, has been averted. By the terms of the arbitration agreement the public is recognized as a third party to the controversy. It is agreed that the whole matter shall be laid before the State Railroad Commission on an application looking to a fair adjustment between the company, its employees and its patrons.

Pleading the high cost of living, the car men's union presented demands for a wage increase. The request of the men if granted would seriously impair the ability of the company to maintain an efficient service and might result in insolvency for the company. Conferences were held between the officers of the company and the representatives of the union. The company took the position, first, that it has always maintained a liberal wage policy, the existing wage scale being considerably higher than the average on other electric railway and interurban lines; and, second, that its financial condition rendered any increase absolutely impossible in the absence of a corresponding increase in its income. In support of these two contentions the company offered the following facts:

WHAT THE COMPANY HAS DONE IN THE PAST

1. That it established more than nine years ago a wage schedule carrying a higher rate than that paid by any other traction system of equal size in the United States—at least 25 to 30 per cent higher than the average.

2. That under the agreement of Feb. 29, 1908, between the company and the union, which agreement was voluntarily canceled by the union on June 17 last, the platform men in the employ of the company have been paid more than \$1,300,000 in excess of what they would have received during the same period from any other company.

3. That the existing scale was agreed to at a time when the rapid development of the east bay communities immediately after the San Francisco fire gave great promise for the future, and before the era of automobile and jitney competition, high taxes, expensive paving and higher prices for materials and supplies of all kinds.

4. That under this agreement the company has carried its platform men without diminution of pay through dull times and automobile competition, although its gross earnings declined, its surplus disappeared and the market value of its securities dropped 50 per cent.

WAGES 26.2 PER CENT OF GROSS

In the four years from 1913 to 1916, inclusive, there has been a steady decrease in gross revenues and an equally steady increase in trainmen's wages, as shown by the following table:

Year	Gross Revenues	Trainmen's Wages	Per Cent of Gross
1913	\$4,695,086	\$1,017,897	21.6
1914	4,546,226	1,042,811	22.9
1915	4,513,513	1,072,760	23.7
1916	4,310,640	1,129,844	26.2

WAGES INCREASED 11 PER CENT—GROSS DECREASED 8.2 PER CENT

Thus in three years the gross revenue decreased 8.2 per cent, or \$384,445, while trainmen's wages increased 11 per cent, or \$111,947. In other words, the annual earnings available for interest charges, sinking fund requirements,

etc., fell away \$496,382, equivalent to interest at 5 per cent on nearly \$10,000,000. In consequence of this sharp decline the company is in default for three years on its sinking funds and is now nearly a year in arrears in the interest on its mortgage bonds. The company closed its books on Dec. 31, 1916, with a deficit of \$269,571 for the year, without including \$300,000 due its sinking funds from the income of this period and without including an adequate depreciation reserve. The floating debt amounted on May 31, 1917, to \$768,125. The company has not paid a dividend for five years. The bonds are selling for from 40 to 75 per cent of their face value. A calculation in July showed a shrinkage of more than \$6,500,000 since 1909 in the market value of bonds alone.

THE COMPANY'S PLEA

In a statement which it issued the company said:

"This company cannot pay higher wages until it has the money to do it with, and its only source of income is the public. Hence the problem of the platform men is that of the company—to increase the common fund from which both are sustained; that is, the gross earnings. In submitting the wage question to arbitration, both sides have agreed that the arbitration board shall certify its conclusions to the State Railroad Commission. Wages are the largest item in operating expense, and the commission, in determining what the public should pay for its service, must allow a return which will cover a fair wage schedule. Without the co-operation of the public, for whose service and benefit alone the property is operated, no solution is possible."

Arbitration was agreed upon on Saturday, Aug. 25. The arbitrator for the company is John S. Orum, president of the Savings Union Bank & Trust Company, San Francisco, one of the directors of the San Francisco-Oakland Terminal Railways and chairman of its executive committee. The arbitrator for the men is George C. Kaufman, a member of the Civil Service Commission of Oakland, well known as having been connected with the Mexican mining properties controlled by the Guggenheim interests. The third arbitrator, selected by the company and the men, is Paul A. Sinsheimer, assistant to the president of the Union Trust Company, San Francisco, formerly the bond and stock expert of the State Railroad Commission of California.

This is an unusual form of arbitration between labor and employers, especially electric railways, inasmuch as the public is regarded as the third factor and the entire findings of the arbitration are to be certified to the Railroad Commissioners, the only body that has the power to fix rates of fare in California.

WHAT THE MEN DEMAND

Since Feb. 29, 1908, a schedule of wages has been in effect for traction men calling for 30 cents an hour for the first year and graduated to 40 cents an hour for men with the company more than ten years. For Key or Ferry division men the rates of pay have been 38 cents an hour for one year of service or less, 40 cents between one and two years and 42 cents between two and three years and over. On June 6, 1917, before a determination had been reached by the Railroad Commission of the company's petitions for increased revenues on its traction lines, the union requested for traction division motormen and conductors and Key Route division brakemen the following scale:

For first six months of service.....	40 cents an hour
For second six months of service.....	41 cents an hour
For second year of service.....	43 cents an hour
For third year of service and thereafter.....	45 cents an hour

For Key Route division motormen and conductors the union requested the following scale:

For first six months of service.....	50 cents an hour
For second six months of service.....	51 cents an hour
For second year of service.....	53 cents an hour
For third year of service and thereafter.....	55 cents an hour

At a meeting of the union on Aug. 5 the original requests were modified and the following schedules were submitted to the company in their stead as a compromise and without reference to arbitration:

For Traction division motormen and conductors and Key division brakemen, 35 to 41 cents an hour.

For Key or Ferry division motormen and conductors, 45 to 51 cents an hour.

Kansas City Welfare Work

Some of the Activities of the Company Along These Lines May Be Affected by the Recent Strike

It is presumed that the rearrangement of welfare work of the company will be a serious problem in the readjustment following the strike of the employees of the Kansas City (Mo.) Railways. Upon the reorganization of the company, and the accession of Philip J. Kealy as president, welfare work was established as one of the most important phases of the company's activities. Outsiders now observe that some of the men who have been the chief beneficiaries of the desire of the company to be helpful in all the private as well as workday activities of the men were among the most radical of the strikers.

The safety work of the company has perhaps affected the largest number of persons in the most helpful way. The benefits to the public, the men and the company, already apparent and effective, have far exceeded the value of efforts expended, and were fully worth while, whatever the present loss may be in the personnel of men trained in the safety propaganda.

A building and loan association was established on Feb. 23, 1917. Trainmen were beneficiaries of this enterprise in larger proportion than any other class. There are 900 employees holding stock, representing \$525,400 of the total capitalization of \$1,000,000. Employees have deposited \$46,369. Thirty-nine real estate loans have been made amounting to \$58,495. Three homes have been built, and seven employees have been assisted in paying for homes.

A pension system was established on Jan. 1, 1917, whereby employees in service twenty years, or more than sixty-five years old, might retire on a minimum of \$240 a year. Nineteen men have been put on this "honor roll," as it is called, and five men have been granted temporary pensions.

A loan fund was created in August, 1916, through which 237 loans for a total of \$12,270 have been made to employees, to whom no interest was charged, thus freeing them from the loan sharks.

An employees' lawyer was retained in June, 1916, to be available to all employees without cost to them. In twelve months 3400 cases were handled for more than 1000 employees, almost all trainmen. In five cases the property of men was saved from foreclosure, three at the very last moment.

Life insurance for all employees was established on March 1, 1917, the company paying more than half the premiums. Practically all the employees have been insured under this plan.

A free hospital service was established on April 1, 1917, through endowments by the company of \$10,000 and \$25,000. Nine of the twelve employees using this service were trainmen. They received 207 of the 299 days of treatment.

A fraternal aid and protective association, entirely for trainmen, has been operating since 1905. It is managed by the trainmen, and pays \$1,000 to \$1,500 monthly in benefits. The company has contributed in the last few months about \$1,200 to this association, which was in need of funds.

The company had planned and was carrying out elaborate arrangements for encouraging athletics, and since 1916 had paid all the expenses of the baseball teams—composed almost exclusively of trainmen and shopmen.

Another feature of the effort to inspire the co-operative spirit was the publication of *The Railwayman*, a monthly magazine going to employees, correspondents from various divisions and departments being paid for their services and elected by the divisions. The magazine has been filled with personal notes of the employees, and with articles describing the activities of the company and the men.

There have been numerous special enterprises and instances in which the company had tried to assist the employees to self-betterment, and to cultivate an *esprit de corps*. One of the most notable was the encouragement to recruiting in the Third Regiment, Missouri National Guard. The men who joined the regiment were paid a proportion of their wages while in service at the Mexican border. An entire company of the Third Regiment is composed of street railway employees. The president of the Kansas City Railways is colonel of the regiment.

Friendly Relations at Portland, Ore.

Men Appeal to Public Service Commission to Allow Increase of Rates if Investigation Verifies Statement of Company Officials

The platform men of the Portland Railway, Light & Power Company, Portland, Ore., recently asked for an increase in wages and a shorter working day which would, if granted, increase the company's cost of operation about \$1,000,000 a year. Franklin T. Griffith, president of the company, discussed the situation fully and frankly with a committee of the men and showed them that the earnings not only would not permit of an increase of expenditures but did not warrant present expenditures. He pointed out that the company realized the justice of the men's claims of higher living expense and would like to grant increases to all employees were it possible for the company to do so, and that while earnings were limited, expenditures exceeding that limit could not be made.

The platform men then took the matter up with the Central Labor Council and after some further conferences adopted a resolution petitioning the Public Service Commission of Oregon to look into the company's affairs and, if necessary to meet the need for increased wages, to permit the increase of rates. The resolution was, in part, as follows:

RESOLUTION ADOPTED BY MEN

"Whereas, It is a matter of common knowledge that the increased cost of living makes it impossible for many of the car men, in common with other workmen, to meet their obligations under present conditions, the executive board therefore presents the resolution:

"That the Central Labor Council of Portland urge upon the Public Service Commission of the State that it immediately investigate the claims of the Portland Railway, Light & Power Company, and if the investigation disclose the fact that the present revenues are adequate to meet the necessary increase in wages that public announcement of the findings be made; and, further, if the revenues be not adequate, the company be permitted to revise its tariffs to meet this necessary readjustment."

The conferences between President Griffith and the men terminated in a manner entirely satisfactory to both sides and the men are now working for the increase of rates which they believe will relieve the situation. An advance in the fare unit from 5 cents to 6 cents has been discussed in the daily press of Portland and seems to be regarded as the logical outcome of the present movement. It is notable that the action of the labor council was taken with a knowledge of the fact that about 75 per cent of the company's patrons are workmen and that about 90 per cent are in the wage-earning class.

New York Commission Sustained

Federal Court Upholds Order of Commission Requiring Brooklyn Company to Purchase 250 New Surface Cars

A special statutory federal court, consisting of Circuit Judge Ward and District Judges Veeder and A. N. Hand, sitting in Brooklyn, has denied the application of the Brooklyn Rapid Transit Company for an injunction to restrain the Public Service Commission for the First District of New York from taking steps to enforce its order, directing the company to purchase and put in operation 250 new cars on its surface lines. The company was recently defeated in the New York State courts, in an effort to obtain a certiorari review of the commission's proceedings and order in the car purchase matter. The company thereupon had recourse to the federal courts, maintaining that the order of the commission was unconstitutional and that the law creating the commission was also unconstitutional and that the order of the commission was confiscatory. All of these points have been decided by the Federal Court, in a decision issued *per curiam*, in favor of the commission. The court held that the company had not been deprived of any of its rights, and that the order had only been issued after a full and fair hearing and was not unreasonable or confiscatory.

Night Service in San Francisco

**United Railroads Resumes Operation After Dark—
On August 28 Service Had Reached About
Two-Thirds Normal**

The United Railroads, San Francisco, Cal., the employees of which are on strike, operated cars at night on Aug. 27 for the first time since Aug. 23, when one employee was killed and two were seriously wounded. The company asked for a policeman for each car. This request was refused by the chief of police, who contended that the streets were well guarded where cars were run. On the afternoon of Aug. 28 a meeting was held at which Mayor Rolph, the members of the public utilities committee of the Board of Supervisors and the head of the Board of Public Works were present looking toward a solution of the strike. President Jesse W. Lilienthal of the United Railroads will not meet the representatives of the strikers. City officials have discussed the possibility of seizing the lines of the United Railroads and operating them with municipal employees. They base their right to do this on the ground that the United Railroads has forfeited its franchise by not providing adequate service. City Attorney Lull is working on the legal phases of the situation to determine whether or not this can be done.

For the first time since the strike was started a car was run to the Union Iron Works on Aug. 27. This was an armored car, of which there are several in use. Some lines are still without service. H. T. Jones, superintendent of the United Railroads, declares that service is about two-thirds normal. B. F. Bowbeer, an official of the union, is assuring strikers that they will win by Labor Day. It is believed that he is depending upon a general strike of union men throughout the city, including the iron workers at the Union Iron Works, to force the United Railroads into a settlement. Few disturbances occurred on Aug. 28.

The only action taken by the Mayor and others at the conference on Aug. 29 was the securing of the use of the Ocean Shore Railroad and the Southern Pacific steam lines by the city for service to the Union Iron Works and similar plants in the Potrero District, where from 10,000 to 15,000 workmen are employed. In view of this the Iron Trades Council called off the strike which was scheduled for Labor Day. Train service to Potrero started on the afternoon of Aug. 29. The Ocean Shore line provides the trains, engine crews and operation. The city pays a fixed price for the trains, collects the fares, handles the transfers and assumes responsibility for accidents. The trains are called Municipal Specials. The fare is 5 cents, with transfer to all the lines of the San Francisco Municipal Railway, owned and operated by the city. Beginning Sept. 1 the city proposed to operate large motor buses to supply the sunset district and the southern part of the city, which have been without adequate service.

Company officials say that the service of the United Railroads is steadily improving. To a copy of the resolutions passed by the Board of Supervisors of San Francisco suggesting and recommending that the strike difficulties be submitted to a board of arbitration, Mr. Lilienthal replied on Aug. 29 in part:

"There is no controversy to arbitrate. Certain of our employees without giving any notice or making any complaint abandoned their cars. We have proceeded to fill their places. With adequate police protection or permitted to provide open armed protection ourselves we are prepared to operate every car on a normal schedule."

Anonymous letters received by Mr. Lilienthal and other officials of the company threaten death, destruction of property by dynamite and a general reign of terror after Labor Day if the strike is not ended.

Ohio Strike Broken

The strike of the employees of the Dayton, Covington & Piqua Traction Company, West Milton, Ohio, declared on Aug. 15, has petered out. The company was able to operate part of its schedule on Aug. 16, 17 and 18 without help from outside. It then offered the strikers a chance to return to their former places at a flat rate of 30 cents an hour, without recognition of the union. Only five of the men accepted this offer, and it became necessary to employ new and ex-

perienced men. The regular schedule was resumed on Aug. 19. On Aug. 22 the Brotherhood of Interurban Trainmen disbanded, thus ending the strike. At no time did the operation of cars cease entirely. The men were offered a scale of wages ranging from 26 cents to 31 cents an hour, effective from July 1, but they insisted upon a flat rate of 30 cents an hour for all trainmen and recognition of the union. As stated previously, the company agreed to the 30-cent rate, but refused to deal with the union. It promptly filled the places of the men who refused to return under these terms.

Dinner to R. B. Stearns at Chicago

Thirty-one of the intimate railway and supply men friends of Robert B. Stearns, former vice-president and assistant general manager of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., and now vice-president of the Bay State Street Railway, Boston, Mass., tendered a congratulatory dinner to him at the Chicago Athletic Club on Aug. 28. G. T. Seely, assistant general manager of the Chicago Elevated Railways, acted as toastmaster, and W. F. M. Goss, W. V. Griffin, Harry H. Adams, John J. Cummings, Lawrence E. Gould, Harry F. Keegan, John Benham and Bion J. Arnold responded. Just eleven years before, almost to the day, Mr. Stearns was tendered a similar dinner when he resigned his connection with the Northwestern Elevated Railway, Chicago, to take charge of the operation of the Chicago & Milwaukee Electric Railroad. A very complimentary review was made by the speakers of the important work which Mr. Stearns has contributed to the American Electric Railway Association and to the industry in general. Some pride was manifested in the fact that Mr. Stearns' accession to the big Eastern position adds another important name to the already long list of Middle West successful railway operators who have been called East. Mr. Stearns was tendered a farewell dinner on Aug. 29 by the officials of the Milwaukee Electric Railway & Light Company.

Preparing for Seattle Arbitration

In a recent letter to the Puget Sound Traction, Light & Power Company, Seattle, Wash., Charles A. Reynolds, attorney for the Seattle local of the Amalgamated Association of Street & Electric Railway Employees of America, asked the company to establish the eight-hour day for employees of the company, and grant the increased scale of wages. The company was given until Aug. 28 to reply. If the request was not granted by that time, the matter was to be referred to the arbitration board, consisting of Dr. Henry Suzzallo, president of the University of Washington, and chairman of the State Council of Defense; James A. Duncan, secretary of the Seattle Central Labor Council, and C. J. Franklin, Portland, Ore. The object of the communication to the company was to remove as many as possible of the issues to be arbitrated between the men and the company before the arbitration board meets to settle hours, wages and working conditions as agreed upon at the conclusion of the recent strike.

Bonus for Topeka Employees

The Topeka (Kan.) Railway has announced a bonus system of 10 per cent of the yearly wage to all its employees, with a minimum bonus of \$50 to any employee whose bonus would amount at the 10 per cent rate to less than that sum. The bonus is to apply for the calendar year 1917. In addition the company will hereafter pay time and a half for all overtime, ten hours to constitute a basic day.

This is the second wage increase granted to the employees of the Topeka Railway this year, a revision of the wage scale having been announced last Christmas Eve, effective on Jan. 1.

In making the announcement A. M. Patten, assistant general manager, said that while the earnings of the company have been less than in previous years, the management felt that it should do all it could to make the lot of its employees easier. The increase was no sudden decision on the part of the company. He had it up with the heads of the company for some weeks.

Toronto Arbitration Finding

Board Appointed in July Concludes Its Work—Company Representative Files Dissent

On Saturday, Aug. 25, the Minister of Labor for the Dominion of Canada made public the report of the Board of Conciliation appointed in July last, following the settlement of the two days' strike of the employees of the Toronto Railway, to hear evidence and decide the various questions which were in dispute at the time of the strike.

The report was signed by Judge Colin G. Snider, chairman, and D. A. Carey, the representative of the employees. Duncan McDonald, who was the third member of the board, acting on behalf of the Toronto Railway, dissenting from the report of the majority on the ground that the weight of evidence did not warrant the award made to the men. The conditions of the report fixing wages were as follows:

"From June 16, 1917, until the termination of this agreement, the wages of the employees shall be as follows:

"For motormen and conductors: For the first six months, 30 cents an hour (to apply only to men employed after this date). For the second six months, 32 cents an hour. For the second year, 35 cents an hour. For the third and subsequent years, 37 cents an hour.

"Motor and truck repair men: For the first six months, 30 cents an hour (to apply only to men employed after this date). For the second six months, 32 cents an hour. For the second year, 35 cents an hour. For the third and subsequent years, 37 cents an hour.

"Shedmen: Foremen, 37 cents an hour. Operating shedmen, men who operate cars and do general shed work, 33 cents an hour. Shedmen, men doing general shed work, but not operating cars, 32 cents an hour.

"Car cleaners, 31 cents an hour.

"The rate of wages for motormen and conductors engaged in train work on Sunday shall be 4 cents an hour platform time in excess of weekday rates. Emergency crews of motor and truck repair men shall receive time and one-fifth for Sunday work.

"Any employee against whom a charge is received shall have the right of appeal in person to the general superintendent.

"The general superintendent or manager shall receive a committee of the company's employees or a duly appointed committee of the members of Division No. 113 at any reasonable time to discuss any matters arising out of this agreement."

The agreement is to continue in force for two years from June 16, 1917.

The report of the Conciliation Board was submitted to a mass meeting of the employees at midnight on Aug. 25, and accepted by the men by a vote of 684 to 289. The report will now be submitted to a meeting of the directors of the Toronto Railway for acceptance.

Strike in Montgomery

The motormen and conductors in the employ of the Montgomery Light & Traction Company, Montgomery, Ala., organized recently and went on strike on Aug. 15. They were receiving 16 cents an hour as a minimum. They demanded a minimum of 20 cents and a maximum of 25 cents, recognition of the union and the reinstatement of the men who they claimed had been discharged recently for participating in the deliberations of the union. The president of the company, Richard Tillis, agreed to discuss all the demands except recognition of the union. This request he refused flatly to entertain. About twenty-five of the men remained faithful to the company. A spokesman for them said that they had no objection to their fellow workers forming a union, but that those who did not care to affiliate with the union should be equally free to choose the course of action which they deemed best for their own interest. The company resumed service with these men, and then set about rebuilding its transportation organization. The practice was followed of operating cars on all lines until 9 p. m. After that hour service was continued only on the Pickett Springs line, on which Camp Sheridan is located. There have been several outbreaks of disorder. In one of these four men were shot, two of them, it is said, probably fatally.

Another Minneapolis Valuation Report

The report of C. L. Pillsbury, consulting engineer to the City Council of Minneapolis, Minn., will show a value of \$24,346,113 for the properties of the Minneapolis Street Railway, as of Jan. 1, 1916. In 1923, when the present franchise expires, it is estimated the value will be increased \$5,850,000, with \$3,500,000 for needed extensions.

Mr. Pillsbury was employed to check up a report of F. W. Cappellen, city engineer, made in connection with franchise matters, whose appraisal was \$21,252,121. Mr. Pillsbury arrived at his figures as follows:

Tracks, bridges, electric distribution system, rolling stock, power plant equipment, substation equipment, bridges, furniture and fixtures.....	\$18,302,835
Real estate	1,088,862
Administration, organization and legal expenses.....	329,420
Taxes during construction.....	325,194
Expenses prior to construction.....	250,000
Interest during construction.....	1,440,742
Expenditures due to municipal improvements.....	239,206
Working capital	360,883
Development costs	2,775,649
Water-power leases to end of franchise, December, 1923	513,172
	<hr/>
	\$25,625,964
Depreciation	1,279,851
Total value	<hr/>
	\$24,346,113

The company's gross earnings for the seven years are estimated at \$47,344,267, with net earnings of \$20,918,806. For the same period renewals and depreciation are estimated at \$4,830,312 and net income, less taxes and depreciations, will be \$16,088,494. The interest on capital for seven years is fixed at \$13,524,875 in the report, leaving expected surplus of \$2,563,619.

The Pillsbury report recommends an immediate new contract between the city and the company, holding that a new franchise can best insure the extensions needed to take care of the city's growth. It also recommends an expert traffic survey of the city, to determine future needs, as the next duty of the street railway committee of the City Council.

Railway Purchases Power.—The Connecticut Power Company has contracted to supply power to operate the Milford & Uxbridge Street Railway, Milford, Mass. The railway will keep its local power plant in reserve for use in case of emergency.

Trenton Companies Must Sprinkle Tracks.—The City Commission of Trenton, N. J., has adopted a resolution compelling the electric railways operating there to sprinkle their tracks with water. The recommendation was made by A. S. Fell, city health officer, who said that the cars stirred up dust germs.

Municipal Ownership at Toledo Constitutional.—City Law Director Harry Commanger of Toledo, Ohio, was quoted recently as saying that the municipal ownership plan to be secured through the proposed charter amendment is constitutional. He was said some time ago to have expressed doubts as to this matter. Mayor Milroy is said to favor the amendment. It will be submitted to the voters on Sept. 11.

Cleveland Interurban Terminal Plan Maturing.—O. P. Van Sweringen said a few days ago that plans for the proposed interurban terminal at Cleveland, Ohio, are nearing completion, and that an announcement will be made regarding them soon. The steel work on the new Hotel Cleveland, which is included as part of this plan, is being placed and the Terminal Building Company, one of the corporations interested, has acquired five more parcels of land. All of the interurban electric railways will probably use the terminal. The building will be located near the retail business section of the city and close to the Public Square.

Link Proposed to Connect Illinois and Indiana Roads.—It is stated unofficially that plans are under consideration for the construction of an electric railway from the terminus of the lines of the Illinois Traction System at Ridge Farm, near Danville, Ill., to a connection with the lines of the Terre Haute, Indianapolis & Eastern Traction Company at Clinton, Ind. The road would extend through the new coal mining field near Dana, Ill., and would complete the link necessary to provide for the trip entirely by trolley from Indianapolis, Cincinnati, Columbus, Dayton, Springfield, Toledo, Detroit, Cleveland or Buffalo to St. Louis.

Financial and Corporate

Annual Report

North Carolina Public Service Company

The comparative income statement of the North Carolina Public Service Company, Greensboro, N. C., for the fiscal years ended March 31, 1916 and 1917, follows:

	1917	1916	Increase
Gross earnings	\$580,491	\$513,391	\$67,100
Operating expenses	320,713	285,453	35,260
Taxes	18,396	17,178	1,217
Net earnings	\$241,382	\$210,760	\$30,622
Interest charges	159,506	145,724	13,782
Net surplus	\$81,876	\$65,036	\$16,840

The railway department of the company suffered on account of the continual high cost of supplies of all kinds and the continual increase of the number of automobiles in the territory served, due largely to the many improved roads. The management hopes to better the financial results of the operation of this department by the installation of "light cars" now being built for the company, and by other economies, and it is also hoping to obtain permission from the city of Greensboro to alter certain burdensome franchise requirements. If this is done, it is believed that the company will still be able to maintain and operate this department with financial success.

The business of the gas department in all cities and towns served shows a consistent growth and with a bright outlook for new industrial business for the coming year, one long term contract having been closed which will increase the "send out" in the Salisbury plant 25 per cent. Under the new gas rates put into effect during the last year the new-business department expects to close numerous long term contracts with hotels, restaurants, hospitals and other industries. During the last year the largest increase was in the electric light and power department, due especially to a large increase in power business—42 per cent greater than the previous year.

At the annual meeting of the stockholders the necessary action was taken to reduce the present outstanding common stock to \$1,500,000 by the exchange pro rata of \$500,000 preferred stock authorized for this purpose, the preferred stock to bear 4 per cent dividend the first year, 5 per cent the second year and 6 per cent thereafter. For example, the owners of 100 shares of the present common stock will receive in the exchange fifteen shares (plus fraction) of new preferred stock and forty-five shares (plus fraction) of common stock. Fractional scrip will be issued for all amounts under one share and arrangements will be made whereby owners of fractional amounts may buy, or sell, at a fixed price. This action will result in considerable saving in taxes and also bring the capitalization more in line with the earning capacity.

Empire United Sold Under Foreclosure

The Rochester, Syracuse & Eastern Railroad and the Empire United Railways, Inc., properties, exclusive of the Rochester, Syracuse & Eastern Railroad, were sold in mortgage foreclosure proceedings at Syracuse on Aug. 28. These corporations are in process of reorganization and the sale in each instance was a formal proceeding to meet legal requirements. A. W. Loasby, chairman of the bondholders' protective committee of the Rochester, Syracuse & Eastern Railroad, bid in that road for \$1,000,000. The Empire United properties were bid in by Thomas W. Meachem, representing security holders, for \$300,000.

A brief review of the terms of the plan proposed for the reorganization of the Rochester, Syracuse & Eastern Railroad by the committee of which Mr. Loasby is chairman was published in the ELECTRIC RAILWAY JOURNAL of May 26, 1917. The plan of reorganization for the lines of the Empire United Railways other than the Rochester, Syracuse & Eastern Railroad was reviewed in the issue of this paper for Feb. 17, 1917.

Electric Railway Statistics

Comparison of Returns for May, 1917, with Those for 1916 Show Operating Revenues Almost at Standstill While Expenses Grow

A comparison of electric railway statistics for the month of May, 1917, with figures for the corresponding month of 1916, made by the information bureau of the American Electric Railway Association indicates that the operating revenues of electric railways in the United States are almost at a standstill while the operating expenses are growing. The eastern district again is suffering most in this respect.

DATA FROM 8084 MILES OF LINE

Data for May, representing 8084 miles of line of companies scattered throughout the country, figured on the per mile of line basis, indicate an increase in operating revenues of 0.83 per cent, in operating expenses of 7.41 per cent, and a decrease in net earnings of 9.05 per cent. Data representing approximately 75 per cent of the above mileage indicate a slight decrease in the amount of taxes paid and a decrease in operating income of 14.65 per cent.

The returns from the city and interurban electric railway companies, as shown in detail in the accompanying table, have been classified according to the following geographical grouping: Eastern Division—East of the Mississippi River and north of the Ohio River. Southern District—South of the Ohio River and east of the Mississippi River. Western District—West of the Mississippi River.

Of the three groups shown in the accompanying table, returns for the Eastern representing 5615 miles of line indicate an increase in operating revenues of 0.20 per cent, in operating expenses of 8.28 per cent and a decrease in net earnings of 11.79 per cent. Taxes paid by companies represented by approximately 70 per cent of the above mileage have decreased 4.40 per cent, while in spite of this the operating income of these companies decreased 19.62 per cent.

Returns for the Southern group indicate a condition similar to that affecting the Eastern group, the operating income having decreased 4.03 per cent and there being a slight decrease in revenue. On the other hand, the Western group shows some improvement. Both groups show increases in the amount of taxes paid.

RESULTS IN COUNTRY AS A WHOLE

The operating ratio for the country as a whole has increased from 60.06 per cent in 1916 to 63.97 per cent in 1917. The operating ratio of the Eastern district has increased from 59.75 per cent in 1916 to 64.57 per cent in 1917. The operating ratio of the Southern group has also risen, while that of the Western shows a slight decrease.

Investors Organize

Holders of Securities of Massachusetts Electric Railways Organize to Protect Their Interests—Homer Loring, President of New Association

A meeting attended by owners of street railway securities from all parts of Massachusetts was held recently at the Algonquin Club, Boston. Representatives of savings banks and of insurance companies in attendance represented \$38,000,000 invested in street railway securities. The meeting was called to order by Homer Loring, Boston, president of the Fort Dodge, Des Moines & Southern Railroad. He said in part:

"The critical situation in which street railways find themselves demands the active and immediate co-operation of all interests. The managing officials are using their utmost endeavors to meet this condition, but the situation is so extraordinary that they alone cannot accomplish the results which will restore the confidence of the investing public in street railway securities. For many years the value of these securities has been declining. This is due to the fact that the roads have been the victims of inimical legislation. Add to burdensome legislation the extraordinary expenses imposed by war-time conditions, and we have a situation which calls for heroic action. Unless those who have invested their money work together as a unit to assist the street railway managers in bettering conditions they will not only fail to secure dividends, but will lose what they have invested. Street railways need money continually for improvements. This they cannot get without assuring investors that their investments will be reasonably protected."

Charles C. Peirce characterized the standardized unit of fare as unbusiness-like. He said that because they were compelled to sell their product for less than it cost them street railway managers found their properties being slowly starved to death.

On motion, the Association of Owners of Massachusetts Street Railway Securities was formed. This association will consist of the owners of securities wherever residing. The officers are as follows: Homer Loring, president; Alfred D. Foster, vice-president; W. E. Gilbert, vice-president; William O. Kimball, secretary and treasurer. The board of directors is composed of the following: Jirah Swift, New Bedford; Francis Peabody, Jr., Boston; Charles G. Bancroft, Boston; Burton H. Wright, Worcester; Charles P. Adams, Worcester; W. W. McClouch, Springfield; A. W. Damen, Springfield; John W. Stevens, Greenfield; W. D. Wyman, Pittsfield; and the officers of the association.

The association hopes to enroll among its members most of the 30,000 owners of Massachusetts street railway securities, and plans to take an active interest in all matters affecting the credit and security of their holdings.

COMPARISON OF REVENUES AND EXPENSES OF ELECTRIC RAILWAYS MAY, 1917 AND 1916.

ACCOUNT	UNITED STATES				EASTERN DISTRICT				SOUTHERN DISTRICT				WESTERN DISTRICT			
	Amount May, 1917	Per Mile of Line			Amount May, 1917	Per Mile of Line			Amount May, 1917	Per Mile of Line			Amount May, 1917	Per Mile of Line		
		1917	1916	% Increase		1917	1916	% Increase		1917	1916	% Increase		1917	1916	% Increase
Operating revenues	\$17,592,790	\$2,176	\$2,158	0.83	\$13,991,008	2,492	2,487	0.20	\$1,335,359	\$1,392	\$1,394	0.14	\$2,266,393	\$1,501	\$1,427	5.19
Operating expenses	11,254,028	1,392	1,296	7.41	9,035,634	1,609	1,486	8.28	787,413	821	799	2.75	1,430,981	948	908	4.41
Net earnings	6,338,762	784	862	9.05	4,955,374	883	1,001	11.79	547,976	571	595	4.03	835,412	553	519	6.55
Operating ratio, per cent	1917, 63.97; 1916, 60.06				1917, 64.57; 1916, 59.75				1917, 58.98; 1916, 57.32				1917, 63.16; 1916, 63.63			
Average number of miles of line represented	1917, 8,084; 1916, 7,992				1917, 5,615; 1916, 5,546				1917, 959; 1916, 955				1917, 1,510; 1916, 1,491			

COMPANIES REPORTING TAXES

Operating revenues	\$12,364,749	\$2,165	\$2,198	†1.50	\$9,413,234	\$2,493	\$2,574	†3.15	\$759,961	\$1,449	\$1,441	0.56	\$2,191,554	\$1,553	\$1,480	4.93
Operating expenses	8,102,888	1,419	1,344	5.58	6,288,600	1,665	1,574	5.78	442,123	843	797	5.77	1,372,165	972	937	3.74
Net earnings	4,261,861	746	854	†12.65	3,124,634	828	1,000	†17.20	317,838	606	644	†5.90	819,389	581	543	7.00
Taxes	800,091	140	144	†2.78	573,482	152	159	†4.40	60,315	115	109	5.50	166,294	118	116	1.72
Operating Income	3,461,770	606	710	†14.65	2,551,152	676	841	†19.62	257,523	491	535	†8.12	653,095	463	427	8.43
Operating ratio, per cent	1917, 65.54; 1916, 61.15				1917, 66.79; 1916, 61.15				1917, 58.18; 1916, 55.31				1917, 62.59; 1916, 63.31			
Average number of miles of line represented	1917, 5,712; 1916, 5,624				1917, 3,776; 1916, 3,707				1917, 524; 1916, 524				1917, 1,411; 1916, 1,393			

†Decrease.

Utility Bonds Recognized in California

The State of California has passed an amendment to its Savings Bank law, making certain public utility bonds legal for investment by savings banks. The amendment to the California law reads as follows:

"Bond of any street railroad corporation; or any gas, water, pipe line, light, power, light and power, gas and light and power, electrical, telephone, telegraph, or telephone and telegraph corporation or any other 'public utility' incorporated under the laws of the State of California, and

"Operating exclusively in the State of California, provided said corporation has had for the period herein fixed, net earnings amounting to one and a half times the interest on all outstanding mortgage indebtedness, or

"Operating its property in part within the State of California, provided said corporation has had one or each of its two fiscal years next preceding such investment, net earnings amounting to one and a half times the interest on all its outstanding indebtedness, or

"The payment of which is guaranteed both as to principal and interest, by a public utility corporation meeting the requirements of either subdivision 1 or 2 of the paragraph."

Somewhat similar changes with respect to legalizing bonds for savings bank investments were made in the laws of Maine, Vermont and Connecticut at the recent sessions of the Legislatures in those States.

Cities Service Company, New York, N. Y.—The Gas & Electric Securities Company, which financed the organization of the Cities Service Company, is offering an issue of \$1,000,000 collateral trust notes—Series "A" at 98¼ and interest to the investor, to yield 6.95 per cent. The notes will be dated Sept. 1, 1917, and mature Sept. 1, 1919. Interest is payable in New York City on March 1 and Sept. 1, without deduction for the normal federal income tax. The notes are redeemable at any time, on thirty days' notice, at 101 and interest, and the Bankers Trust Company is acting as trustee. The notes are followed by \$1,000,000 par value of 7 per cent cumulative preferred stock and \$1,000,000 par value of common stock, both paying regular dividends. They are the direct obligation of the company and are secured by the deposit with the trustee of \$1,250,000 principal amount of mortgage bonds of seven public utilities.

Dominion Power & Transmission Company, Ltd., Hamilton, Ont.—The Dominion Power & Transmission Company has declared a quarterly dividend of 1 per cent on the common stock, payable on Sept. 15 to holders of record of Aug. 31. Semi-annual dividends of 2 per cent have been paid on this issue for some time.

Electric Bond & Share Company, New York, N. Y.—The holders of the preferred stock of the Electric Bond & Share Company were notified on Aug. 28 by A. E. Smith, treasurer of the company, that pursuant to a vote of the board of directors adopted on Aug. 28, arrangements have been made to offer to the holders of the preferred stock of record at the close of business on Aug. 30, the right to subscribe pro rata for 10,000 shares of the preferred stock at par plus accrued dividends. Each holder of preferred stock is entitled to subscribe for one share of new stock for each four shares of preferred stock held by him at the close of business on Aug. 30, 1917. The increase in the capital stock from \$16,000,000 to \$20,000,000, consisting of 20,000 shares preferred and 20,000 shares common stock, was approved by the stockholders recently.

Iowa Railway & Light Company, Cedar Rapids, Iowa.—Harris, Forbes & Company, New York, N. Y., Harris, Forbes & Company, Inc., Boston, and the Harris Trust & Savings Bank, Chicago, are offering at 98¾, yielding 6.75 per cent, \$700,000 of two-year 6 per cent secured gold notes of the Iowa Railway & Light Company, dated Aug. 15, 1917, and due Aug. 15, 1919, but callable on thirty days' notice at 101 and interest prior to Aug. 15, 1918, and at 100½ and interest thereafter. The notes are secured by the pledge of \$972,500 of first and refunding mortgage twenty-year 5 per cent gold bonds, the notes being issued on the basis of 72 per cent of the face value of the bonds pledged.

Lackawanna & Wyoming Valley Rapid Transit Company, Scranton, Pa.—Brooks & Company, Scranton, Pa., announce a proposed agreement for the creation of a sinking fund to retire the \$888,000 of 5 per cent fifty-year collateral trust bonds of the Lackawanna & Wyoming Valley Rapid Transit Company, by which the Scranton & Wilkes-Barre Traction Corporation will pay to the Guaranty Trust Company, trustees, \$15,000 in cash, or deliver \$15,000 of the bonds per year. The bonds will then be purchased at 105 and interest or retired by lot at this figure. The Scranton & Wilkes-Barre Traction Corporation is the owner of the bonds and capital stock of the Lackawanna & Wyoming Valley Railroad, which are pledged to secure the payment of the bonds of the Lackawanna & Wyoming Valley Rapid Transit Company.

Lehigh Power Securities Corporation, Allentown, Pa.—The Electric Bond & Share Company and Brown Brothers & Company, New York, N. Y., and Edward B. Smith & Company and Henry & West, Philadelphia, Pa., are offering for sale the ten-year 6 per cent secured gold notes of the Lehigh Power Securities Corporation dated Aug. 1, 1917, and due Aug. 1, 1927. The company was incorporated on July 19, 1917, in Delaware, and has acquired by the use of the securities immediately issued, or the proceeds thereof, all of the stock of the Lehigh Navigation Electric Company, a substantial majority of both classes of stock of the Lehigh Valley Transit Company and approximately all the preferred and common stocks of the companies formerly controlled by the Northern Central Company. The company is under the management of the Electric Bond & Share Company.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—The Mahoning & Shenango Railway & Light Company, all of whose common stock is owned by the Republic Railway & Light Company, was incorporated in Ohio on Aug. 20 with \$21,000,000 of authorized capital stock. The capital stock of the new company remains unchanged from that of the previous company of the same name. It is divided into \$10,000,000 of authorized preferred stock, of which \$3,500,000 is outstanding, and \$11,000,000 of common stock, of which \$10,628,000 is issued. Companies controlled previously are now consolidated under the new company. Considerations of economy and a desire to centralize the management brought about the decision to reincorporate. The change is also in the interest of simplifying intercorporate relations. It has been approved by the Ohio Public Utilities Commission.

New York (N. Y.) Railways.—The holders of the \$30,626,977 of adjustment income bonds of the New York Railways will receive no interest for the six months ended June 30 last, due to the losses incident to the strike of the employees last fall.

Ottumwa Railway & Light Company, Ottumwa, Iowa.—An issue of \$118,900 of 7 per cent cumulative preferred stock is being offered to customers and employees by the Ottumwa Railway & Light Company. The stock is issued to pay in part for improvements and extensions necessary to serve increasing demands for power and lighting. Power house capacity will be increased by the addition of a 1600-hp. steam turbine, already erected; and a 14-mile transmission line is being built to serve adjacent communities on a wholesale basis.

Reading Transit & Light Company, Reading, Pa.—In connection with the organization changes at Reading, Bonbright & Company, New York, have purchased an issue of \$2,300,000 of two-year, 6 per cent secured notes of the Reading Transit & Light Company, subject to the approval of the Public Service Commission of Pennsylvania, and an advance offering of these notes is being made. The purpose of the issue is to provide in part for the acquisition of all of the outstanding common stock of the Metropolitan Edison Company of Reading. These notes will be secured by the deposit with the trustee of \$3,000,000 of Reading Transit & Light Company, general and refunding mortgage, thirty-year, 5 per cent bonds and all of the outstanding \$3,000,000 common stock of the Metropolitan Edison Company.

Sandusky, Norwalk & Mansfield Electric Railway, Norwalk, Ohio.—The final briefs have been filed in the United

States District Court for the Northern District of Ohio in connection with the receivership of the Sandusky, Norwalk & Mansfield Electric Railway, and as soon as the court opens in September the judge will hand down his decision in the numerous cases pending and will set the date of sale for the property. It is expected now that this date will probably be fixed for some time during next October or November.

United Railways & Electric Company, Baltimore, Md.—The United Railways & Electric Company has adopted a financial plan to make provision for the purchase of new cars for various extensions and improvements to its lines and for betterments and improvements to its service during the next four years. The form which this financing will take is an issue of \$3,000,000 of 6 per cent five-year convertible gold notes, which are to be sold at 97½ and accrued interest. Alexander Brown & Sons head the syndicate of bankers offering the issue. Associated with them are Hambleton & Company, Baltimore. The notes are to be offered "when as and if issued" and subject to the approval of the Public Service Commission and of the stockholders of the company. They will be convertible into the common stock of the company at \$30 per share for the stock during the first two years, \$32 per share during the third year, \$34 per share during the fourth year, and at \$36 per share during the fifth year of the life of the note issued. A meeting of the stockholders of the company will be held at Baltimore on Sept. 11 to consider and act upon the proposal for issuing notes. Stockholders of record of Aug. 31 will receive preference in the allotment of the notes. The notes will be dated Aug. 15, 1917, and will be due on Aug. 15, 1922. They are to be issued in denominations of \$100, \$500 and \$1,000, registerable as to principal only.

United Railways Investment Company, San Francisco, Cal.—The United Railways Investment Company on Aug. 15 paid off the last \$100,000 of its 6 per cent serial notes of 1908. With this payment it has retired out of earnings all of the \$3,500,000 of notes issued to provide the United Railroads of San Francisco with money for rehabilitation following the San Francisco earthquake and fire. It is pointed out that this will mean that the company is relieved of paying \$400,000 annually for the retirement of notes, a sum equal to 2½ per cent on the preferred stock of the Investment Company.

Traffic and Transportation

Inquiring Into Shore Line Wreck

Evidence Places Blame Upon Crew of Westbound Car for Failing to Wait at North Branford Siding

The head-on collision on the Shore Line Electric Railway, Norwich, Conn., to which brief reference was made in the *ELECTRIC RAILWAY JOURNAL* of Aug. 18, page 288, occurred at a point about 1200 ft. west of what is known as North Branford siding. Between this siding and the point of the wreck is a station known as North Branford. The North Branford siding is a regular meeting point when the company is operating on half-hourly schedule, and the accident was the direct result of the failure on the part of the crew of the westbound car to stop on this siding. The east-bound car was practically on time. The watch of Motorman Morris, who was killed, stopped at 4 54 p. m. He was due at the siding at 4.55 and had only about 1200 ft. to go, while the westbound car was ahead of time.

At the point of the accident there is a slight curve and the vision is obstructed by an abutment carrying an overhead bridge of a steam road operated by the New Haven Trap Rock Company. Neither motorman involved in the accident could have seen the approaching car until it was within 400 or 500 ft. The facts brought out at the several hearings very clearly evidence the fact that there was no question of conflict of orders. The crews were running on regular schedule and at regular meets and the accident was the direct result of the failure on the part of the westbound crew to remain at the appointed meeting place. The North Branford switch and the switch at Quinnipiac Avenue, nearer New Haven, at which these regular half-hour meets occur, were the only switches between Guilford and New Haven locked open, forcing a car into them. All the other switches were locked closed.

RESPONSIBILITY RESTS ON TRAIN CREW

The defense of the westbound crew immediately after the accident was that they were asleep and did not know that they had passed the North Branford siding until the cars came together. In setting up this defense, however, they forgot two important facts, namely, that the North Branford siding is at the bottom of a long down grade on which a car coasting would probably have attained a speed of from 50 to 60 m.p.h. and that the lead of this switch is so short that the car would unquestionably have been derailed had it not been under control. As a matter of fact, a car would not safely make this switch at a speed of more than 15 to 20 m.p.h. so that it was evident that the motorman was awake when he passed through this switch. Moreover, it was clearly shown by the evidence of four people that the motorman stopped his car at North Branford, which is between the switch and the place of the accident, and took on a passenger. Another significant fact brought out was that the motorman managed to get out of his cab in the end of the car, go back to the center of the car and jump before the two cars came together.

It has not been possible to prove so conclusively that the conductor was awake. There was some testimony to the effect that he was dozing. Both men stated at first that their drowsy condition was due to excessive hours of labor. When confronted with the facts, however, they claimed it was due to physical ailments.

Nothing in the track or equipment was found to be defective and everything pointed to exonerate the company from any blame. There has been criticism of lack of the very latest devices in the way of block signals and also criticism of the dispatching system, but it is generally acknowledged in this case that precaution other than those provided would have had no effect upon the accident, as the motorman was apparently not alive to any of the things that would naturally remind him of his obligation at the North Branford switch.

Electric Railway Monthly Earnings

CLEVELAND, PAINESVILLE & EASTERN RAILROAD, WILLOUGHBY, OHIO

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., June, '17	\$47,431	*\$31,632	\$15,799	\$11,615	\$4,184
1 " " '16	43,527	*22,419	21,108	11,467	9,641
6 " " '17	243,320	*152,559	90,761	70,569	20,192
6 " " '16	210,615	*121,461	89,154	68,163	20,991

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m., June, '17	\$164,448	*\$109,392	\$55,056	\$37,568	\$17,488
1 " " '16	158,080	*95,275	62,805	36,583	26,222
12 " " '17	1,959,871	*1,286,176	673,695	442,230	231,465
12 " " '16	1,903,532	*1,207,628	695,904	436,459	259,445

HOUGHTON COUNTY TRACTION COMPANY, HOUGHTON, MICH.

1m., June, '17	\$27,758	*\$18,360	\$9,398	\$5,117	\$4,281
1 " " '16	26,656	*15,862	10,794	5,266	5,528
12 " " '17	340,082	*199,437	140,645	62,237	78,408
12 " " '16	304,420	*169,739	134,681	65,606	69,075

LAKE SHORE ELECTRIC RAILWAY, CLEVELAND, OHIO

1m., June, '17	\$153,396	*\$100,011	\$53,985	\$34,207	\$19,778
1 " " '16	139,003	*86,288	52,715	36,237	16,478
6 " " '17	813,922	*565,065	248,857	206,043	42,814
6 " " '16	722,320	*483,885	238,435	217,813	20,622

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

1m., June, '17	\$179,405	*\$112,192	\$67,213	\$29,126	\$38,087
1 " " '16	149,460	*97,610	51,850	28,692	23,158
12 " " '17	2,088,392	*1,227,416	860,976	349,248	511,728
12 " " '16	1,831,954	*1,117,769	714,185	339,682	374,503

SAVANNAH (GA.) ELECTRIC COMPANY

1m., June, '17	\$79,183	*\$51,578	\$27,605	\$24,040	\$3,565
1 " " '16	68,110	*46,860	21,250	23,363	±2,118
12 " " '17	858,906	*587,338	301,568	286,324	15,244
12 " " '16	789,536	*531,537	257,999	257,999	±21,645

*Includes taxes. †Includes non-operating income.

Rerouting Complaint Dismissed

Pennsylvania Commission Refuses to Permit Changes in Routing Plans Made in Previous Readjustment

The complaint made by the Central Germantown Avenue Business Association, et al, against the Philadelphia (Pa.) Rapid Transit Company, requiring it to do considerable rerouting of its lines, was dismissed recently by the Public Service Commission of Pennsylvania. Following a comprehensive study of the railway transit problems in 1913 made by the Pennsylvania Railroad Commission, there was a readjustment and rearrangement of the service in Philadelphia and the complaint in this case was in reference to the rerouting on two of the lines, particularly in so far as the cars on these routes on northbound trips do not pass along portions of Germantown Avenue between Glenwood Avenue and York Street.

The commission held that since following the previous readjustment no service was abandoned nor the directions of the various routes materially changed and since on some streets the number of lines was increased as well as decreased, it cannot be said that the direct charter obligations of the company were being violated. It argued that if the changes made were of benefit and convenience to the public generally, although one locality derived from the change more advantage than another, they must be sustained. The evidence in the case, according to the commission's decision, was not sufficient to show that the company is not rendering such adequate service.

Commissioner Michael J. Ryan issued a dissenting opinion on the ground that the rerouting of lines in 1913 was done without the consent of the city of Philadelphia. He based his opinion on a provision of the State constitution which says that "no passenger railway shall be constructed within the limits of any city, borough or township without the consent of its local authorities," and took this to apply to a change in the plan of operation as well as the construction of a new line for the purpose of operating.

Service Interrupted on I. R. T.

Lack of Adequate Coal Supply Causes Suspension of Service—Public Service Commission Conducting Inquiry

All trains on the subway lines of the Interborough Rapid Transit Company, New York City, were held up for two hours on Saturday afternoon, Aug. 25, on account of the lack of power. A shortage of coal due to the lack of adequate reserve had been imminent for some time. When the failure to receive an expected barge of coal made it impossible to continue service the subway trains were stopped and transfers were issued to the elevated lines. The surface lines immediately took measures to supply additional service.

The Public Service Commission for the First District on Monday, Aug. 27, conducted an investigation to determine whether officials of the company had been guilty of violating the order of the commission requiring them to provide continuity of service unless prevented by unavoidable difficulties. E. J. Berwind, a director of the Interborough Rapid Transit Company and president of the Berwind-White Coal Company, which is under contract to furnish coal to the Interborough, testified at the hearing that the interruption of service was attributable to a clerical error in calculating the reserve at the Fifty-ninth Street station, and that he did not know that the supply was so low. It developed that officials of the Interborough had impressed upon Mr. Berwind the need for more coal, but did not enforce the demand. Mr. Berwind said that the government had demanded much of the coal intended for commercial purposes, and claimed he was unable to build up the reserve required by the Interborough to avert the danger of a shut-down.

The hearing was resumed on Aug. 28, when it was found that neither the government nor the Navy Department had interfered with coal that should have gone to the Interborough. Following the testimony Commissioner Hayward issued a statement which was in substance as follows:

"The evidence shows that Mr. Berwind had failed to give the Interborough the coal it demanded and had a right to demand under its contract, and that this failure was because the Berwind coal was being sold under other contracts to other people at a higher price than that called for by the Interborough contract, and hence at a greater profit to the Berwind-White Coal Company. That was the reason for keeping the Interborough on such a meager coal allowance that the result was finally disaster.

"The evidence convinces me further that because Edward J. Berwind was a director and member of the executive committee of the Interborough; because of his wealth, influence and position, the Interborough officials did not dare to enforce the fulfillment of his contract."

The commission issued a verbal statement ordering a 5000-ton coal reserve to be kept constantly on hand at the Fifty-ninth Street station which in emergency may be drawn upon for one day only and that upon depletion must be brought back to that amount within forty-eight hours. It also requires that during that period the commission must be notified every four hours of the state of the reserve until it is restored to the minimum required.

The hearing was adjourned until Sept. 4.

Seattle Fare Hearing

Case of Puget Sound Traction, Light & Power Company, Asking to Abolish Sale of 4-Cent Tickets, Is Taken Under Advisement

The application of the Puget Sound Traction, Light & Power Company, Seattle, for authority to eliminate the sale of 4-cent tickets, was heard by the Public Service Commission of Washington recently. W. H. McGrath, vice-president of the company, submitted a chart showing that the valuation of the property, not including power facilities, has increased from \$1,002,301 to \$14,851,197 in the last seventeen years, the latter valuation being obtained by a board of appraisers. The chart gave the net returns for the years from 1900 to 1915, showing a maximum of \$739,901 in 1907. It showed deficits of \$175,972 in 1915 and \$125,203 in 1916. The average rate of return was slightly more than 4 per cent, the highest rate being 7.72 per cent in 1906. A deficit of 1.22 per cent was reported in 1915 and 0.85 per cent in 1916.

According to the chart, the company paid taxes amounting to \$288,700 in 1915, and those for 1916 were estimated at \$300,000. This estimate, it was shown, included \$64,000, the 2 per cent city tax on gross earnings, which has not yet been paid and for which the city is suing the company. Mr. McGrath stated that seven-tenths of 1 per cent of the gross earnings was used to pay the salaries of the general manager and officials of the company, amounting to \$22,069 in 1916.

A. L. Kempster, manager of the Seattle division, gave statistics on the tremendous increase in cost of materials and the advances in wages of trainmen and employees. He estimated that the increase in wages asked by the trainmen and now pending before a board of arbitration would absorb all the gain that might come to the company through the new tariff.

Guy A. Richardson, general superintendent of the company, estimated that the gross earnings of the company would be increased \$150,000 annually by the elimination of the 4-cent tickets. He testified that the company is operating with a deficit of 0.55 cent per car-mile, but that with the 4-cent rate eliminated this would be reduced to 0.26 cent per car-mile. Mr. Richardson introduced statistics showing increases of from 12 to 633 per cent in costs of materials used in the operation of the road. The passenger earnings for the first six months of 1917 were \$1,680,677.18 as against \$1,470,451 for the corresponding period of 1916 or an increase of 14 per cent. J. B. Howe, general counsel for the company, stated that though the company had not refused to pay its 2 per cent tax on gross earnings to the city, it had tendered it under certain conditions, and would not pay it now until a decision had been reached by the court before which the suit of the city of Seattle is being tried.

In discussing the arbitration meetings to be held in the

settlement of the recent strike, Superintendent Richardson testified that 200 more men would have to be employed should the demands of the employees be granted. The demands of the men call for a minimum wage of \$75 a month.

The commission took the case under advisement. Both the city of Seattle and the traction company were given until Aug. 25 to submit briefs.

Hearing on One-Man Cars

Operation of One-Man Cars on Several Lines of Bay State Street Railway Is Considered by Massachusetts Commission

The Public Service Commission of Massachusetts held a hearing on Aug. 23, on the proposal of the Bay State Street Railway, Boston, to introduce the use of one-man cars on several of its lines now giving light service. H. W. Irwin, superintendent of car repairs for the company, testified as to the mechanical operation of the cars and General Manager R. S. Goff gave further details about the comparative costs of operating them and the effect on service to the public. Other officials of the company and A. Stuart Pratt, president of the Brockton & Plymouth Street Railway, also spoke in favor of the one-man cars. The opposition was led by P. F. Sheehan and Fred Crowley, representing the local employees' unions. Previous to the hearing, the company made, in part, the following statement:

"In dealing with the one-man or efficiency car and in dealing with everything else connected with street railways the first thing to be considered is the service to the public. There isn't any question at all but that there is a demand for street railway transportation of lighter units, more frequent headway and a faster schedule. In putting its one-man cars into service the Bay State Street Railway is only acting under the suggestion of the Public Service Commission supported by the opinion of experts who have studied the operation of these cars, in different parts of the country and who know, as the result of the most intensive study, that they are sure to result in the giving of much more satisfactory service."

In speaking of the opposition to the use of the one-man cars, P. F. Sullivan, president of the company, said that the principal objection to them is that their adoption may throw men out of employment. He said that if the company were prohibited from using these cars on some non-paying lines, as planned, it would discontinue operation on those lines. Mr. Sullivan stated further that due to the shortage of labor the company proposes to employ women wherever possible and he hoped the public would look with favor upon these changes.

Ohio Roads Ask Increase

Two companies operating interurban lines in Ohio have petitioned the Public Utilities Commission of that State for permission to increase the rate of fare from 2 cents to 2½ cents a mile. The roads concerned in the movement are the Western Ohio Railway, Lima, and the Cleveland, Southwestern & Columbus Railway, Cleveland. The companies contend that the 2-cent rate in effect in Ohio applies only to steam roads. The old rate, it is said, is not sufficient under present conditions to provide revenue for needed extensions and new equipment.

The petition of the Cleveland, Southwestern & Columbus Railway does not apply to rates within cities. Mileage books have not been considered as yet. Conditions regarding competitive points will be taken up later, the principal object at this time being to increase the basic passenger rate. About 85 per cent of the business of the interurban roads consists of passenger business, while on steam roads 85 per cent is freight business. At the present time this road is equipped to do a very small freight business.

The commission held a hearing on the application of the Western Ohio Railway and on Aug. 29 approved the new schedule. It proposed to suspend the new rate until a complete inquiry could be made, but the company opposed that course.

Jitneys to Operate in Wilkes-Barre.—The City Council of Wilkes-Barre, Pa., has received notice that fifty jitneys are to be put in operation in that city and throughout Wyoming Valley. Authority has been granted to Joseph Pugh of Kingston, who was in the jitney business before the Public Service Commission came into power. The commission decided it has no right to interfere with his operation of jitneys.

Accident on Chicago & North Shore.—As a result of the collision of two trains on the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., two persons were killed and a dozen others injured. The accident occurred at the Great Lakes Naval Training Station, where one train of two cars was unloading passengers when the other train approached from the rear. It is said that disobedience to orders on the part of the motorman of the second train was the cause of the accident.

St. Joseph Jitneys Abandon Service.—As a result of the enforced new city ordinance requiring jitney operators to furnish an indemnity bond in the sum of \$3,000 for each car operated only two jitneys remain in St. Joseph, Mo., and these are operated by the St. Joseph Railway, Light, Heat & Power Company of that city. The motor buses are operated from Twenty-sixth Street and Frederick Avenue to the east city limits. Transfers are issued free to Frederick Avenue patrons who pay the 5-cent fare, and 1 cent for transfers is charged those who use tickets.

Women Conductors Wanted in Muskogee.—The Muskogee (Okla.) Electric Traction Company is advertising in local papers for young women between eighteen and twenty-five years of age for positions as conductors on the cars in Muskogee. The company has lost many of its men from the train service on account of the many enlistments. It expects, however, when it has filled the ranks with women employees to find the new conditions quite satisfactory. "Girls as conductors are coming just as sure as to-morrow's dawn" is a statement made recently by R. D. Long, general manager of the company, in discussing the situation.

Public Service Rescinds Free-Ride Order.—The Public Service Railway has withdrawn the free transportation privilege to members of the National Guard in uniform, which has been in effect since last April. When the men were called to the colors and assigned to guard duty, the company found it was necessary for them to travel back and forth in small units and the regimental commanders had no funds to pay car fares. It then agreed to carry all armed soldiers free. There being no longer need for the guardsmen to move from place to place on daily duty the company has given notice that soldiers are now expected to pay fares.

Jitney Ordinance Opposed.—An injunction has been granted by Judge Southall of the Circuit Court to representatives of fifty-two petitioners against the city of Petersburg, Va., restraining the enforcement of a jitney ordinance recently adopted by the City Council which, if enforced, would mean the death of 143 licensed jitneys and about sixty hacks now operating in the city. The petitioners direct attention to the inability of the electric railways to handle the local traffic and have intimated that, unless the injunction is sustained, they will insist upon the enforcement of the State law prohibiting railway companies from allowing passengers to stand in the aisles and on the running boards of cars.

Jitney Question Before Birmingham.—An appeal by employees of the Birmingham Railway, Light & Power Company, Birmingham, Ala., for an increase in wages, has been placed before the city officials in the form of a request that jitney competition be lessened. The company had turned over its books to a committee of the employees union to show that earnings did not justify the increase, but agreed to comply with the request for more wages if the jitneys could be suppressed. The committee then referred the matter to Commissioner Weatherly, saying, however, that if the company made no increase voluntarily the men would abide by their two-year contract. Mr. Weatherly said the jitney question must be considered from the viewpoint of the public, the jitney driver, the railway employees and the company. The matter will be taken up by the City Commission.

Personal Mention

Charles R. Morley has resigned as president and a director of the Stark Electric Railroad, Alliance, Ohio.

Morgan Jones, superintendent of the northern division of the Union Traction Company of Indiana, with offices in Tipton, has resigned.

H. K. Gamble, assistant superintendent of transportation of the Conestoga Traction Company, Lancaster, Pa., has been appointed acting superintendent, to succeed Samuel T. Charles, deceased.

W. Clapper, heretofore traffic manager of the Inter-Urban Railway, Des Moines, Iowa, has been appointed general manager of the company. Mr. Clapper will retain charge of the traffic department.

John J. Gannon, vice-president of the New Orleans Railway & Light Company, New Orleans, La., has resigned. He resigned also as chairman of the board of directors of the American Cities Company, New York, which controls the road.

T. C. Cherry, heretofore general manager of the Empire United Railways, Syracuse, N. Y., has become general manager for the receiver of the Rochester, Syracuse & Eastern Railroad, which was combined with the former company but is now operated separately.

R. R. Hayes, superintendent of the Western Ohio Railway, with headquarters at Wapakoneta, has resigned, effective Sept. 1, to become general manager of the Tiffin, Fostoria & Eastern Electric Railway at Tiffin, Ohio. No successor to Mr. Hayes has as yet been named.

Harry Reid, president of the Kentucky Utilities Company, Somerset, Ky., has been elected president of the United Gas & Electric Company of Jeffersonville and New Albany, Ind., to succeed Chester P. Wilson of Indianapolis. Both companies are subsidiaries of the Middle West Utilities Company.

Edward A. Maher, Sr., president of the Third Avenue Railway, New York, N. Y., has tendered his resignation, to take effect Jan. 1, 1918. On May 1, 1917, Mr. Maher had completed twenty-five years of service with the company. Prior to that date he had concluded that at the end of his twenty-fifth year of service he would retire and had expressed his intention to F. W. Whitridge, then president of the company. The unexpected death of Mr. Whitridge changed these plans and Mr. Maher was elected to succeed him as president. Mr. Maher has had more than fifty years of constant employment and feels that he should be relieved of his duties and the responsibilities of his position. He was born in Albany, N. Y., in 1852, and was graduated from the State Normal School. He was elected Mayor of Albany in 1888, and upon the expiration of his term was made president and general manager of the Albany Electric Illuminating Company. In 1892 he became president of the Union Railway, New York. When the Third Avenue Railway acquired the Union Railway properties, Mr. Maher was retained as president and general manager of the Bronx and Westchester subsidiary company. He was appointed general manager of the Third Avenue Railway in 1908 and later was elected vice-president in addition. His son, E. A. Maher, Jr., later became assistant general manager of the company and succeeded Mr. Maher when he was elected president last February.



E. A. MAHER, SR.

T. F. Grover, general manager of the Terre Haute division of the Terre Haute, Indianapolis & Eastern Traction Company since June, 1907, as reported last week, has been



T. F. GROVER

appointed vice-president and general manager of the Chicago, South Bend & Northern Indiana Railway and the Indiana & Michigan Railway, with office at South Bend, Ind. Mr. Grover was born in New Jersey but has been connected with the electric light and electric railway industries in the Northwest since 1892. He was superintendent of the Milwaukee & Wauwatosa Electric Company as one of his early connections, and left this company in 1896 to become vice-president and superintendent of the Fond du Lac (Wis.) Electric Com-

pany. After securing a new electric light, railway and gas franchise in that city, he formed the Fond du Lac Railway & Light Company, which later acquired the property of the gas light company. In 1899 he built the electric railway system in Fond du Lac which was extended the following year to North Fond du Lac. In 1902 the Fond du Lac & Oshkosh Electric Railway was incorporated and Mr. Grover became its general manager and later its president. This company was subsequently absorbed by the Eastern Wisconsin Railway & Light Company, from which Mr. Grover retired in 1905. He next was engaged in consolidating the electric light, railway and gas properties in and about Trinidad, Col., and left this work to become general manager of the Terre Haute division of the T. H. I & E., and president of the Terre Haute & Western Railway. Mr. Grover will remain for a while in charge of the Terre Haute property, dividing his time between his old and his new duties.

A. M. Buck, who for the last six years has been in charge of the electric railway courses at the University of Illinois, has resigned to join John A. Beeler, consulting engineer, New York City. His work will consist largely of investigations dealing with the construction, operation and management of electric railway properties. At present he is assisting Mr. Beeler in an investigation of the operations of the Boston Elevated Railway, which is being done for the Public Service Commission of Massachusetts. Professor Buck has written a standard text-book, "The Electric Railway," and contributed a number of articles to the technical press. He was born in Washington, D. C., in 1881, and received his technical education at Sibley College, Cornell University. After receiving the degree of mechanical engineer in 1904, he was an instructor in electrical engineering at Cornell for one year, and later was successively assistant professor of electrical engineering at New Hampshire College and professor of electrical engineering at the Clarkson School of Technology. Prior to his connection at the University of Illinois, he was employed by the Delaware, Lackawanna & Western Railroad for a short period. Professor Buck is a member of the American Electric Railway Association, the American Institute of Electrical Engineers, and the Society for the Promotion of Engineering Education, and is a Fellow of the American Association for the Advancement of Science.

Obituary

N. M. Thygeson, general counsel of the Twin City Rapid Transit Company, which controls the Minneapolis Street Railway, the St. Paul City Railway and the Minneapolis & St. Paul Suburban Railroad, died on Aug. 23 at Palo Alto, Cal. Mr. Thygeson had been connected with the legal department of the Twin City lines for nearly thirty years and was prominent in legal circles of both cities. He obtained a leave of absence last spring and went to Palo Alto in the hope of regaining his health. He was held in high esteem by all his associates.

Construction News

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

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

RECENT INCORPORATION

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—Incorporated as a consolidation of the Youngstown & Sharon Railway, the Mahoning Valley Railway, the Youngstown Park & Falls Railway, the Mahoning Valley Southeastern Railway, Poland Street Railway and the Mahoning & Shenango Railway & Light Company. Capital stock, \$21,000,000.

FRANCHISES

Richmond, Cal.—The Southern Pacific Company, which holds a franchise for an electric railway into Richmond from the terminus of its Albany suburban line, has asked the City Council for permission to operate a steam line on Cutting Boulevard from the main line Southern Pacific tracks at Pullman Avenue westward for 2 miles to Richmond Avenue. It is understood that after two years the company will electrify the line.

Santa Ana, Cal.—The Pacific Electric Railway has asked the Board of Supervisors for a franchise to construct an extension of its proposed Santa Ana-Tustin line to Irvine.

Walkerville, Mich.—A by-law will be submitted to the electors at an early date to grant the Sandwich, Windsor & Amherstburg Street Railway a franchise to construct new tracks from Walker Road along Ottawa Street and Lincoln Road, to connect with the belt line at Wyandotte Street.

Cincinnati, Ohio.—The Cincinnati, Newport & Covington Railway has submitted the formal bid of that company for the Green Line franchise to the City Council. As the city and company have agreed to the provisions of the franchise, the grant will be made by the City Council at a meeting to be held at an early date.

East Cleveland, Ohio.—The new street railway franchise was approved by the City Council of East Cleveland on Aug. 20 to take the place of the one recently voted down by the electors. This was done at the demand of the people who have been using the Hayden Avenue line. The Cleveland Railway has threatened not to accept the new ordinance.

Erie, Pa.—The Buffalo & Lake Erie Traction Company will ask the City Council for franchises for its two interurban trolley lines operating in and out of Erie.

Reading, Pa.—The Reading Transit & Light Company has received a twenty-year franchise to construct a single-track railway along Canal Street, south of Chestnut Street.

Waco, Tex.—The Texas Electric Railway has received a franchise from the City Council to construct an extension on Lasker Street from Twenty-fifth Street to the city limits and an extension on Reuter Street from McIver Street to the city limits.

Richmond, Va.—The Board of Aldermen has granted permission to the Petersburg & Appomattox Railway to construct a new line along Bollingbrook Street from the eastern corporate limits of the city to Second Street. Work on the new line will be begun at once.

Tacoma, Wash.—The Puget Sound Traction, Light & Power Company has received a twenty-five-year franchise from the County Commissioners to erect transmission lines between Tacoma and Tapps.

TRACK AND ROADWAY

Pacific Electric Railway, Los Angeles, Cal.—A contract has been awarded by the Board of Public Works to W. M. Ledbetter for the construction of a reinforced concrete bridge for street traffic over the Pacific Electric tracks at West Boulevard and Sherman Way. The cost of the bridge will be about \$24,957, to be shared equally by the city and the company.

***Jacksonville, Fla.**—The Jacksonville & Seashore Electric Association has been formed for the purpose of constructing an electric railway from Jacksonville to the beach resorts. M. B. Jennings was elected president; Judge H. B. Phillips, W. R. Rannie, Telfair Stockton, P. J. Mundy, E. W. Waybright, F. O. Miller and Sam Marshall, vice-presidents, and St. Elmo W. Acosta, secretary of the association.

Georgia Railway & Power Company, Atlanta, Ga.—Work will be begun at once by the Georgia Railway & Power Company on its proposed extension from Brookhaven to Camp Gordon.

St. Louis & East St. Louis Interurban Railway, East St. Louis, Ill.—Mayor Kiel of St. Louis has announced that the Municipal Bridge Commission will give assurance to the officials of the St. Louis & East St. Louis Interurban Railway Company that a permit will be issued to that road to operate cars on the Free Bridge. In a letter accompanying the application filed by the St. Louis & East St. Louis Railway, Joseph McCoy, attorney for the corporation, said it had ordered its equipment and was laying tracks in East St. Louis to connect with the bridge and would be ready for operation within thirty days. The company does not ask to use the bridge to the exclusion of other interurban roads. William P. Launtz, East St. Louis, is interested. [Aug. 4, '17.]

***Ridge Farm, Ill.**—It is reported that a new line will be built from Ridge Farm, Ill., to Clinton, Ind., connecting the lines of the Danville, Urbana & Champaign Railway and the Terre Haute, Indianapolis & Eastern Traction Company. The road, if built, will provide a continuous trolley line from St. Louis to Detroit and Buffalo.

Rockford & Interurban Railway, Rockford, Ill.—A report from the Rockford & Interurban Railway states that the company expects to build a 3-mile extension from Rockford to Camp Grant within the next few weeks. The line will be single track with frequent sidings.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—This company reports that work will be begun at once on the construction of approximately 13,500 ft. of double track on Eddy Street and Mishawaka Avenue, South Bend, using 6½-in., 125-lb. T-rail with continuous joints.

Bay State Street Railway, Boston, Mass.—Work has been begun by the Bay State Street Railway on the construction of new track on Derby Street from Lafayette to Liberty Street, to replace the Charter Street line which will be taken up.

Houghton County Traction Company, Houghton, Mich.—It is probable that this company's line will be extended during the coming year to Lake View Cemetery, west of Calumet.

City & Leeds Railway, Kansas City, Mo.—This company will construct a three-span bridge across Blue River in connection with its proposed line from Thirty-first Street to the city limits, via Leeds.

Public Service Railway, Newark, N. J.—This company has filed a certificate with the Secretary of State showing that it proposes to extend its lines in Bergen County. The plans call for the extension from the lines of the Palisades railroad to Palisades Avenue northwest of Sylvan Avenue in the borough of Englewood Cliffs.

New York Municipal Railway, Brooklyn, N. Y.—Commissioner Travis H. Whitney has announced that operation of the New York Municipal Railway from Brooklyn, through Canal Street and up Broadway to Fourteenth Street, New York, will be begun on Sept. 4.

Interborough Rapid Transit Company, New York, N. Y.—Bids will be received by the Public Service Commission for the First District of New York for constructing Shaft No. 2 of route 26 of the Queensboro subway, to be located on the northerly side of East Forty-second Street between First Avenue and East River.

Long Island Electric Railway, New York, N. Y.—Service on the Long Island Electric Railway, operating between Far Rockaway and Jamaica, will be discontinued on the line from Far Rockaway to Hook Creek after Sept. 15, when work will be begun upon the widening and improvement of the Nassau County section of the Rockaway Turnpike.

Youngstown & Suburban Railway, Youngstown, Ohio.—This company contemplates improvements to its system in Columbiana. An extension will also be built from Columbiana to East Palestine.

Pottstown & Phoenixville Railway, Pottstown, Pa.—Arrangements have been completed by the Pottstown & Phoenixville Railway for the sale of a new issue of first and refunding mortgage 5 per cent gold bonds, the proceeds of which are to be used to complete the line from Sanatoga to Spring City, including the bridge over the Schuylkill River.

Schuylkill Railway, Pottsville, Pa.—New ties are being laid along the line of the Schuylkill Railway in Pottsville.

Dallas (Tex.) Southwestern Traction Company.—In addition to this company's proposed line between Dallas and Cleburne, a shuttle line will be placed in operation between Eagle Ford and Irving. The line will give service to West Dallas, Cement City and Gates. [June 23, '17.]

Port Arthur (Tex.) Traction Company.—The Gulf Construction Company, Dayton, Ohio, has received a contract from the Port Arthur Traction Company to construct a 2-mile extension of its line on Beaumont Avenue from Proctor Street to Tenth Street and thence to DeQueen Boulevard.

Salt Lake & Ogden Railroad, Salt Lake City, Utah.—Directors of the Salt Lake & Ogden Railroad have ordered the name changed to the Bamberger Electric Railway, because the original name was easily confused with that of other roads entering Salt Lake City.

Newport News & Hampton Railway, Gas & Electric Company, Newport News, Va.—This company has been authorized to increase its capital stock from \$2,375,000 to \$4,000,000 to provide for extensions and improvements to its system.

Virginia Railway & Power Company, Petersburg, Va.—This company plans to build an extension to Camp Lee.

Seattle (Wash.) Municipal Railway.—The city of Seattle has purchased 123 tons of 60-lb. steel rails to be used in the extension of Division A into Ballard. The rails cost \$65 a ton and will be paid for out of \$25,000 borrowed from the light funds for the purpose. The light funds will also be used for extension from the new Ballard bridge to Leary Avenue and Market Street.

Puget Sound Electric Railway, Tacoma, Wash.—An extension of the Short Line from its present terminus at Meeker's Junction to the eastern city limits will be built by the Puget Sound Electric Railway.

Wisconsin Interurban System, Madison, Wis.—A contract has been let by the Wisconsin Interurban System to J. T. Adams, Columbus Savings & Trust Building, Columbus, for the construction of its proposed 250-mile line. The first unit will be built from Madison to Janesville via Stoughton. J. E. Jones, Portage, general manager. [Aug. 11, '17.]

Green Bay & Eastern Railway, Manitowoc, Wis.—This company has increased its capital stock from \$50,000 to \$3,000,000 and will soon let a contract to build its line from Manitowoc to Green Bay and thence to Sheboygan, 70 miles. Rudolph Stockinger, Manitowoc, secretary. [April 14, '17.]

SHOPS AND BUILDINGS

Detroit (Mich.) United Railway.—Planning for the future, the Detroit United Railway has purchased slightly less than 14 acres of land on the north side of Warren Avenue West, east of the Snyder road. The purpose of the purchase is to take care of the growing needs of carhouse and car-yard facilities for the lines on the west side now constructed and that are expected to be constructed. The present accommodations at the West Warren car yards have become too small for proper service and the new property, when occupied, will give ample room for many years to come.

Texas Electric Railway, Dallas, Tex.—Work will be begun at once on the construction of the new freight and express station for the Texas Electric Railway at Young, Jefferson, Wood and Houston Streets, Dallas.

POWER HOUSES AND SUBSTATIONS

Pacific Gas & Electric Company, Sacramento, Cal.—The Railroad Commission of California has authorized the San Jose Railroads and the Peninsular Railway to transfer to the Pacific Gas & Electric Company for \$6,400, a transmission line, including poles, wires, etc., along the right-of-way of the two railroads from San Jose to Saratoga; also the stationary motor system of the railroads in Santa Clara County for \$62,500. The companies are authorized to execute a contract for the sale of electric energy.

Denver (Col.) Tramway.—A new Curtis steam turbine has been installed by the Denver Tramway at its Platte Street power house to replace older electrical machinery and to give increased power capacity at greater economy. The older engines will, with one or two exceptions, be retained as a duplicate source of power for use in emergencies. The total cost of the new equipment, which was purchased from the General Electric Company, was \$150,000.

Milford & Uxbridge Street Railway, Milford, Mass.—This company has decided to close down its electric power plant at the foot of Granite Street, Milford, which now furnishes nearly all of the motive power for the local system, and to purchase its power from the New England Power Company. The plant will be maintained for the balance of this year. The plant will not be dismantled, but will be kept intact for use in case of an emergency.

Union Street Railway, New Bedford, Mass.—Work will be begun at once on the construction of a new power plant for the Union Street Railway on the company's present wharf at the foot of Middle Street. The structure will be 80 ft. x 115 ft. and 70 ft. high, of brick, with a concrete chimney. It will be equipped with a 30-ton crane. The new station will about double the present equipment of the power plant. Contracts have been placed for Babcock & Wilcox boilers, which are to be fitted with Riley stokers. Contracts have also been placed for the electrical equipment. The plans and arrangement of the new station were prepared by the Harry M. Hope Engineering Company of Boston, which company will supervise the construction of the building and the installation of the equipment. It is stated that the new plant will cost about \$1,000,000.

Binghamton (N. Y.) Railway.—Two new generators and equipment have been ordered by the Binghamton Railway from the General Electric Company, and it is expected that delivery will be made about Oct. 1. The cost of the new equipment is about \$40,000.

Columbus, Delaware & Marion Electric Company, Columbus, Ohio.—Orders have been placed by the Columbus, Delaware & Marion Electric Company, the successor to the Columbus, Delaware & Marion Railway, for equipment and material for enlarging and rebuilding its distributing system in Marion, at a cost of about \$35,000. The company is now installing a steam turbine, water cooling tower, boilers, etc., at its plant on Mill Street, to cost approximately \$125,000. Improvements on the local plant and system, to cost about \$125,000, are contemplated during 1918.

Republic Railway & Light Company, Youngstown, Ohio.—It is reported that right-of-way is being secured by the Republic Railway & Light Company for the erection of a high-tension power line through the southwest section of the city.

Youngstown & Suburban Railway, Youngstown, Ohio.—This company contemplates the erection of a substation at Columbiana. Electrical machinery, it is understood, has been purchased. Energy will be supplied from Salem, where a power house will be erected for the purpose, to be used instead of the one at West Point.

Rutland Railway, Light & Power Company, Rutland, Vt.—Plans are being made by the Rutland Railway, Light & Power Company for the early operation of its new substation at Castleton, which will be used for local service. The company has completed the construction of a new high-tension line from Rutland to Castleton.

Puget Sound Electric Railway, Tacoma, Wash.—The County Commissioners have granted the Puget Sound Electric Railway a franchise to erect an electric transmission line from the Dieringer power plant to Tacoma.

Manufactures and Markets

Discussions of Market and Trade Conditions for the Manufacturer, Salesman and Purchasing Agent
 Rolling Stock Purchases Market Quotations Business Announcements

Metal Market Conditions

Government's Regulating Program Causes Slight Decrease in Prices—Production of Copper Must Be Increased

Conditions in the metal market for the past month have been dull. The fixing of prices for coal last week by the government has caused the belief that some radical readjustment of metal prices is bound to come. In anticipation of this price-fixing program, practically all of the metals, including copper, tin, lead, etc., have dropped off slightly during the last week. Basic materials, such as pig iron and steel billets, have decreased slightly, but steel plates show the greatest decrease, having declined \$15 to \$20 per ton. In case the government fixes maximum prices on raw materials that are considerably lower than present prices, it will not only tend to prevent further increases in fabricated products, but will probably force a reduction in the price of a number of manufactured articles. Quotations on steel and wire products remain unchanged in most instances as the manufacturers do not intend to revise prices until the significance of the government's action is known. These prices are purely nominal, and few sales have been made that would indicate what the future trend would be. The consensus of opinion in the trade is that 22½-cent copper may be named by the government, although 20-cent copper is not an improbability. It is thought that the price to the Allies will be the same as to this government. The price to be made to the public is largely a matter of conjecture.

Labor troubles during the last few months have caused a serious reduction in the output at the largest copper mines. This will undoubtedly cause hardships unless these mines are put in operation immediately and run at maximum capacity. In some cases, producers might hesitate to resume operations if the government set a low price for the product, unless the purchasers would guarantee a premium for delivery sufficient in amount to provide a return commensurate with the risk and demand.

Increase in Coal and Ashes-Handling Equipment Sales

Utility and Industrial Companies Placing Most of This Business—Manufacturer Who Obtains Government Business Is Fortunate

Large purchases of coal and ashes-handling equipment have been reported, the principal orders having been placed by general utility and industrial companies including munitions manufacturers. Some utility companies have obtained additional load from near-by manufacturers who have been unable to obtain coal, and in some few cases the railway and lighting companies have placed orders for additional equipment of this kind. The Rochester Railway & Light Company is one of these and has just completed the installation of a skip hoist for handling ashes.

Deliveries on coal and ashes-handling equipment are good. The manufacturers of this equipment are generally covered by contracts for raw materials, but the delivery of these products has been slow. One company which makes a specialty of overhead bins and chutes advises that it has sufficient stock of ¼-in. plates to last for months. This company has contracted six months ahead on every kind of raw material used and in addition has considerable stock of spare parts on hand. Structural shapes and plates of all kinds are giving manufacturers considerable trouble for future requirements as many difficulties are being met with

in the delivery of plates. The market prices of bins and chutes at present is actually lower than the market prices of the plates from which they have been made. There is no telling how long this condition will exist. In general, coal and ashes-handling equipment has increased in price only 50 per cent, although structural shapes have increased 400 per cent and steel plates almost 1000 per cent.

STANDARD PARTS FOR EQUIPMENT HELP DELIVERIES

Practically all parts used in the assembly of equipment by the company in question are of standard design. This alone is responsible for the good deliveries that have been made. Spares are always available and repairs can be made quickly. Orders for standard equipment are being accepted right along but the company mentioned is not accepting orders for any special equipment. Those companies which have been favored with government orders are particularly fortunate because where the raw materials are lacking, pressure is brought to bear upon the producers by the government agents, with the result that so far little trouble has been encountered. Every attempt is being made to eliminate non-essentials in the production of coal and ashes-handling equipment. Long-standing records, unnecessary drawings and other data, which have outlived their usefulness, have been disposed of. In addition special studies have been made of methods to reduce the number of movements in putting work through the shop so that production can be increased to the maximum.

A Good Time to Clean Up the Back Yard

Obsolete Devices and Parts Designs May Find Ready Market Because of Immediate Delivery Possibilities

The very abnormal materials condition prevailing makes this a good time for the manufacturer to clean up the stock of old, obsolete designs of devices and repair parts which have been held in storage for years in some cases. This can be done now to the mutual advantage of both manufacturer and customer. There are many instances where the initiative of the manufacturer has created an improvement on a former design and then put the later type on the market and thus left himself with a more or less heavy stock of the obsolete design. This has been carried for many years, in some cases without any way to dispose of it. While the former design is less efficient and less desirable than its successor, yet it will serve the purpose reasonably well. This fact, taken in conjunction with the necessity the railways face in many instances of having to secure various items on prompt delivery, may very probably make them willing and glad to get a supply of the older design to help out in their immediate needs.

An instance of this kind recently came to our attention when a railway company ordered some trolley bases which the manufacturer was unable to supply for a considerable period ahead. In looking up the past sales to this railway the manufacturer discovered that a previous order had been for an older type of base which was now obsolete, but of which the manufacturer still had a small stock. A reply to the railway company stated this fact and that they could be shipped immediately, and the railway company wired back placing an order. The railway company was glad of the opportunity to get the older bases immediately, and it gave the manufacturer an opportunity to get rid of part of his old stock.

Almost every manufacturer has such a stock of obsolete devices or parts in the storeroom or in a pile in the back

yard. When the more modern design cannot be supplied, advantage should be taken of the opportunity to offer the older style to the railway companies, making very clear what the situation is. Such material as cannot be legitimately sold this way should be sold for scrap and the back yard cleaned up while the material market for scrap metal is so very high. One special work manufacturer recently cleaned up his back yard in this latter manner at a very significant profit.

Rising Cost of Railway Materials

Testimony at New York State Fare Hearing Shows Increase in Cost of Cars, Copper, Coal and Rails

The hearings before the Public Service Commission for the Second District of New York on the application of the twenty-eight electric railways for permission to increase passenger fares were reported in the **ELECTRIC RAILWAY JOURNAL** for July 28, Aug. 11 and Aug. 18. Further evidence of the ever-increasing cost of materials as brought out at the same hearing is given in the following paragraphs.

The testimony of W. H. Heulings, Jr., sales manager of The J. G. Brill Company, shows the enormous increase in the cost of cars since 1913. In this year the total number of cars of all classes purchased and built in railway shops was 5514, the largest number since 1907 with the exception of 1912, when the total reached 6001.

Mr. Heulings said that glass and canvas show an increase of 100 per cent and presented the following table showing the increase in cost of the component parts of cars:

	Per Cent Increase Over	
	1913	1916
Billets	135	79 1/4
Bars, shapes and plates	144	71 1/2
Tubing	42	73 1/3
Springs	141	42
Malleable iron	10	73 1/2
Brake shoes	3	57
Bearings and center plates	56	30 1/2
Journal boxes	33 1/3	60
Cast bolsters	41 1/2	90
Lumber	150	50
Bolts, nuts, etc.	66	12 2/3
Paint	30	21 1/5
Fibers	28	50
Oil and waste	17	21
Axles	130	70

It was pointed out that although railways could evade buying new equipment for a time, there is a corresponding increase in the cost of supply parts to maintain present equipment.

The increase in the costs of all overhead supplies averaged about 100 per cent, according to the testimony of A. H. Englund, vice-president of the Electric Service Supplies Company of Philadelphia.

James A. Emery of Ford, Bacon & Davis testified to the following increases in coal, copper and rail costs:

	1916	1917
Girder rail	\$36 a ton	\$60 a ton
Bessemer T rail	28 a ton	38 a ton

At the present time, owing to the war, rails are difficult to get at any price.

	1914	1917
Lake copper	\$.013 per lb.	\$.030 to \$.036 per lb.

In coal, the recent increases have been very great:

	1915	1917
Lump coal	\$1.15	\$5.00
Mine run	1.05	5.00
Slack coal	.90	5.00

Order Wood Blocks Early

Electric railway companies and contractors engaged in paving operations requiring wood blocks are finding it to their advantage to place their orders as far ahead of actual requirements as possible. This is because the paving block manufacturers are experiencing serious delays both in getting wood for treatment and cars for shipment. Wood paving blocks are made from 4-in. x 8-in timbers which are very much in demand for furthering the country's ship-building program. Consequently the government is commandeering all of this material available and particularly when it is loaded on cars ready for shipment.

There is a lot of wood-block paving under way on the lines of the Philadelphia Rapid Transit Company at present and one of the contractors engaged in the work took a chance on getting blocks in the ordinary time of delivery. As a result he had some very busy thoroughfares torn up and long stretches of concrete base ready for blocks that did not arrive. The public set up a howl and what threatened to be a most disagreeable situation was averted by the public-spirited action of a competing block manufacturer who was able to help out with blocks that happened to be available for the emergency.

New Export Business

Manufacturers of electric railway cars and car equipment are now getting business in South America because of the inability of European manufacturers to supply the demands. In fact the particular business now coming to this country was placed in Europe some time ago but the war prevented the fulfillment of the original orders. About 200 cars are involved.

Another interesting situation in connection with export trade has been brought about by the holding up of shipment of a large quantity of car equipment consigned to Belgium. This material was shipped by the manufacturer months ago but it is all being held up at "an Atlantic port" by the authorities.

While the ramifications of the Barber Asphalt Paving Company of Philadelphia for world-wide trade are great and the export business of the company figures very favorably in relation to its total output, recent orders of unusual magnitude indicate that the company is now getting a stronger hold on foreign trade, due to the inability of European companies to handle the business owing to the war.

As an instance of this development, we might cite an order for several thousand rolls of Genasco roofing received from a concern in Calcutta, India. The roofing is to be used for covering cars and buildings by various railway and tramway companies in India.

Another very large order booked last week called for roofing and miscellaneous asphalt products consigned to tramway interests in Hongkong, China.

NEW YORK METAL MARKET PRICES

	Aug. 22	Aug. 29
Prime Lake, cents per lb.	26 1/2	25 1/2
Electrolytic, cents per lb.	26 1/2	25 1/2
Copper wire base, cents per lb.	36	36
Lead, cents per lb.	10 5/8	10 1/2
Nickel, cents per lb.	50	50
Spelter, cents per lb.	8 3/4	8 3/4
Tin, Straits, cents per lb.	61 3/4	61 1/2
Aluminum, 98 to 99 per cent, cents per lb.	50	50

OLD METAL PRICES

	Aug. 22	Aug. 29
Heavy copper, cents per lb.	24 1/2	24 1/2
Light copper, cents per lb.	21 1/2	21 1/2
Red brass, cents per lb.	19 1/2	19 1/2
Yellow brass, cents per lb.	16	16
Lead, heavy, cents per lb.	8 1/2	8 3/4
Zinc, cents per lb.	6	6
Steel car axles, Chicago, per net ton	\$41.00	\$42.00
Old car wheels, Chicago, per gross ton	\$30.00	\$32.50
Steel rails (scrap), Chicago, per gross ton	\$39.00	\$41.00
Steel rails (relaying), Chicago, per gross ton	\$55.00	\$55.00
Machine shop turnings, Chicago, per net ton	\$17.50	\$18.00

CURRENT PRICES FOR MATERIALS

	Aug. 22	Aug. 29
Rubber-covered wire base, New York, cents per lb.	36	36
No. 0000 feeder cable (bare), New York, cents per lb.	36 1/2	36 1/2
No. 0000 feeder cable (stranded), New York, cents per lb.	33 3/4	33 3/4
No. 6 copper wire (insulated), New York, cents per lb.	33 1/2	33 1/2
No. 6 copper wire (bare), New York, cents per lb.	36	36
Rails, heavy, Bessemer, Pittsburgh	\$38.00	\$38.00
Rails, heavy, O. H. Pittsburgh, per gross ton	\$40.00	\$40.00
Wire nails, Pittsburgh, per 100 lb.	\$4.00	\$4.00
Railroad spikes, 9/16 in., Pittsburgh, per 100 lb.	\$7.00	\$7.00
Steel bars, Pittsburgh, per 100 lb.	\$4.00	\$4.50
Sheet iron, black (24 gage), Pittsburgh, per 100 lb.	\$8.85	\$8.85
Sheet iron, galvanized (24 gage), Pittsburgh, per 100 lb.	\$10.05	\$10.05
Galvanized barbed wire, Pittsburgh, cents per lb.	\$4.85	\$4.85
Galvanized wire, ordinary, Pittsburgh, cents per lb.	\$4.65	\$4.65
Cement (carload lots), New York, per bbl.	\$2.22	\$2.22
Cement (carload lots), Chicago, per bbl.	\$2.31	\$2.31
Cement (carload lots), Seattle, per bbl.	\$2.65	\$2.65
Linseed oil (raw, 5 bbl. lots), New York, per gal.	\$1.25	\$1.25
Linseed oil (boiled, 5 bbl. lots), New York, per gal.	\$1.26	\$1.26
White lead (110 lb. keg), New York, cents per lb.	12 3/4	12 3/4
Turpentine (bbl. lots), New York, cents per gal.	42 1/2	42 1/2

ROLLING STOCK

South Carolina Public Service Company, Greensboro, N. C., has bought three convertible cars for the Salisbury-Spencer line.

Sarnia (Ont.) Street Railway Company, Ltd., expects to purchase one or two double-truck cars as soon as details can be arranged.

Georgia Railway & Power Company, Atlanta, Ga., will purchase six light-weight second-hand closed cars to be used as trailers. The cars will have a seating capacity of forty.

South Carolina Light, Power & Railways Company, Spartanburg, S. C., has purchased eight second-hand cars from the Wendell & MacDuffie Company for use in cantonment service.

Rockford & Interurban Railway, Rockford, Ill., will purchase eight or ten second-hand cars to equip a 3-mile single-track extension from Rockford to Camp Grant which will be built in the next five weeks.

Petersburg, Hopewell & City Point Railway Company, Petersburg, Va., is reported to be in the market for cars to be used in service in the cantonment at Camp Lee. It is estimated that 8 miles of track will be laid.

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., is reported to be preparing specifications for about thirty new passenger cars in view of possible purchase in the near future. These cars are badly needed not only on account of the large amount of traffic which comes to the road from the Great Lakes Naval Training Station and Fort Sheridan, but also because of a material growth in the Chicago-Milwaukee through traffic. This company has just ordered two 50-ton freight locomotives from the General Electric Company.

Seattle (Wash.) Municipal Street Railway is in the market for eight single-truck, double-end, safety motor passenger cars and equipment for Division A. Bids will be received by C. B. Bagley, secretary Board of Public Works, until 10 a. m., Sept. 28. Plans and specifications are on file in the office of the superintendent of public utilities, A. L. Valentine. Each bid must be accompanied by a satisfactory surety company bid bond, approved by the Mayor and the city comptroller as to sufficiency and the corporation counsel as to form, or a certified check, payable to the order of the city comptroller, for a sum not less than 5 per cent of the total amount of bid.

TRADE NOTES

Railway Specialties Corporation, New York, N. Y., has moved its office to larger quarters at 30 Church Street.

John Stephenson Company, Elizabeth, N. J., has sold its entire property, consisting of about 86 acres, to the Standard Aero Corporation, Plainfield, N. J.

V. L. Crawford, formerly of Hubbard & Company, is now in charge of sales of the B & K Manufacturing Company, manufacturer of pole line and bracket hardware, New Britain, Conn.

American Steel Foundries, Chicago, Ill., announces the appointment of W. S. Spieth as manager of the Davis Wheel department with office at Chicago, to succeed F. A. Lorenz, Jr., who resigned to go into another field.

Continental Car Company of America, Louisville, Ky., has taken over the plant, land and buildings of the Continental Car Company, and will manufacture dump, mine, plantation and industrial cars, motor truck bodies, and standard railroad flat cars.

Hamilton Watch Company, Lancaster, Pa., announces the appointment of Paul Gifford as advertising manager to succeed Robert E. Miller. Mr. Miller has been appointed secretary of the Hamilton Corporation, a subsidiary concern manufacturing measuring and recording instruments and specialties.

Thomas Finigan, president American Electric Railway Manufacturers' Association, and for the last year Eastern Coast representative of the American Brake Shoe & Foundry Company, has moved to Chicago to assume the duties of E. S. Moore, vice-president of the American Brake Shoe & Foundry Company. Mr. Moore will devote his time to Red Cross work during the period of the war.

Consul N. T. Johnson, Changsha, China, requests that catalogs describing and quoting prices on small motor-driven inspection cars, such as are used on railway lines by engineers for inspecting track or roadbed, be sent to the consulate. Information concerning small one-passenger or two-passenger cars is wanted. The cars should be driven by kerosene motors rather than gasoline, if possible.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has just secured the services of J. C. Bryan, formerly with Manning, Maxwell & Moore, Inc., as Southwestern representative of the Ashcroft Manufacturing Company, the Consolidated Safety Valve Company, the Hayden & Derby Manufacturing Company and the Hancock Inspirator Company. Mr. Bryan will be associated with the equipment department.

American Car & Foundry Company has leased for five years a half of the seventeenth floor of the Hudson Terminal Building, 30 Church Street, New York, and will consolidate its New York and St. Louis offices there. At present the company has New York offices at 165 Broadway, but could not obtain sufficient space in that building to provide for the departments that will be moved to New York from St. Louis.

McCarthy Drill & Tool Corporation, Toledo, Ohio, with executive offices at 30 Church Street, New York City, has purchased the Toledo Drill & Tool Company, which has just moved into a new and enlarged fireproof two-story structure where they have arranged to turn out large quantities of high-speed drills, in addition to a full line of cutters and reamers. This corporation has added new machinery and equipment and is in a position to take on contracts and make prompt delivery for both millimeter and inch size of high-speed twist drills.

Electric Service Supplies Company, Philadelphia, Pa., will soon place in operation a big new plant for the production of floodlighting apparatus. The new building adjoins the present plant and is six stories in height and about 100 x 100 ft. in area. The company's headlight department will also be moved to the new building, thus giving a considerable amount of space to the present building for extending the productive capacity of other "Esco" specialties. The new building is similar in design to the present one, being of reinforced concrete with special provision for lighting and ventilation. The machinery equipment which has been planned with an eye to the very latest shop practice is about to be installed. In addition to enjoying a large share of the present activity in floodlighting apparatus the company is reaping a big business in its specialties in the one-man car boom. A contract just closed by the Chicago office of the company calls for 300 sets of "Esco" specialties for one-man cars.

NEW ADVERTISING LITERATURE

Peter Witt, Cleveland, Ohio.: Leaflet on the "Car Rider's Car," calling attention to the scarcity of labor and pointing out the feasibility of moving the fare box to the front of the car, adding safety devices and operating as a one-man car.

General Electric Company, Schenectady, N. Y.: Bulletin 47419 on small capacity industrial oil circuit breakers, type FP-10. This supersedes bulletin 47409. This company has also issued bulletin 45600A, superseding 45600, on vacuum tube lightning arresters.

General Vehicle Company, Long Island City, N. Y.: Bulletin giving a brief résumé of the possibilities of electrical industrial trucks. A brief description is also given of the standard 2000-lb. type truck, including satisfactory performance data under various conditions, interesting time studies, and increased practicability and efficiency. Many photographs of actual uses are given in this book.

NEW PUBLICATION

Electrical Data. Published by Underwriters' Laboratories, Chicago, Ill. Thirty-two pages. Paper.

This bulletin describes the new quarters for the Underwriters' Laboratories in New York, and contains minutes of the recent meeting of the Electrical Council of Underwriters' Laboratories, an article on the aging of code standard rubber insulating compound, and studies of a number of electrical fires.