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Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing Editor

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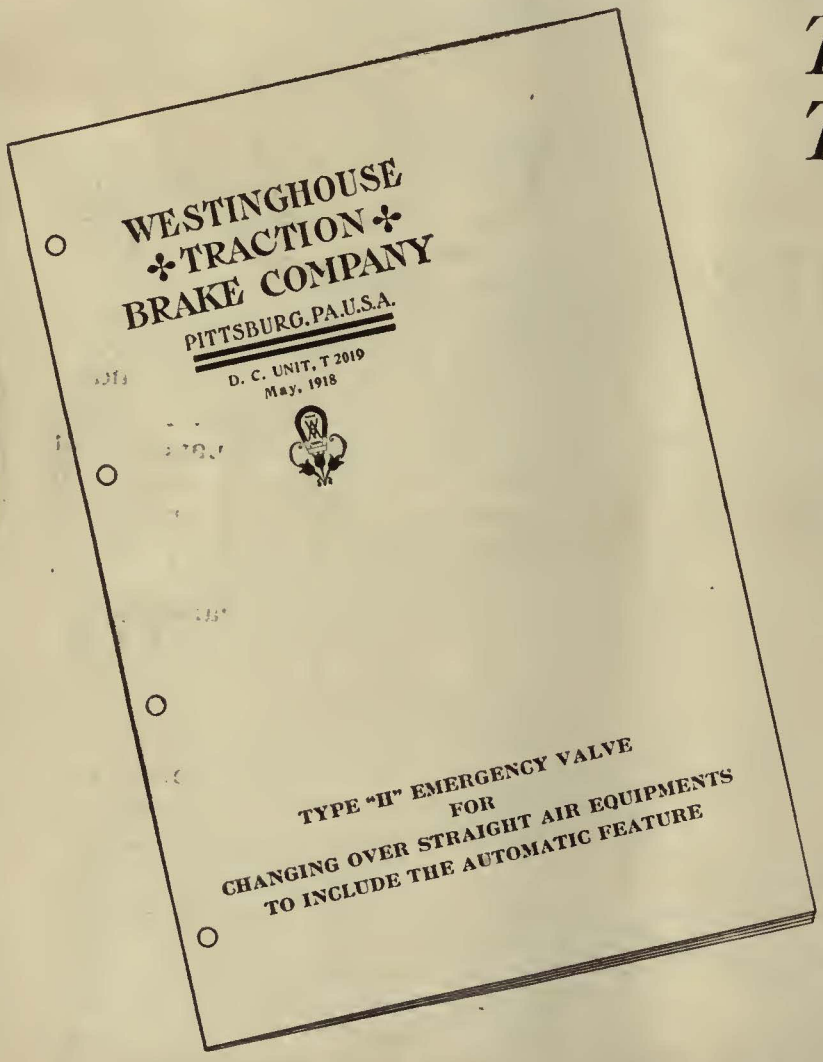
MAXIMUM SAFETY!



This Leaflet Tells You How

How to secure maximum safety in car operation by changing over your existing Straight Air Brake equipments to include the more advanced Automatic Emergency Feature is the subject of Descriptive Catalog T-2019, which is yours for the asking.

This change-over is accomplished easily and quickly, with slight expense, merely by adding the Westinghouse "H" Emergency Valve. The flexibility of the straight air equipment is not impaired and there is no change whatever in the brake valve or its manipulation.

The "H" Emergency Valve offers an economical solution of an important braking problem. Descriptive Catalog T-2019 tells you why.

Our representatives are always available for analyses of operating conditions and to render such assistance as may be required in determining the best form of power brake for any class of service.

Westinghouse Traction Brake Company
General Offices and Works: Wilmerding, Pa.

OFFICES:

Boston, Mass.	Los Angeles	Pittsburgh
Chicago, Ill.	Mexico City	Washington
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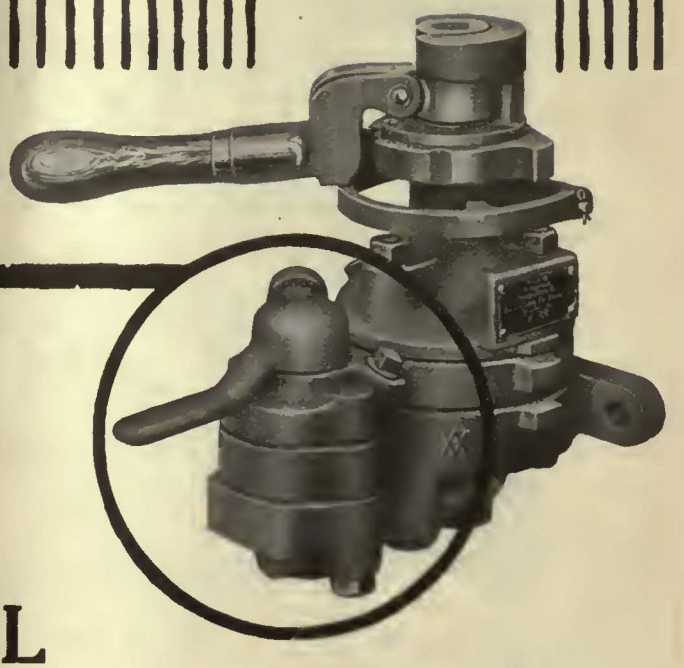
WESTINGHOUSE TRACTION BRAKES

More Power to the Motorman!



GET

INDEPENDENT DOOR CONTROL

With the New Selector Valve

ANOTHER advance in Safety Car development! A "Selector" Valve to give quick, easy, automatic door control for entrance only, exit only, or both simultaneously.

Three combinations—all at the discretion of the operator.

The "Selector" Valve is a new achievement particularly solving the problem of satisfactory door control on modified Safety Cars having double-passage, front-platform entrance and exit doors.

Affects car mileage by reducing time required to load or unload passengers.

Increases earning power of the equipment.

Gives the operator wider latitude in handling his car to the best advantage under all conditions.

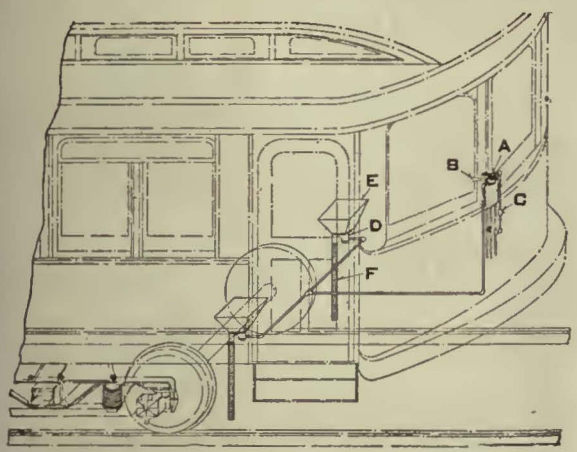
Contributes generally to passenger-comfort, safety and good-will.

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

O-B Air Sander Equipment
Positive—and economical of air



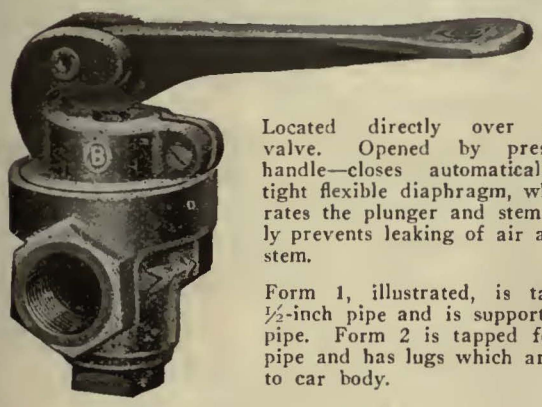
Typical installation of O-B Air Sander Equipment. "B" is engineer's valve handle. "E" is a hopper which may be built in any convenient point near the wheel.

"D"—O-B Air Sand Trap

A compact trap which fits in any corner where it has to go. Won't let sand through except under air pressure. Full, curved passages let sand flow freely under pressure. 2-inch, sherardized, clean-out plug in bottom. Threaded for ¼-inch air line. Spout of Form 1, illustrated, is equipped with studs to hold 2-inch sander hose. Form 2 spout is threaded for 1-inch pipe coupling.

"A"—O-B Air Sander Valve

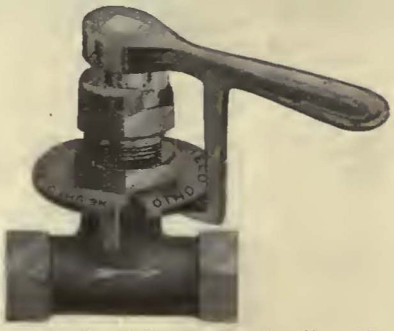
Diaphragm Type—Patented



Located directly over engineer's valve. Opened by pressing the handle—closes automatically. Air-tight flexible diaphragm, which separates the plunger and stem, absolutely prevents leaking of air around the stem.

Form 1, illustrated, is tapped for ½-inch pipe and is supported by the pipe. Form 2 is tapped for ¼-inch pipe and has lugs which are screwed to car body.

"A"—O-B Independent Air Sander Valve

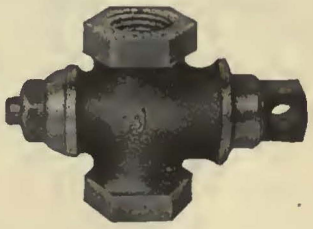


Opened or closed by turning handle. Tapered seat gives close regulation of air flow and positive shutoff. Handle is removable for double-end operation, but can be taken off only when valve is closed.

"F"—O-B Wire Sander Hose

Deposits sand directly on the rail always—even on curves.

"C"—O-B Air Reducing Valve



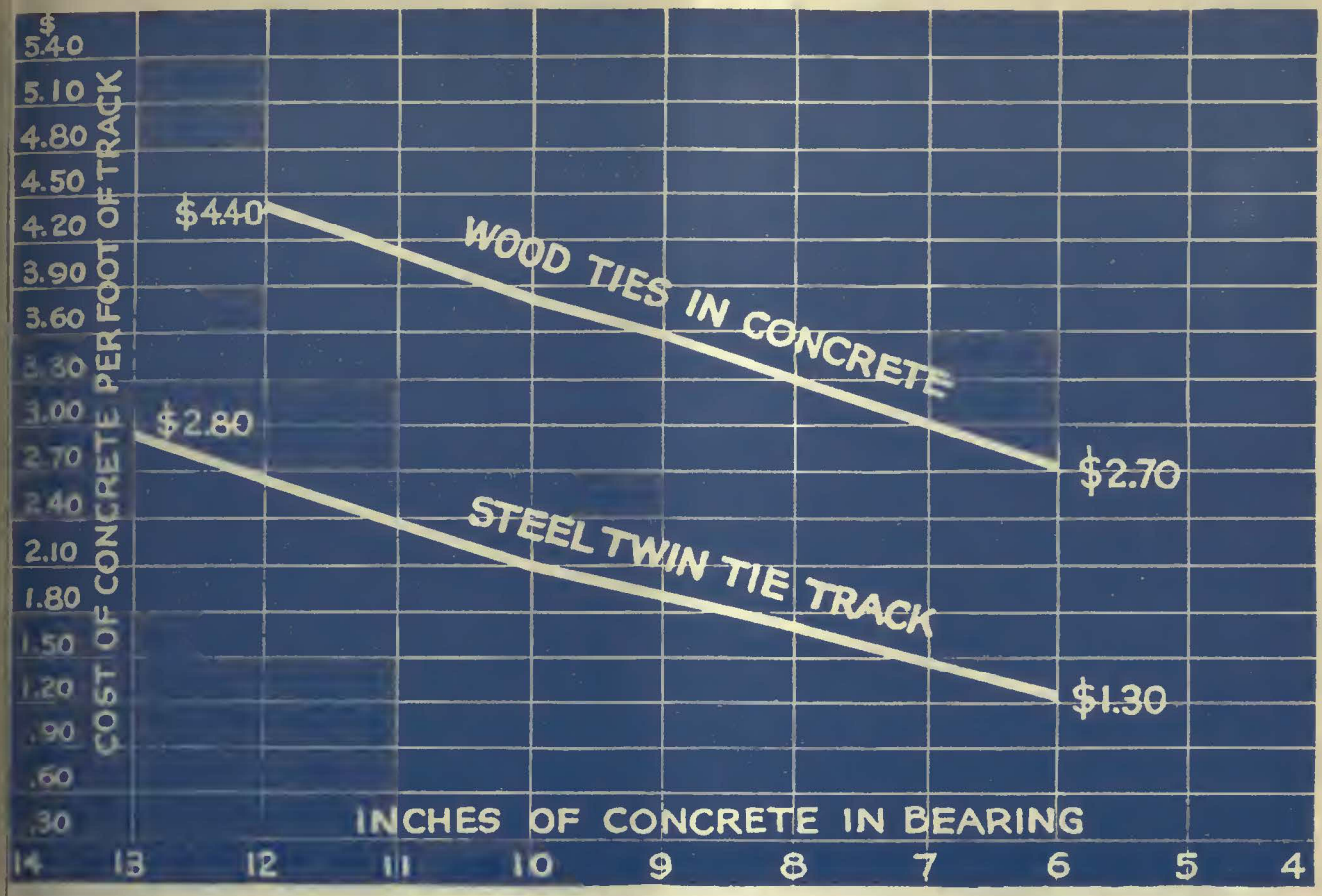
Limits, to any desired pressure, the amount of air which flows when the sander valve is wide open.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1922

The Ohio Brass Co.
Mansfield, Ohio, U.S.A.

New York Philadelphia Pittsburgh Charleston, W.Va. Chicago Los Angeles San Francisco Paris, France

oducts: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators



Non-essential Concrete Costs More Than Steel Ties

IN conventional types of concrete track construction with wood ties, often *only* 50 *per cent* of the total cubic contents of the track foundation transmits the wheel loads from the tie to the subgrade.

The inefficient concrete between wood ties and at their ends is an economic loss when regarded as part of the track foundation.

The fundamental economy of Steel Twin Tie construction depends upon a more complete utilization of the concrete in the track foundation than is possible with wood tie designs.

The comparative initial economy of Steel Twin Tie construction depends on the type of construction with which it is compared.

In order to determine the possible saving on your property, include a comparative estimate with Steel Twin Ties on the work your track department has up for 1922.

1922 Price on Twin Ties at your delivery point will go forward by mail or wire at your request.

THE INTERNATIONAL STEEL TIE COMPANY, Cleveland, Ohio

International Steel Twin Ties manufactured and sold in Canada, by Sarnia Bridge Co., Ltd., Sarnia, Ont.

Steel Twin Tie Track

Elreco Tubular Poles

Lowest Cost—Lightest Weight
Least Maintenance
Greatest Adaptability

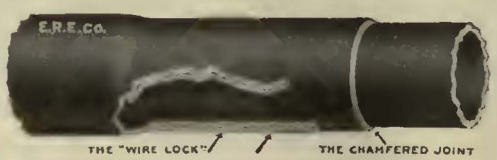
Plain Tubular Steel Pole

The committee on power distribution of the A. E. R. A. recommended tubular steel poles. The ELRECO tubular steel pole stands pre-eminent.

ELRECO poles may be set without regard to the direction or strain of the load to be carried —applying any load to an ELRECO at right angles to its length produces the same strain regardless of the direction in which the load is applied — they possess great reserve strength. You can save the additional pole necessary on curves or corners by using ELRECO steel poles.

They have no angles or pockets to retain moisture—they have no corners accessible to corrosion—they are most accessible to painting and they lend themselves most readily to combination railway and lighting purposes.

Patented Wire Lock Swedge Joint



ELRECO poles are assembled with our well known Patented Wire Lock Swedge Joint. The edge of the outer tube is chamfered, so that water can not rust and corrode the pole at this joint.

It is impossible for poles made up in this manner to telescope at the joints, either by overloading or by the drop test.

The Electric Railway Equipment Co.
Cincinnati, Ohio
New York Office: 30 Church St.

Plain Tubular Steel Pole

ADVERTISE your service to these places

KEYSTONE-HUNTER Illuminated Car Signs

Spring is here.

The baseball season is beginning. Parks and playgrounds are opening. The circus is on the move. The beaches will soon be wide open. All of which means extra revenue.

Have you ever thought of advertising your service to these places?

In addition to designating the destination points of each car *Keystone-Hunter Illuminated Signs* advertise by day and night to the people in the streets the fact that your road operates regular service to recreation seekers.

Send for the data sheets

ELECTRIC SERVICE SUPPLIES CO.

Manufacturers of Railway Material and Electrical Supplies

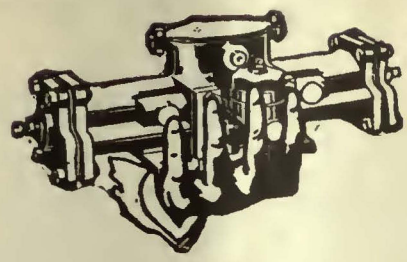
PHILADELPHIA
17th and Cambria Street

NEW YORK
50 Church Street

CHICAGO
Monadnock Bldg.

Branch Offices: Boston, Scranton, Pittsburgh. Canadian Distributors; Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver.

Modernize! *Pneumatize!*



Stead-ay! Both Doors!

Cheerily the conductor of a pneumatized car will be heard urging his patrons to use all doors available.

Because it's just as easy for him to open and close two or three sets as it is to control one.

National Pneumatic Motorman's Signal Lights takes care of *this*. And the conductor has something else to be cheery about through having no signals to give and fret over.

National Pneumatic Motorman's Signal Lights and Safety Interlocking Door Control take care of *that*.

Let's help you to pick what you need from

The Complete National Pneumatic "Rushour" Line

Door and Step Operating Mechanisms
Safety Interlocking Door Control
Door and Step Control
Motorman's Signal Lights
Multiple Unit Door Control

Manufactured in Canada by
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

National Pneumatic Company, Inc.

50 Church St., New York
Edison Bldg., Chicago
Works, Rahway, N. J.

Cleveland comes again:—

FOUR Repeat Orders *so far this year*

Cleveland is the third one
(Next week another)

This Repeat Order

6 More DIFFERENTIAL CARS

Makes Total of 15 for Cleveland

In 1915—3 *Differential Cars*
In 1920—6 *Differential Cars*
In 1922—6 *Differential Cars*

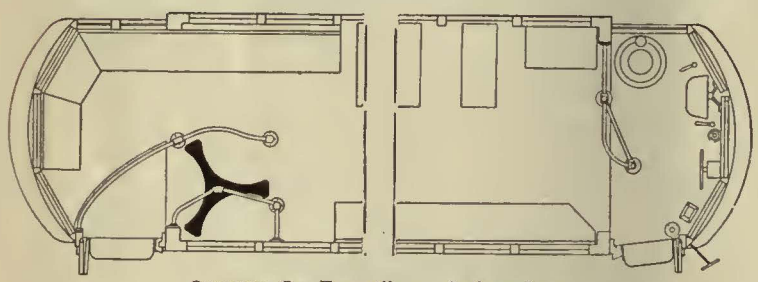
With those first three cars, Mr. C. H. Clark, Engineer of Maintenance of Way, Cleveland Railway Co., achieved a saving of $10[illegible] per mile on a 20 mile track reconstruction job. You can read his article on it in the Electric Railway Journal of March 17, 1917.

That explains their repeat orders for Differential Cars—Let us demonstrate them to you. Actual performance counts. Differentials *do* save big money under all sorts of conditions.

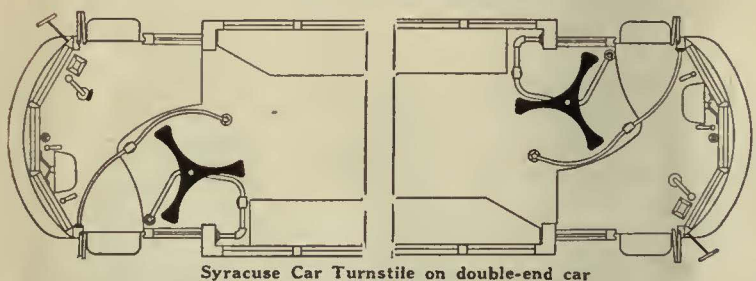
THE DIFFERENTIAL STEEL CAR CO.
Findlay, Ohio

Syracuse Car Turnstile in operation on single-end, double-truck, one-man car.

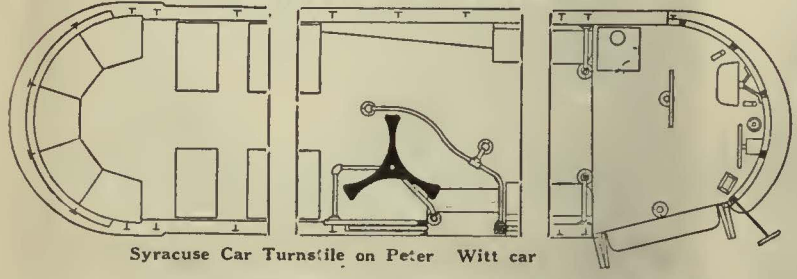
A Rear-Entrance Front-Exit One-Man Car



Syracuse Car Turnstile on single-end car



Syracuse Car Turnstile on double-end car



Syracuse Car Turnstile on Peter Witt car

Now possible with the

SYRACUSE CAR TURNSTILE

Patents Pending

Eliminates Congestion

Double-Truck cars have proved their efficiency fo city transportation. Don't take a backward step whe you change to one-man operation.

Do you think your service is too heavy for one-ma operation? We doubt it. If your service is handle with double-truck, two-man cars at present, you ca handle it with one man by equipping with the Syra cuse Car Turnstile system—the quick, safe, easy access way.

Keep the entrance and exit at different ends of th car to allow rapid passenger interchange. The loca tion of entrance and exit at different ends of the ca has already proved itself in two-man city service a the most practical way. The turnstile congestionles car adapts itself to any type of safety device that i required. In case of emergency the motorman ca release the turnstile so as to permit exit of passenger via the rear end.

Let our engineers show you.

THE CAR TURNSTILE CORPORATION

383 West Fayette St.,

Syracuse, New York

The First Step to BETTER TROLLEY POLE SERVICE

Send for Your Copy TODAY

If you are interested in trolley poles of maximum strength with minimum weight and neat design, this booklet will be well worth your while.

The two different designs of "SHELBY" SEAMLESS COLD DRAWN STEEL TROLLEY POLES (Standard "A" and Standard "B") are described and the methods of testing at the mill are outlined.

Complete tables of dimensions, loads, etc., are also given. A copy may be obtained from any District Sales Office of National Tube Company without charge.

Reinforced only where the reinforcement is needed. Resiliency and lightness without sacrifice of essential strength characterize "SHELBY" SEAMLESS COLD DRAWN STEEL TROLLEY POLES.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.

General Sales Offices: Frick Building

DISTRICT SALES OFFICES

Atlanta Boston Chicago Denver Detroit New Orleans New York Salt Lake City Philadelphia Pittsburgh St. Louis St. Paul
PACIFIC COAST REPRESENTATIVES: U. S. Steel Products Co. San Francisco Los Angeles Portland Seattle
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Tulc—and expert service—insure correct lubrication

CONSIDERED as a lubricant alone, Tulc has many advantages that are distinctive. Tulc lubricates perfectly with no loss. It will not harden, leaves no residue, and will not grow rancid nor corrode metals.

But to secure proper lubrication, something more than mere lubricant is necessary. A lubricant exactly adapted to the individual requirements of the individual property, and applied in proper quantity is the full solution of the problem, and nothing less will do.

Tulc is sold on the basis of a definite prescription to fit a particular set of operating conditions. Wherever Tulc is in service, it is there as the result of a careful study of the lubrication requirements.

The result of this policy is a marked reduction of lubricating costs, savings of 40% or more over former methods.

If you are interested in better lubricating methods at a materially reduced cost, it will pay you to learn more about Tulc and the Universal Lubricating Service. Write today, and our complete service will be placed at your disposal.

"Overall Specialists"

The service men who work with you on your lubricating problems are not "experts on theories." They put on overalls and get right down to brass tacks—pack your cars—*show* you how and why Tulc should be used. They get results — real money-saving results—99 times out of a hundred. The hundredth time there is no charge for the service.

The Universal Lubricating Co.

Offices: Schofield Bldg.
Works: Sweeney Ave.
Cleveland, Ohio

TULC
A
LUBRICANT

—scientifically and accurately compounded to reduce lubricating costs

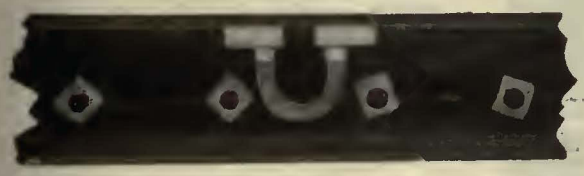
Type "AT-F" Arc Weld Bond

We have faith in
Erico Rail Bonds

Because their design and manufacture is based on our seventeen years' experience as rail bonding specialists.

The Erico Brazed Bond is pre-eminent in the rail bonding field. For extended application it has no superior in ease, rapidity or economy of application. The conductivity of the Brazed Bond is unrivalled.

Erico Arc Weld Bonds are characterized by the electrically brazed union of the iron terminal and copper conductor. This true molecular union insures maximum conductivity. The iron terminals are readily welded to the rail with the metallic arc.



Type "ET" Brazed Bond

Type "AU" Arc Weld Bond

Investment in ERICO Rail Bonds for your Spring bonding will establish both your faith and satisfaction in their performance.

Brazed and Arc Weld Bonds in every type and capacity
Write for our low prices—samples gratis

The Electric Railway Improvement Co.

Cleveland, Ohio

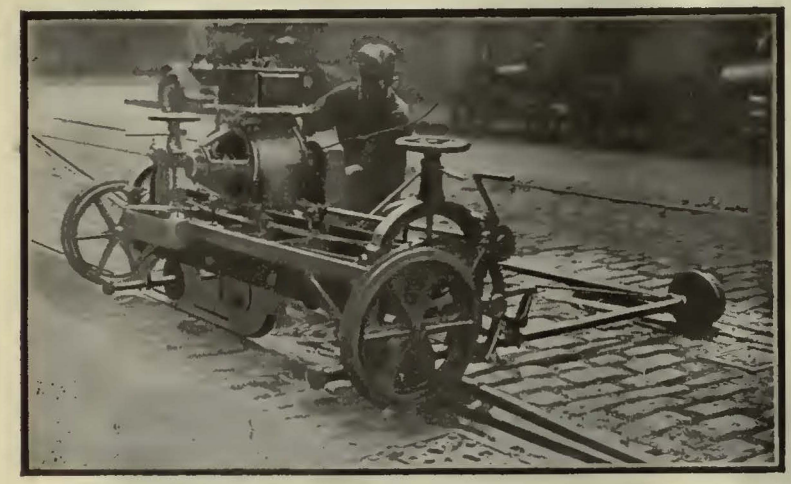
AJAX
Electric Arc Welder

A 155 lb. high capacity resistance welder, esp designed and built for efficient maintenan railway track.

Get Busy Now!

Don't delay that track rehabilitation any longer!

THE public now expects b quality service and the rub tired motorbus looks pretty goo some places. Start putting tracks in shape at once. Extra g can be employed now at reason wages and additional highest-g welding and grinding equipment be secured at attractive prices for quick delivery.



ATLAS
Rail Grinder

An efficient rotary grinder, high speed, ligh suitable for working under heavy traffic cond

RECIPROCATING
Track Grinder

Unsurpassed for removing all trace of co tions from straight and curved track.

RAILWAY TRACK WORK CO., 3132-38 E. Thompson St., PHILADELPHIA,

AGENTS:

Chas. N. Wood Co., Boston. Electrical Engineering & Mfg. Co., Pittsburgh. Atlas Railway Supply Co., Chicago. P. W. Wood, New O

Arc suppressor plates are considered a necessary part of new controllers. Put them in your old equipment

These plates add life to the controller

G-E Arc Suppressor Plates are an auxiliary to the controller arc deflector. They are installed opposite the fingers where there is the most arcing, to shorten the time for disrupting the arc. This is accomplished by narrowing the arc passage, which increases the resistance and the cooling effect of the arc by decreasing its cross-section. The result is less burning of the controller fingers, segments, and arcing plates.

Modern controllers are now equipped with arc suppressor plates. They give better, longer service and require fewer repairs and less frequent inspection.

These plates are inexpensive and can be used to advantage on any G-E controller having individual-finger blowouts, such as the K-34, K-35, K-36 and K-64. It takes only a few minutes to install them.

Try them and see the difference.

General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities

40-228

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors — HENRY H. NORRIS, Managing Editor

HARRY L. BROWN, Western Editor — C. W. SQUIER, Associate Editor — CARL W. STOCKS, Associate Editor — G. J. MACMURRAY, News Editor

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Volume 59 — New York, Saturday, April 1, 1922 — *Number* 13

A Large-Scale Application of Machines in Track Construction

FEW electric railways have the opportunity for wholesale reconstruction that has been presented to the Toronto Transportation Commission during the past eight months. Also, and in some ways fortunately, few are obliged to do so much work with such a short period available for preparing and executing plans. The circumstances will recall to the old timers the situation in the '90s, when the streets of all of the important cities in the country were torn up incident to electrification of the erstwhile horse and cable railways.

The performance in Toronto, of course, differs from those of the early days in the large substitution of machines for men. Then labor was cheap, while machinery was scarce and dear. Now most of the energy-consuming operations are, on progressive railway systems, being performed by means of apparatus driven by electric, steam or gasoline motive power.

The work performed during the latter half of 1921 in Toronto was so great in extent that it has taken several months to evaluate it and check the data. The results of the study of the accomplishment, made by members of the ELECTRIC RAILWAY JOURNAL staff, are given *in extenso* this week. Their study has emphasized the importance of the position now occupied by track standards, especially those of the American Electric Railway Association. This should furnish encouragement to the faithful engineers who for years have lavished time and energy on the work. To the availability of these standards, combined with the possibility of applying them with the aid of machinery, must be assigned a fair share of credit for the success of the Toronto rehabilitation program.

Wanted: Some Old-Fashioned Selling in the Railway Field

TWO reasons prompt this comment. One is that the salesmen of this paper bring in the report too frequently that a manufacturer is saturated with the idea that the electric railway field is dead, that it is a waste of effort and money to cultivate it further, and that if any orders were placed the money to pay for the supplies would be lacking. The other reason is that within the last thirty days three prominent executives in well-separated parts of the Middle West, without any leading questions to bring out the statement, have declared that the salesmen who are calling on them these days seem to have forgotten they are out to sell. As one of these executives put it, "You make one harsh remark to them about their product and they are all done; they immediately get away from the business of their call or make preparations to get out as gracefully as possible."

These two things go together and bear joint treatment. How can a salesman be expected to go out and do a real job of selling when the support of his boss is undermined with pessimism? The salesman's reports are expected to be just what he turns in—expense accounts—and, conversely, the salesman is not concerned at having to turn in reports of no sales, for he knows these are expected and so he doesn't get down to real old-fashioned selling.

The only thing wrong is that these "Gloomy Guses" are asleep; their pessimistic attitude of mind has not permitted them to see the changing condition of the industry. For not in five years have there been greater signs of activity in the electric railway field, nor a better average credit standing. The industry is gaining substantially in financial soundness and the news pages of this journal are full of reports indicating better margins between gross earnings and operating expenses, dividends resumed or good prospects of them, and large programs of betterment. One has only to read to be convinced, and the supply members of the industry are urged to peruse the pages of the ELECTRIC RAILWAY JOURNAL since the first of this year. The signs of the times are truthfully reflected there and manufacturers and salesmen will do well to read the business paper of their industry as they ought to if they would be alert to the rapidly changing circumstances and ready to capitalize them.

Chicago Is Good Location for the 1922 Convention

CHICAGO has been definitely selected as the location for the convention of the American Electric Railway Association this fall. Much sentiment throughout the country, particularly in the West and Southwest, was inclined toward a central location this year, and concurrence with these wishes and the central location itself should result in a very large attendance. For Chicago now has admirable and adequate facilities for this convention with the extensive exhibits and various simultaneous meetings and many social events, and also has ample hotel accommodations. Both exhibits and meetings will be held on the wonderful Municipal Pier, which extends nearly a mile out into Lake Michigan. It has the advantage, in a way, of being located somewhat away from the loop district, which will tend to keep the whole convention attendance together all day and isolated from distractions. Yet it is within walking distance of Chicago's newest and finest hotel, the Drake; and street cars, motor buses and Chicago's famous Yellow Taxis make the pier only a few minutes removed from the loop hotels.

October weather in Chicago is almost invariably delightful, and the weather man has agreed to fix up a concoction that will insure fair weather for the first week of October this year. Aside from the convention proper, Chicago holds forth other important business attractions. It is the home of the world's largest street railway system, which offers a host of things of particular interest for study. There is an extensive ele-

vated railroad system. There is the North Shore Line running between Milwaukee and the Chicago loop, over which no interurban operating men who attend the convention should fail to ride if they would see a most impressive object lesson of what an electric railroad can be. Then there is the opportunity to study the newer phase of the business—motor bus operation, as carried on by the Chicago Motor Bus Company, the Depot Motor Bus Lines, Inc., and other smaller bus companies in suburban and interurban service.

So with the most accessible place in the country as the meeting point, with a most attractive meeting place and exhibits assured, this ought to produce the largest attendance ever recorded at an A.E.R.A. convention. It is anticipated, also, that exhibitors will be very favorably impressed with the unusual transportation facilities and general ease of handling machinery and material and equipment to and from their spaces on the Pier. The task now set is to insure a good program and then advertise it well so that the convention may be a great success in point of accomplishment and breadth of influence.

How to Get Rid of the Jitney

THE jitney has often been called a product of hard times. It is therefore not surprising that during the present season of unemployment jitneys have increased in a number of places. In most cases they are purely piratical in that they confine their services to the profitable hours and short hauls in a city, leaving the longer hauls and less profitable hours of service to the railway. It is also true that in many, if not most, cases the jitneys are unsanitary and disregard most of those requirements, such as responsibility for damages, which have been accepted for centuries as obligatory on common carriers. Nevertheless they get considerable business, even at a fare which is sometimes slightly more than that charged on the parallel trolley lines. The trouble is not one to which the railways only are liable. Legitimate bus routes are subject to this form of attack.

A consideration of what the jitneys supply which is absent from the trolley service will help in determining what remedies are available. The case of the bus line will be considered later.

One advantage of the jitney is undoubtedly frequency of service. A would-be passenger in a hurry is apt to take the first conveyance which comes along, whether it is a jitney or a car. The second advantage is speed, possible because of the smaller number of stops. Then the jitney will undoubtedly get some special business where it does not operate over the exact route of the trolley line.

There are four principal ways by which the jitney can be combated. No one is always sufficient but it must be combined with one or more of the other methods.

The first of these is restrictive legislation. The unfairness of allowing a tax-free vehicle to take the best part of the business and requiring the tax-burdened carrier to haul the long-distance passengers, as well as the neglect by the ordinary jitney of maintaining schedules, paying damages and carrying out other requirements associated with common carriers, may be shown. Some companies have gone so far as to give an object lesson of the necessity of making the choice between the two modes of travel by shutting down the trolley service, as in Augusta now.

The second method is to improve the trolley service, particularly in the way of higher speed and more frequent service. Much more can be done in this way than is often realized, especially by companies which have not introduced one-man car operation with high-powered motors so that they can accelerate quickly. Here also there is opportunity for the transportation engineer to show his ability to speed up car service by changes in routing, introduction of island platforms, improvement in traffic control, checking up schedules, etc. For meeting jitney competition the skip stop is probably not so desirable as the other means mentioned for speeding up the cars. With one-man cars the smaller number of stops required brings about largely the same results as the skip stop, yet offers the same advantages of convenience to the passengers as the jitney.

A third method for combating jitneys, which has been employed to advantage in certain places, is the weekly pass. A large corporation furnishing transportation service in all parts of the city is obviously in a far better position to offer a worth-while pass than a single jitney operator or even a group of them. In consequence, the trolley line gets all the business not only of the passholders but also of those who may accompany the passholder on his trips.

The fourth means by which companies have attacked the jitney situation is by the operation of a bus service themselves. This can be done to advantage in some circumstances, but is hardly advisable where there is no restrictive legislation against competition, because it would substitute a responsible bus service for an irresponsible one, and the company would probably lose money on both services. When, however, the authorities recognize the necessity for a co-ordinated service, the offer of the railway company to operate a bus on a route not covered by a trolley line may keep out a competing bus service.

Where jitneys raid the earnings of responsible bus lines, obviously the three remedies first mentioned are equally applicable.

Small Motor Cars for Use in Work on Track and Line

THE men who are responsible for the track and line maintenance on electric railways have to some extent and for some time appreciated the value of using motor cars and trucks for emergency repair work. The use of small automobiles or motor-cycle cars for other maintenance work is also increasing. The motor cycle with side car has apparently solved the track-greasing problem in Tampa, Fla.; and a sanding or salting car has proved to be a real labor saver for the New York State Railways at Utica, N. Y. The Brooklyn Rapid Transit Company uses a light truck effectively in connection with a portable welding outfit. The chief advantage in the use of these cars lies in their ability to hurry from point to point, wherever their service is needed, by the shortest route and without regard to car operation. Also the use of a self-propelled car conduces to better work because, where men travel from point to point on passenger cars, their work is sometimes done hurriedly in order to permit them to catch the next car.

The saving made in labor resulting from the use of the small cars is easily sufficient to pay the cost of operating and maintaining them.

TYPICAL FINISHED TRACK CONSTRUCTION IN TORONTO—INTERSECTION AT QUEEN AND CHURCH STREETS

Expediting Track Construction in Toronto

Although the Transportation Commission Had a Late Start on Its Big Rehabilitation Program, Rapid Progress Was Made on the Work Until Winter Set In, Due to the Advance Standardizing of Materials and Procedure and the Extensive Use of Machinery

ON SEPT. 1, 1921, the Toronto Transportation Commission* took over the property of the Toronto Railway and also the Civic Railway lines, previously operated by the city government. The single-track mileage of the Toronto Railway was approximately 143 and that of the Civic Railway 22, a total of about 165 miles. With the exception of about 15 miles of single track, which will ultimately become the property of the city, the commission now operates all of the electric railway lines of the city.

The accompanying map shows the track layout of the city system when it was taken over. The total mileage already mentioned includes 75 miles of double track and 14½ miles of single track, with a rather elaborate system of special trackwork for looping and turning back cars in the downtown district. The commission inherited a track rehabilitation job which was of great magnitude for two reasons: First, on account of the unsettled conditions of the past two years incident to negotiations between the city and the Toronto Railway, the track had been allowed to run down; and second, the standard devil strip width of the Toronto Railway was only 3 ft. 10 in., which was too narrow for operation of cars of the modern type which the commission planned to use. On the Civic Railway the devil strip width, in conformity with a recent civic by-law, was 5 ft. 4 in. and this was adopted as standard throughout. This will give a clearance between new cars of not less than 12 in. In this connection it may be noted that the Toronto Railway, in order to operate a few wide double-truck cars, had to offset the bodies on the king pins to overcome danger of side-swiping of passing cars.

Four months before the commission took over the railway lines, it appointed A. T. Spencer, formerly on the engineering staff of the Montreal Tramways, as engineer of way. Mr. Spencer immediately set about the building up of an engineering organization, as shown in the diagram on page 555, and developed a system of standard specifications and procedure. A special section to handle excavation and concrete work was organized under the direction of A. E. Gibson, a prominent Toronto engineer who specializes on concrete work. As far as possible the standards of the American Electric Railway Association were adopted. The effectiveness of this organization is shown by the fact that it succeeded in laying 12 miles of track extensions and additions, including carhouse yards, and rebuild 13

PAVING GANG GROUTING GRANITE BLOCK PAVING

*The Transportation Commission consists of three members. P. W. Ellis is chairman, the other members being George Wright and F. R. Miller. The general manager is H. H. Couzens and the assistant manager D. W. Harvey. The headquarters of the commission are at 229 Yonge Street.

Tearing Up Old Car Track in Rehabilitation Program in Toronto

No. 1—Rail and derrick car delivering rail along track slated for rehabilitation.

No. 2—Temporary shunt track to divert traffic during reconstruction.

No. 3—This steam hammer is doing duty as a pavement breaker.

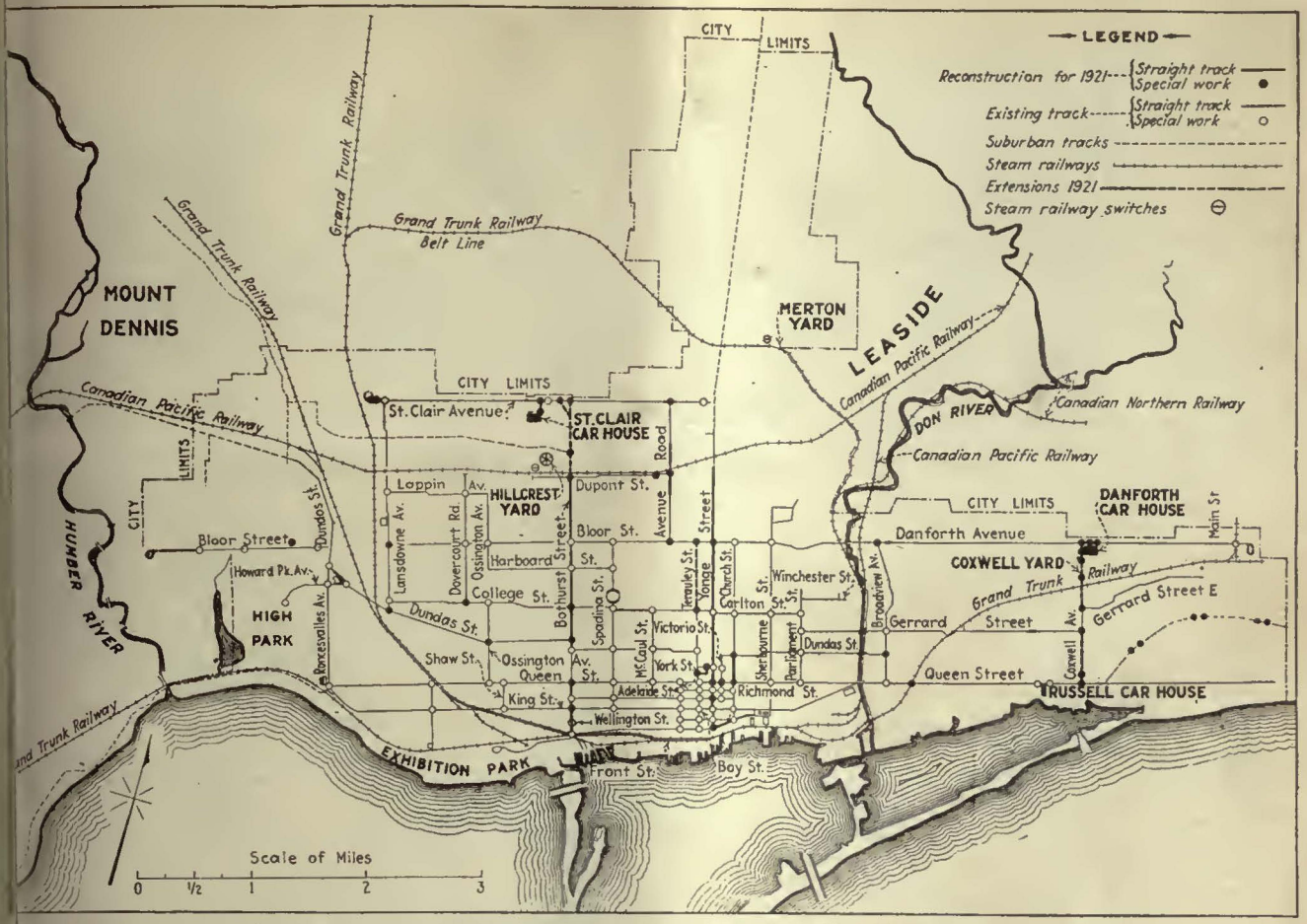
No. 4—Pneumatic chisels used where big breaker might disturb subsurface structures.

No. 5—Some heavy work for the steam shovel.

No. 6—Rented trucks were used in removing spoil.

No. 7—The track was taken out in chunks for salvaging. The sections are taken to nearby yards for this purpose.

No. 8—This complicated special trackwork will soon be cut up with the acetylene torch and carted away.



OUTLINE MAP OF TORONTO, ONT., SHOWING RAILWAY LINES NOW UNDER CONTROL OF TORONTO TRANSPORTATION COMMISSION

nles of track, much of it under traffic, including more t n 100 pieces of special trackwork, during the last four nths of 1921. The nature of the special trackwork c struction is indicated in an accompanying table.

Within a few days after the commission took control o the railway lines, actual construction was begun. T force was gradually increased until on Oct. 20 it r ched its peak. On that day there were twenty-three j s under way, employing 2,754 men in addition to th regular operating force, 112 teams and 141 motor t cks. This personnel does not include the necessary fi d and office engineering construction forces.

WHAT THE REHABILITATION PROGRAM INVOLVES

s will have been inferred from the figures already gi en, the task in front of the way department on S t. 1 was a staggering one. Each of the numerous jo s would, under ordinary conditions, have been large e ugh to be of special interest to track engineers. T en as a whole, the job is almost bewildering. Here ar just a few of more than thirty large jobs substantia y completed in the first ten weeks of work: New d ble-track line on Coxwell Avenue from Queen Street to unction with Toronto Civic Railway, 2,900 ft. Inte ection at Coxwell Avenue and Danforth Avenue, of so d manganese steel, being a double-track three-part w . New double-track line on Bathurst Street from D ont Street to connection with Toronto Civic Railwa , equivalent to 5,564 ft. of single track. Rehabilitati of northbound track on Church Street from Queen St et to Dundas Street, 1,250 ft. of new single track. Re abilitation of double track on Yonge Street from Fi t Street north to Carlton Street, 4,396 ft. Rehabilitation of 1,800 ft. of track on College Street between Spadina Street and McCaul Street, with new rails and widening of devil strip.

TYPICAL PIECES OF SPECIAL TRACKWORK IN TORONTO 1921 PROGRAM*

(See map for location of these pieces)

Location	Details of Special Trackwork	Shipping Weight in Pounds
Danforth and Coxwell	Double-track three-part wye	85,700
Queen and Coxwell	Double-track three-part wye	87,860
Gerrard and Coxwell	Double-track right-hand branchoff	38,090
Broadview and Danforth	Repair pieces	36,040
St. Clair and Vaughan	Single-track wye from double track	46,700
Danforth and Hillington	Single-track facing wye	35,850
St. Clair and Wychwood	Double-track three-part wye	83,740
Church and Queen	⅛ grand union	136,920
Queen and Victoria	⅛ grand union	158,560
Bloor and Yonge	⅛ grand union	166,370
Dundas and Ossington	Double-track crossing	47,060
Gerrard and Coxwell	Additional curve	23,950
Terrauley and Albert	Left hand single-track branchoff from double track	18,320
Louisa and James	Right hand single-track branchoff from single track	15,770
Queen and Yonge	⅛ grand union	170,380
Dundas and Broadview	Double-track three-part wye	88,060
Reverse curves Dundas and St. Patrick		23,720

* All solid manganese switches, mates, frogs and crossings.

GETTING READY FOR SEPT. 1

Preparation for the activities of the fall involved: (a) Preparing specifications for track, track supplies, rails, special trackwork, etc. (b) Laying out a schedule of procedure. (c) Providing personnel and tools for carrying out the program. (d) Arranging for material storage yards and transportation to prevent delay.

Soil conditions in Toronto rendered two types of track construction necessary, one for use on a firm soil foundation and the other for locations where a sub-base was necessary. A. E. R. A. grooved girder rail weighing 122-lb. per yard was selected as standard for

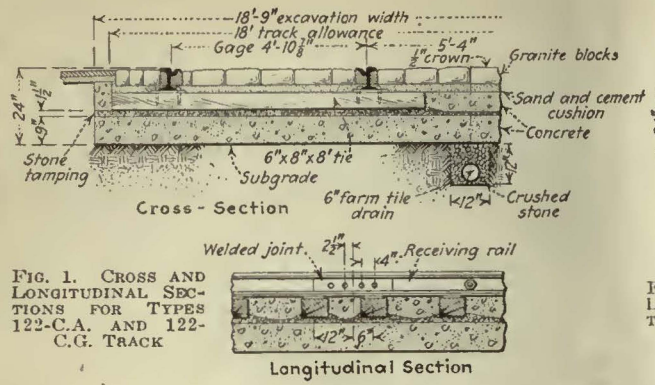


FIG. 1. CROSS AND LONGITUDINAL SECTIONS FOR TYPES 122-C.A. AND 122-C.G. TRACK

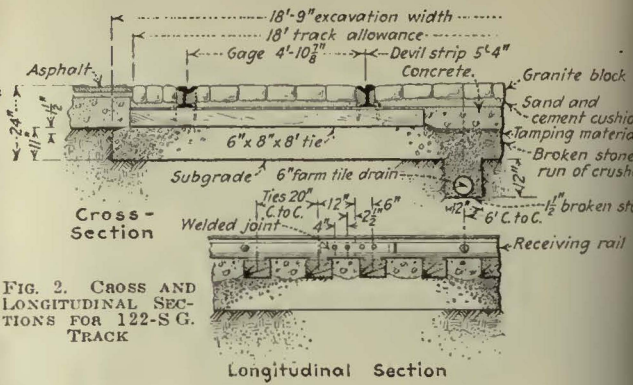


FIG. 2. CROSS AND LONGITUDINAL SECTIONS FOR 122-S.G. TRACK

Toronto Transportation Commission Track Standards

Specifications for Track Type 122-C.A. and 122-C.G.*

Rail — Commission standard 122-lb. grooved girder rail, 7 in. high, as met by United States Steel Products Company Sect. 122-491, or Bethlehem Steel Company Sect. 122-407-A.

Ties—6 in. thick by 8 in. wide by 8 ft. long, and made of soft wood for use with standard tie plates, or No. 1 white oak for use without tie plates. (See Fig. 3 for standard tie plate.)

Spikes—Standard, 5½ in. by $\frac{9}{16}$ in. (See Fig. 4 for standard spike.)

Tie Rods—5 ft. 3 in. long by ⅞ by 2½ in. flat, with 1-in. round terminal.

Joint Plates—of standard type. (Typical standard shown in Fig. 5.) Welded top and base. Plates set in tight with four bolts. After welding two bolts may be removed.

Bolts—1 in. in diameter and of such length as to take full nut and not to exceed ½ in. outside nut.

Excavation—Wearing surface to be removed and total excavation made to a depth of 24 in. below finished grade of top of rail. Width of excavation to be sufficient to lay a slab of concrete 8 ft. 6 in. wide for each track.

Drainage—Except in cases requiring special attention under-drainage shall consist of 6 in. farm or bell-mouthed tile drain laid in the center between tracks in a trench 12 in. wide by 12 in. deep, filled to subgrade with clean 1½-in. stone.

Foundation—Of concrete slab or slabs 9 in. thick. Proportion of concrete to be 1 of cement to 2½ of clean sharp sand and 5 of crushed trap rock.

Cushion—To consist of best obtainable material, preferably ¾-in. crushed limestone mixed with limestone dust.

Paving Base—To be of concrete of the proportion: 1 of cement to 3 of sand and 6 of crushed limestone or gravel.

*These symbols indicate weight of rail (122-lb. grooved girder), type of foundation (concrete), and types of wearing surface (asphalt and granite block, respectively).

GENERAL ITEMS

Gage of track to be 4 ft. 10⅞ in., and double track construction to be laid to 10 ft. 2⅞ in. centers.

Ties to be spaced 2 ft. center to center except at joints, where tie under receiving rail shall be placed so that edge is 2 in. from the joint. Ties to be placed at right angles to rail.

Rails to be laid with opposite joints, with no variation of more than 2 in., and wherever possible all four rails of a double-track to be laid with opposite joints.

Rails to be tight-butted at joints and before joint plates are applied joint plates under head and base of rail are to be thoroughly brushed with wire brush to free contact surfaces from rust or scale. Head of rail or any piece of special trackwork not to be damaged in butting back rails. Cuts for closures to be sawn through head and web and closure joints to be tight. Uneven railheads at joints to be brought to uniform surface by grinding, care being taken not to grind more than is necessary to secure true running surface.

Joint bolts to be tightened with wrench not more than 2½ ft. long. Spikes to be driven straight and last few blows to be tapped lightly.

Tamping to surface to be done by hand or pneumatic tampers, tamping material being dampened. Line and surface to be within ⅛ in. of established line and grade. Under no circumstances shall track be concreted until line and grade are established, and in varying temperatures care shall be taken to keep track in perfect line before concreting.

Standard track drains to be installed at suitable and approved spaces.

Where 122-C.G. construction is specified, paving base shall be brought to line of top of base of rail and thoroughly tamped around and under rail, and smooth surface shall be secured. Where 122-C.A. construction is specified, paving base shall be brought to within 3¼ in. of top of rail. Concrete to be thoroughly tamped under and around rail and a rough surface secured for asphalt surface. Where 122-C.G. construction is specified, paving cushion of cement and sand shall be used and granite block grouted with cement grout. Before blocks are laid, stiff cement grout shall be plastered against web of rail, against which blocks are to lie.

Top of finished wearing surface to be at least ½ in. below top of rail.

Specification for Track Type 122-S.G. (Stone foundation, granite block paving).

Rails, ties, tie plates, spikes, tie rods, joints, and bolts as in preceding specification.

Excavation—Wearing surface to be removed and total excavation made to depth of 24 in. below finished grade of top of rail. Width of excavation to be 8 ft. 6 in. for a single track and 18 ft. 9 in. for double track.

Drainage—As in preceding specification.

Foundation—To consist of layer of run-of-crusher to 2 in. stone spread 9½ in. thick on subgrade, rolled to 15 in. below grade of top of rail, thus allowing about 1 in. for tamping to surface.

Tamping Materials—As cushion in preceding specification.

Paving Base and General—As in preceding specification, except that where 122-S.G. construction is specified, paving base shall be brought to line of top of base of rail and thoroughly tamped around and under rail, and a smooth surface secured. Paving cushion of cement and sand shall be used and granite block grouted with cement grout. Before blocks are laid a stiff cement grout shall be plastered against web of rail against which blocks are to lie. Top of finished wearing surface shall be at least ½ in. below top of rail.

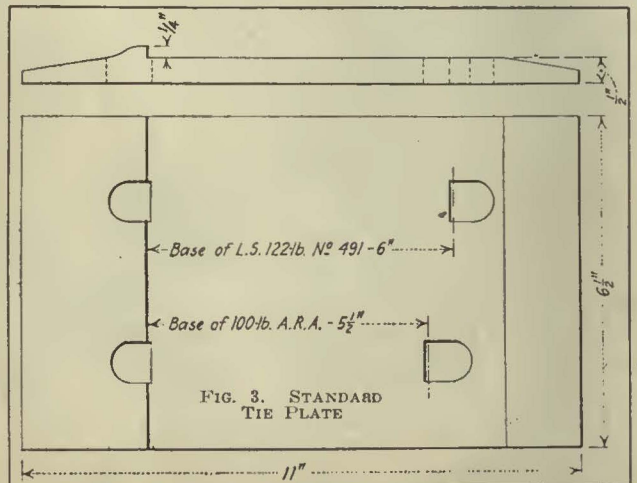


FIG. 3. STANDARD TIE PLATE

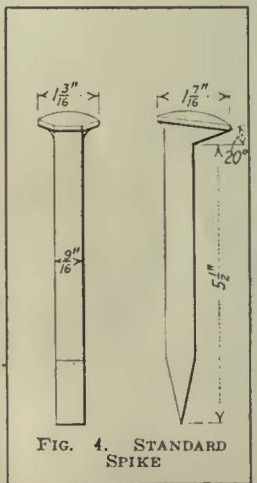


FIG. 4. STANDARD SPIKE

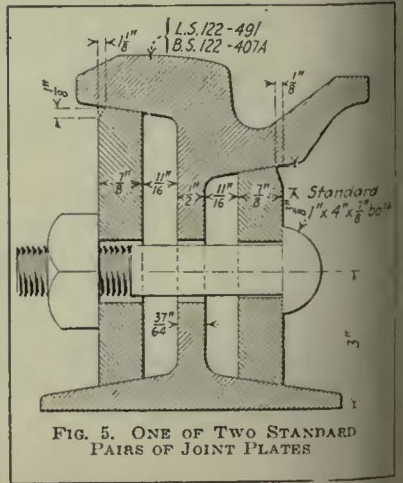


FIG. 5. ONE OF TWO STANDARD PAIRS OF JOINT PLATES

t track in streets, while 108-lb. grooved girder and 7 lb. A. S. C. E. T-rail sections were adopted for the c houses and storage yards.

Three standard cross-sections were provided to cover t different conditions of foundation and paving. Tese cross-sections are reproduced, together with a drest of the specifications on page 554. They will be s n to follow A. E. R. A. standards in general.

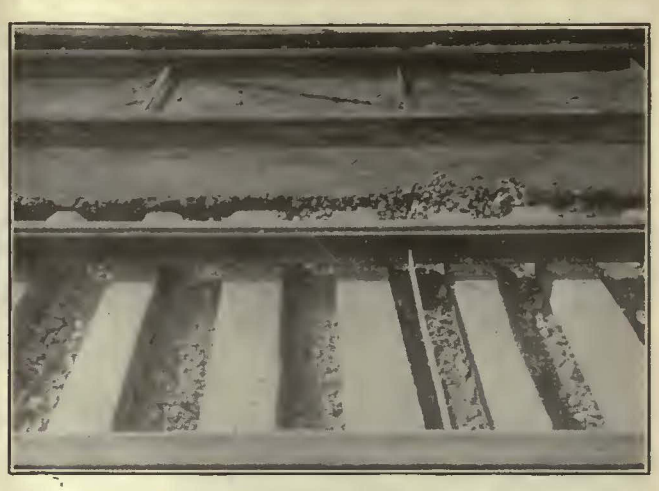
For the concrete foundation, types 122-C.A. and 1 -C.G. track, an aggregate of trap rock was specified s as to give a tough and durable concrete. It is e ected that this foundation will be permanent. The c crete which is placed between the ties has a softer a regate. It is separated from the base slab by a c hion of dust and fine stone.

Specifications for special trackwork, rails, etc., have n been reproduced. All of these were fully standa ized, however.

Three types of special trackwork were provided: Tpe A, solid manganese switches, mates and crosses, wh class No. 1 rail.* Type B, solid manganese s tches and mates with frogs and crossings of steel c tings, having manganese inserts at the points re- ving greatest wear, with class No. 1 rail. Type C, s d manganese switches with mates, frogs and cross- i s of rolled rail arms bound together with cast-iron o cast-steel bodies, having manganese inserts placed at he points receiving greatest wear, with class No. 1 ra . Provision is made in a complicated layout where ty e B or type C construction is called for, and it is f nd that the length of arms on any individual piece is insufficient to permit the proper use of manganese in rts with plate clearance of at least 9 in. from the er of the arm, for the construction of the whole or p t of the piece of solid manganese steel.

Under the specifications for cast-steel construction wh manganese inserts and iron or steel-bound con- st ction with manganese inserts, it is interesting to n e that provision is made for construction in con- f mity with the latest recommended specifications of th A. E. R. A. for each class of construction, except th t the general conditions as given in the commission's

*Rail has this chemical composition: Carbon, 0.60 to 0.75 per c ; manganese, 0.60 to 0.90 per cent; silicon, not more than 0.2 per cent; phosphorus, not more than 0.04 per cent.



"CLOSE-UP" OF DOUBLE-TRACK CONSTRUCTION WITH CRUSHED STONE FOUNDATION. ABOVE, CONCRETE PAVING BASE IN PLACE; BELOW, TIES TAMPED READY FOR POURING OF PAVING BASE

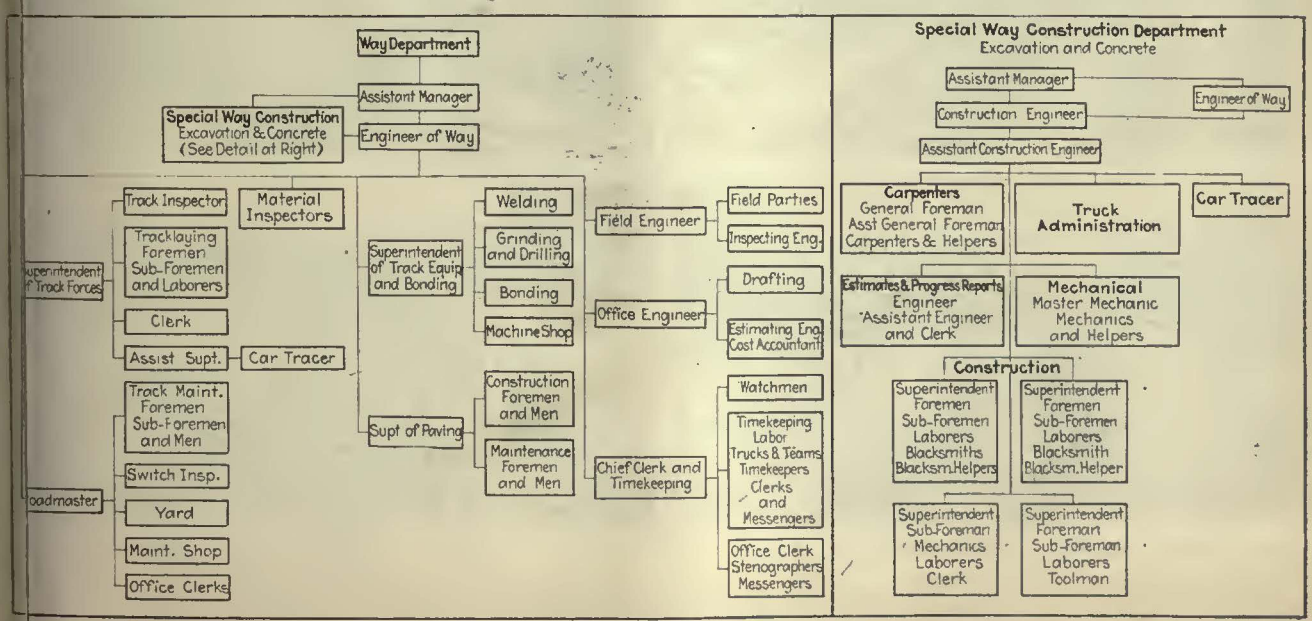
specifications shall apply as far as possible under the conditions governing the individual layout.

As to ties, the commission's specifications permit the use of white oak, cedar, jack pine, tamarack, hemlock and long-leaf 90-per-cent-heart Southern yellow pine. Pole ties are acceptable excepting those made from oak or from Southern long-leaf yellow pine. For special trackwork ties, the only woods acceptable are white oak, rock elm, chestnut, hemlock and long-leaf 90-per-cent-heart Southern yellow pine.

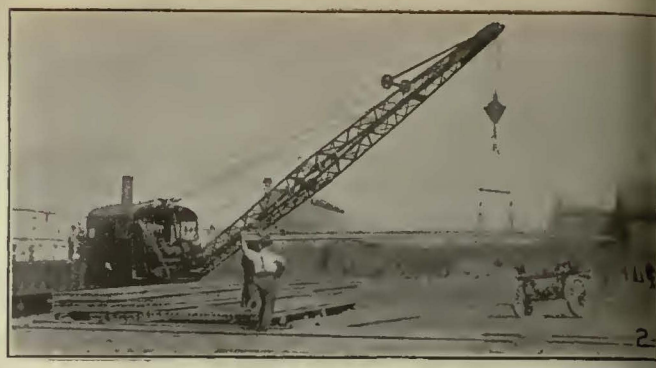
SCHEDULING WAS AN IMPORTANT ELEMENT IN THIS WORK

With so many jobs to be done simultaneously, and such large forces to be handled, unusual care had to be given by Mr. Spencer and his associates to the scheduling of the numerous operations.

As far as the general trackwork was concerned, it could be considered best in connection with the several operations involved as follows: (a) Wearing surface removed. (b) Concrete broken. (c) Grading done. (d) Slab poured (or crushed stone foundation placed and rolled). (e) Rails laid. (f) Track lined and surfaced. (g) Joints completed. (h) Base poured. (i) Wearing surface laid.



ORGANIZATION OF WAY DEPARTMENT, TORONTO TRANSPORTATION COMMISSION

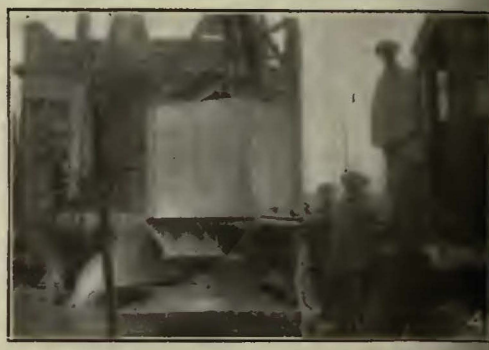


No. 1—Loading and measuring machines at Coxwell Avenue yard.

No. 2—This locomotive crane is kept busy at Coxwell Avenue yard.

No. 3—A group of labor-saving machines at Bathhurst Street yard.

No. 4—One of the batch boxes used in transporting mixed concrete materials.



Storing and Handling Track Materials in Toronto

No. 5—Laying the drain in a double-track trench.

No. 6—The mixer at work distributing concrete base in double-track trench.

No. 7—Track blocked up to permit passage of cars while concrete base is being poured.

No. 8—Track on temporary blocking with concrete sub-base in process of hardening.

No. 9—A temporary track crossing made of old T-rail with planking held in position by clamping with tie rods.

No. 10—Track on crushed stone foundation ready for pouring of concrete pavement base.

Toronto Track in Various Stages of Construction

By means of a progress chart form, such as that reproduced on page 558, it was possible to estimate about how fast the work could be done. As the work was actually done, it was represented, day by day, on the progress chart by means of shaded rectangles like those reproduced.

While the special trackwork jobs were more difficult to estimate, every effort was made to schedule this work so that the maximum number could be completed before heavy frost set in.

How the Trackwork Was Organized

Mention has already been made of the general personnel of the special way department organization. Now, as to the way in which the actual construction was carried out. A number of track gangs were provided, each with its special duty. These gangs and their functions were as follows: Gang A does all excavating and concrete work, and all delivery of material except rails. Gang B does track laying, tamping and surfacing, and when necessary blocks up the track for traffic. Gang C does all paving and arranges track drains and connections with the city sewers. Gang D delivers tangent rails and makes changes and repairs in special trackwork. Gang E delivers blocking as needed, having for this service a Ford 1-ton delivery wagon.

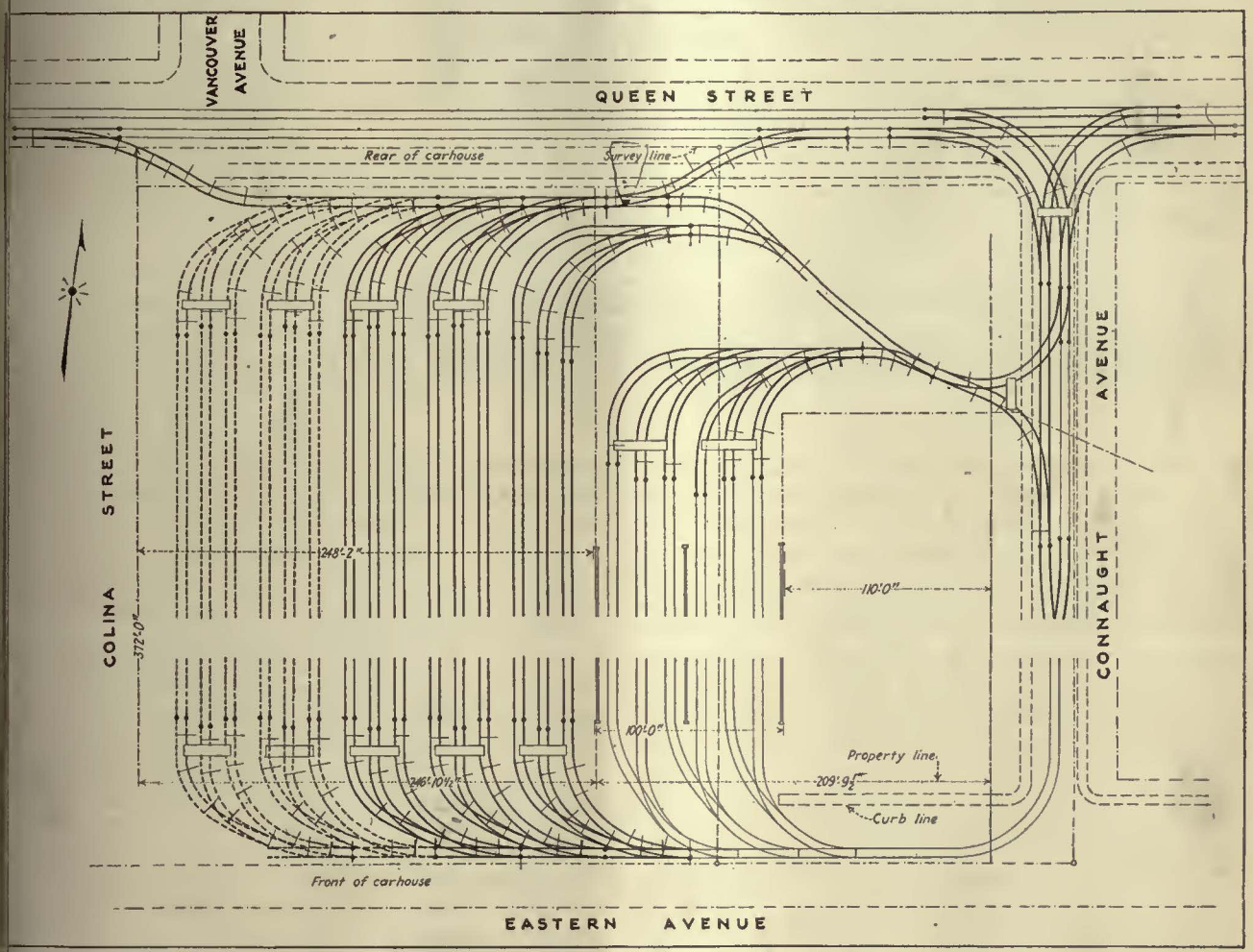
The field engineering work is divided as follows: One engineer is responsible for lines and grades; a second supervises bonding, welding and grinding; a third attends to material requisitions, time keeping and watchman service; a fourth is responsible for the sufficiency of supplies of materials and for their delivery as required by the track forces.

Mechanical Devices Provided to Save Labor

The way department could not have performed the difficult task assigned to it without liberal provision of mechanical devices for performing every possible operation. These machines can best be considered in connection with the functions they were called upon to perform. The series of functions may be followed from the materials yards to the finished track.

In the materials yards, of which there were several, locomotive cranes with 50-ft. booms and clamshell buckets were provided to shunt and unload steam railroad cars loaded with stone, gravel and sand. Brownhoist derricks were also provided for handling rails and special trackwork, both in the yards and on the work. Liberal numbers were also provided of Barber-Greene loading machines for lifting sand, crushed stone, stone dust, etc., from the piles and delivering them into a measuring hopper or chute for loading into trucks.

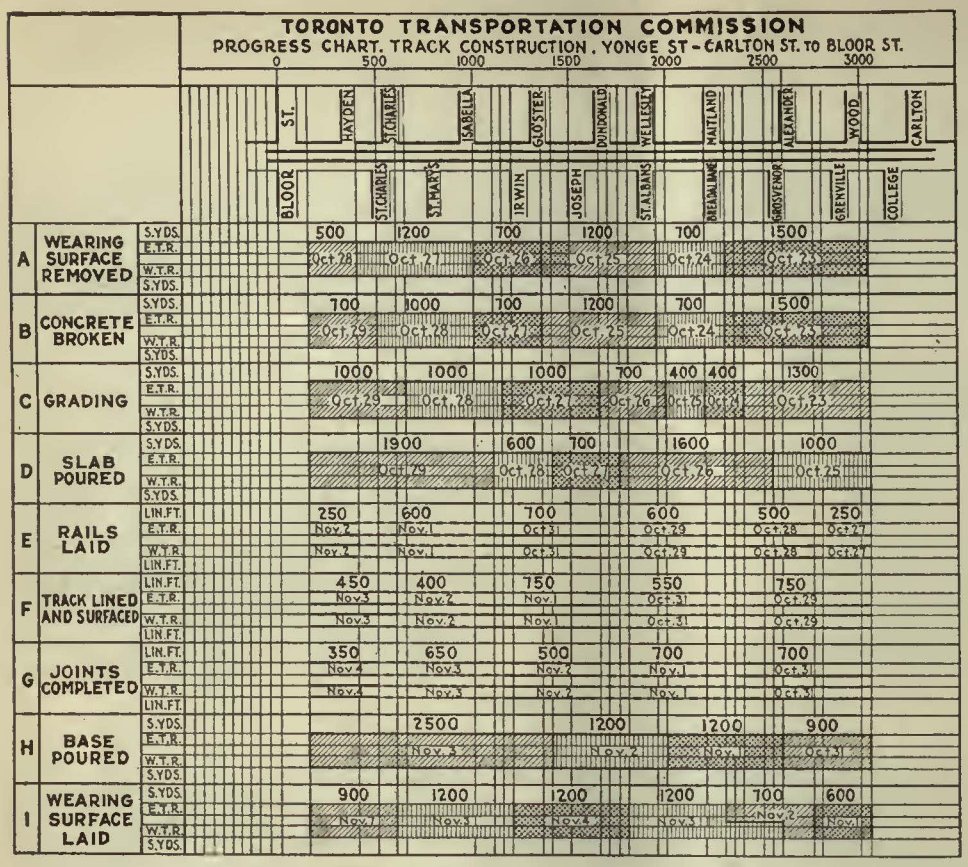
For transporting materials from the yards to the job, work cars and various forms of truck are employed. The latter are in most cases hired from local trucking concerns.



General Track Layout at the Russell Carhouse

Concrete Material Mixed at Yards

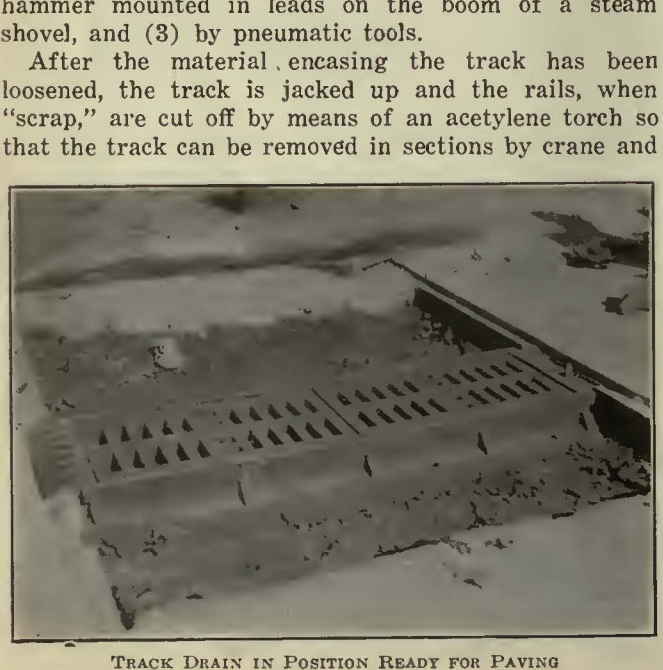
In order to simplify the work at the concrete mixers, concrete materials are proportioned at the yards by means of the loading machines. The materials are



TYPICAL TRACK RECONSTRUCTION PROGRESS CHART

handled in batch boxes of 33 cu.ft. capacity, two of which form a load for one motor truck. The batch boxes are bottom opening, so that the materials can be dropped directly into the concrete mixer hopper by means of a boom on the mixer. The bags of cement are laid on the batch boxes at the yards, and are emptied into the boxes while the batch-box trucks are in transit between the yards and the work. On the street, the first task is to loosen and remove the paving. Three methods are used for breaking track and pavement foundations: (1) By means of a drop-hammer in leads on the boom of a steam shovel; (2) by means of a steam hammer mounted in leads on the boom of a steam shovel, and (3) by pneumatic tools.

After the material encasing the track has been loosened, the track is jacked up and the rails, when "scrap," are cut off by means of an acetylene torch so that the track can be removed in sections by crane and truck to nearby yards for storage and salvaging. In many cases openings were made in the paving, jacks were introduced and the whole track structure was jacked up off the ties. After the paving blocks had been removed, the shovel was able to handle all excavation without the use of the breaker.



TRACK DRAIN IN POSITION READY FOR PAVING

The next step in construction is the excavation of the roadbed, which is done by means of ¾-yd. steam shovels. Three of these are employed, two of which are mounted on wheels, and the other on caterpillar treads.

After the shovels have completed their work on the trench the latter is trimmed to line and grade by hand if a concrete base is to be used, and is ready for the concrete sub-base. The concrete is mixed and poured by means of Foote mixers in 21-cu.ft. batches. These mixers are mounted on caterpillar treads and are steam driven. As previously explained, the materials are transported dry, in batch boxes, from the yards. The cushion is then spread on the sub-base, the ties are laid, the rails strung and spiked, etc.

The 122-S-G-type track does not require careful trimming of the trench and the crushed rock is spread and compacted to a depth of 9 in. in two rollings.

The joints are made by first tightening up the plates with four bolts. They are then seam-welded top and bottom by the use of the metallic or carbon arc. These plates are chamfered to provide suitable grooves for the welding materials. After the joints are welded, two of the bolts are removed. The joints not welded are electrically bonded by means of No. 0000 bonds with metal terminals.

The work in Toronto was considerably complicated by the fact that so much of it had to be done under traffic. Of course, as the commission had control of most of the trackage in the city, it was possible to divert much of the traffic to adjacent lines when a stretch of street was needed for track rehabilitation. Temporary track was laid in some cases. To secure sufficient time for the hardening of the concrete base, in some cases the following expedient was adopted:

After the trench had been finished, the rails were strung with temporary joints on alternate ties, the latter being blocked up to approximate position. On the top of each pile of blocking a wedge was inserted under the tie, partly to permit adjustment and partly to provide for convenient knocking out of the top blocking when desired. The concrete base was then poured, and traffic over the track was permitted while the base was setting. The alternate ties were then tamped up on the cushion and the blocking was knocked loose, leaving the track resting on the ties. The cushion material was then distributed, the remaining ties placed in position and under-tamped, the paving base poured, etc.

afety Committee Reduces Accidents

ith the Assistance of Safety Organization Little Rock Reduces Accident Charges in 1921 to Nearly Half of 1 per Cent of the Gross

HE efficacy of safety work when in charge of a committee devoting its time to that question is strikingly own on the property of the Little Rock Railway & ectric Company. This system is a combined electric ilway and lighting property, but this does not account r the low figure quoted above as that is the figure for e railway department. Exactly, the railway depart- nt figure was 0.56 per cent. This figure represents ounts paid out for claims and does not include the ex- nses of the claims department, which are about 1.1 per nt of gross receipts. For both departments the figure s slightly higher than this, owing to two accidents in e power station and one on the lighting distribution stem. If it had not been for these accidents the dam- es account would have been less than one-half of 1 r cent of the gross.

The chairman of the safety committee is Elmer hoggen, assistant attorney in charge of claims, and the mmittee is made up of one employee from the distri- tion department, one from the power station, one otorman, one conductor and one representative from e shops. Mr. Schoggen is a practical transportation n, having spent three years on the platform himself. is committee meets every two weeks to consider sug- stions, visit the various departments where accidents ght occur, and discuss methods of preventing acci- nts. The total claims force consists of Mr. Schoggen, r. Rowland, the claim agent, himself a former con- ctor; the company's physician and one motorman who available for special claims inspection work. Some the recommendations made by the committee during 21 follow:

A better method of carrying pikes on car-construction cks.
Covering holes in the boiler room floor.
A rule forbidding a passenger from standing in the rner of the car platform near the controller.
Improving the condition of the wash rooms.
A rule forbidding the throwing of clothing on machinery d other places in the shops.
Improving the operation of sanders on the cars.
Providing guards on machinery in the shops.
Placing new rubber mats in front of the switchboards and ng the old ones in front of the cut-off saw and jointer in e car shops.
A rule providing that the conductor can cancel his two- ll signal to start by another bell if he has to open the r door again.
A protest to the health officer to stop passengers spitting or on cars.
Stopping boys from hanging onto the backs of cars. The thod followed in this case was to notify their parents of e dangerous practice.
The installation on each car of a box for waste for the otorman to keep windows clean in rainy weather.
The installation of lights at the end of car lines.
Instructions to linemen to make special efforts not to hold cars because the cars delayed may incur accidents while eeding up to make up time.

The figures secured in 1921 are the lowest attained the company and are attributed entirely to the work the committee. Three or four years ago it was the stom of the company to set up an accident reserve of per cent of the gross. That this has been a progres- e improvement is shown by these figures: In 1919 ims paid averaged $8.54 per 1,000 car-miles; in 1920, $.58 per 1,000 car-miles; in 1921, about half the latter ure.

Benefits from this attention to safety come not only directly but indirectly. Among the latter advantages is undoubtedly the knowledge by both employees and public generally that the company is making every effort to make its service as safe as possible. The result is that suits are less frequent than they were and can usually be settled out of court, if the company is liable. In fact, there has not been a judgment in court against the company in a damage suit for two and one-half years. The last was a judgment of $100 in a $5,000 suit.

In fact, one of the strong features of the Little Rock safety work is the policy of settling so far as possible any, or any likely liability. This has been the policy for so long and the record in the past is such that all jurors in that section of the country go into the jury box with the idea that there is not much wrong on the company's part or the case would not be in court.

Then, too, the co-operation of the company's physician in the claims work is very important. If any one is hurt, even though there is no apparent liability whatever, the company's policy is to send the physician, who takes an immediate statement. The personality of the physician has proved to be such that even though the injured person is hostile, he is usually made a friend.

In judging results of claims work, it is usually important to have a few statistics. In this regard, the average speed of the cars in Little Rock in 1919 was 8.36 car-miles per hour; in 1920, 8.46, and in 1921 about the same as in 1920. The car-miles operated are slightly in excess of 2,500,000; the passengers carried, something over 22,000,000. The population of Little Rock proper is about 65,000. In 1920, 1,723 accidents of all kinds were reported.

Japanese Railways Report

ALTHOUGH the mileage of government-owned electrically-equipped track and the number of electric locomotives and tramway cars owned and operated by the Japanese government are not large, the latest report of the Railway Administration shows that the government is awake to the possibilities of electrical operation.

Out of 2,933 locomotives owned on March 31, 1919, twelve were electric. There were 190 electric tramway cars, an increase for the year of thirty-eight. Improvement work for the preceding year included the completion of the overhead tracks for the electrified line in Yokohama.

Electric service on the Tokyo suburban lines was improved by reduction of headway of trains from fifteen to twelve minutes on the Yamati line and the Tokyo-Yokohama electric section. Time-table improvements were also made on the Nakano-Kichijoji section of the Central line just electrified, part of the electric service being now furnished as far as Kichijoji. The Tokyo-Manseibashi electric section was opened to traffic and electric trains were operated from Nakano to Uyeno through the Tokyo station. Some trains were operated from Tokyo to Nakana, and from Tokyo to Kichijoji.

The fifteen power stations operated by the government produced 35,775,000 kw.-hr. of energy during the year and the output of the twenty-five substations was 31,495,000 kw.-hr. The average cost of the former was 0.0333 yen (1.67 cents at par of exchange) per kilowatt-hour and of the latter 0.0183 yen (0.9 cent) additional.

The government's electric cars made 7,892,000 miles at an energy expenditure of 2.41 kw.-hr. per car-mile

(cost 3.7 cents); while the electric locomotives made 153,200 miles and consumed 19.63 kw.-hr. per mile, hauling an average of about seven cars.

The government conducts a Central Institute for training railwaymen, with courses in railway business, technology, electricity and English. A total of 942 men have graduated since the opening of the institute in 1909, divided thus: 526, 219, 63 and 134 respectively in the sections listed. There are also five district institutes in which the instruction is largely of a practical nature. In one year there were more than 2,500 graduates from these.

The report from which the above information is taken also contains facts regarding the privately-owned (including municipal) tramways. The number of passengers carried was 983,068,275 and 2,435,847 tons of freight was moved. The earnings were 49,136,431 yen (about $24,500,000 at par of exchange). The total mileage given above was made up of 720 miles of electric; 273 of steam; 33 of gas; 195 of horse, and 49 of man-power (rikisha) railway. The numbers and lengths of lines in these average divisions were: Electric, 69—10.4 miles; steam, 29—9.4 miles; gas, 4—8 miles; horse, 34—5.7 miles; rikisha, 9—5.5 miles.

Letters to the Editors

Improving the Electric Railway Personnel

GEORGIA RAILWAY & POWER COMPANY
ATLANTA, GA., March 21, 1922.

To the Editors:

I feel very deeply on the subject of the selection of employees, as outlined in an editorial in your March 4 issue. There is, to my mind, no question connected with the industry which should command more attention from railway operators. Below are given, as briefly as possible, our ideas and aims in this connection.

First, we are of the opinion that the designations "conductor" and "motorman" are misnomers in so far as the public is concerned. Conductors and motormen are nothing more nor less than salesmen—sellers of service. They sell the only thing we have to sell, namely, street car rides. Upon the manner in which they sell these rides—the smooth operation of the car, the courteous and careful handling of passengers and the agreeable willingness to serve—upon these things depend the satisfaction we will render our customers. Upon them rests in large measure the good will we are going to receive from these same customers, constituting the public who cannot now, and never could, "be damned." We don't believe that the American public is so much concerned about one or two cents additional care fare as about quick, safe, courteous and comfortable car rides. And these "service salesmen" are the men who furnish such rides, or else they fall down on the job and furnish an unsatisfactory service. Therefore, since so much depends on the personnel of our trainmen, we believe that the highest type of men available for the wages paid should be employed for the positions of salesmen. To this end we have entirely reorganized our employment and instruction department and are working toward a higher goal in the matter of personnel.

Assuming that the applicant is of sufficiently reasonable intelligence for the position of salesman (and by process of strict examination and elimination we ascertain this before considering his application), we think it equally important that he be physically fit. This man, if employed, is going to do business with the rich and the poor, with smart people, foolish people, ignorant people and all sorts of cranks. He must deal with the good natured and ill natured. He meets them all daily, and has perhaps a wider assortment of customers than any other salesman in the world. In addition to this, the operation of his car through the busy, crowded thoroughfares of a city requires physical as well as mental alertness; the proper brain and muscle co-ordination to cause him to act, and act quickly in case of emergency. How many customers have been offended by some grouchy conductor, whose ill nature could be probably traced to poor eyesight and resulting headaches, or possibly to defective teeth? How many accidents have been caused by the defective eyesight of the motorman and his inability properly to judge distances, or possibly by a slightly defective hearing (which he has kept secret) and which caused him to miss his signal bells? And who knows but what that same customer who was offended by the grouchy conductor may sit on the jury in the damage suit resulting from the accident caused by the physically defective motorman? Many a conductor naturally of even temper and good judgment has developed a surly, crabbed disposition because he was physically ill and didn't know it. Many a motorman with a previous clear accident record has spoiled it by reason of his own physical ailment of which he was unaware.

We by no means put the physical above the mental qualifications of applicants, but under our system of selection, which insures a satisfactory mental fitness, we are giving particular attention to physical requirements. We are now finishing our first annual physical examination of every trainman in the service, an examination which extended to the division superintendents. The company pays the nominal fee charged by the doctor, and feels amply repaid from the results already obtained. The examination (the same as that used for applicants) is very rigid, including heart and lung tests, blood pressure examination and urinalysis. We have found some of our older employees suffering from high blood pressure and in immediate danger of paralysis. Such men have been laid off and required to take treatment in the way of diet, etc., and they are being paid sick benefits by our relief association, an organization organized and supported by employees themselves. Others have been found with bad teeth, responsible for and liable to cause serious physical ailments. To meet this, we have established a dentist at our transportation headquarters, and by reason of the large volume of work he is enabled to make comparatively low prices on cases handled among our men. The charges are deducted in reasonable monthly installments from the employees' wages. No single thing we have done recently has met with more favor among our trainmen than the introduction of "industrial dentistry" for their benefit, and for the benefit of their families.

As time passes there will no doubt be found men who are physically unable to perform the duties of either motorman or conductor. If such men have had sufficient length of service, and we are unable to place them elsewhere, we will retire them under our plan of annuities or pensions. Where they have not, we will use every possible means to get them into such physical condition that they can carry on their duties, or will endeavor by persuasion to have them enter some other field of work

epending on the merits in each case. In other words, e expect to build up the physical standard among our rainmen and weed out the misfits, bearing in mind, of ourse, that this last must be done with justice and dis-rimination. And in employing new men, it is our aim o select only such types as are physically, mentally and orally fit to represent us before the public as service lesmen.

In connection with the actual training of men, we are ndeavoring to remove every trace of the taskmaster nd substitute the feeling of helpful leadership. We elieve we can make the man feel that the company is, fter all, his best friend. We want him to know that we re just as anxious about his making a clean record as e is himself. By our follow-up methods we find men ho have been with us for some little time, occasionally long time, who have grown stale or indifferent in their ork. Unless their offenses are viciously flagrant, we re bringing them back to school and trying by patient ethods to "work the kinks out" and recharge them ith a desire to be up and on their toes in an effort to nder service—not just ordinary service, but good rvice—just as we should do if there were a dozen mpeting street railways here.

The idea, the spirit and the aim we have in mind seem o be rapidly permeating our entire body of men, and by he tactics which I have described we are getting splen-id results.

In conclusion, I can only add that a motorman or a nductor is not an ordinary individual, in the sense so any have come to regard him. He is a salesman, who eals with everybody and who requires infinite tact, atience and judgment, if he is to protect his company nd maintain its standards of service. And to the end hat he may make a success of his work, he must have he natural requirements to begin with, he must have he right principles of duty instilled into him when he new and in an impressionable state, and thereafter he ust be encouraged when he gets a raw deal from his ublic (because he is going to get this anyway, at some me or other) and when things break badly for him he ould have the satisfaction of knowing that his com-any is with him and for him. With this spirit of unity nd co-operation and the proper training and guidance othing but good results can be obtained.

F. L. BUTLER,
General Operating Manager.

Combating Jitneys by a Small Railway

DANBURY & BETHEL STREET RAILWAY
DANBURY, CONN., March 28, 1922.

o the Editors:

It may be of interest to your readers to know the ffect of the elimination of jitney competition on a mall street railway in the hands of a receiver. The anbury & Bethel Street Railway is operating 13 miles f electric railway in the towns of Danbury and Bethel nd 4 miles of motor bus lines. The company has been n the hands of a receiver since Nov. 1, 1917. The ter-itory which is served by this railway has a population f about 27,000.

Jitney competition began in the spring of 1918 and ntinued until about May 1, 1921. The Connecticut egislature of 1921, carrying out the recommendation f Governor Lake in his inaugural message, passed an ct declaring jitneys "common carriers," placing them nder the jurisdiction of the Public Utilities Commis-sion and requiring a certificate of "convenience and necessity" before a jitney could be allowed to operate, operation being over fixed routes under regular sched-ules approved by the commission. This act took effect on July 15, 1921, but several months before it went into effect the jitneys competing with our company ceased to operate, due largely to a routing of the jitneys under a local ordinance passed after announcement was made that street railway service would be suspended unless the jitneys were curbed. Since the law has gone into effect no application has been made by any jitney seek-ing to compete with our company for a certificate of "convenience and necessity." The same session of the Legislature authorized the street railways of the state to operate motor vehicles. We have had no jitney com-petition since May 1, 1921, and since July 1, 1921, we have been operating two lines of motor buses as feeders to our electric railway lines.

The following monthly comparative statement of gross passenger receipts for 1920 and 1921 and two months of 1922 shows just what the elimination of jitney competition has meant in dollars and cents to our little company:

	1920	1921	1922
January	$11,644.02	$ 9,871.02	$14,154.05
February	9,740.27	9,000.74	12,675.71
March	8,767.72	11,284.99	
April	9,731.62	10,830.83	
May	10,052.43	11,830.83	
June	10,711.82	13,484.27	
July	13,597.01	16,543.15	
August	13,478.62	16,407.39	
September	10,895.52	14,473.68	
October	12,413.97	18,077.33	
November	8,546.52	12,567.36	
December	10,117.50	14,367.15	
	$129,697.28	$157,971.29	

During the first six months of 1920 we had a 7-cent fare within the limits of Danbury or Bethel, and a 10-cent fare for a through ride. Since July, 1920, we have had a flat 10-cent fare on all lines with an 8-cent ticket rate (metal tokens now being sold twenty-five for $2). Notwithstanding the increase of fare, the first four months of 1921 showed an increase over the same months of 1920 of only $1,103.69, or an average monthly gain of $275.92. The last eight months of 1921 (after the elimination of jitney competition) show a gain of $27,937.77 over the same months for 1920, notwith-standing that during six of these months the same rate of fare prevailed. This corresponds to an average monthly gain of $3,492.22. January and February, 1922, show a gain over January and February, 1921, when we had jitney competition, but with the same rate of fare, of $7,958, a monthly average of nearly $4,000.

In 1920 we had an operating deficit of $18,962.19, while in 1921 we had an operating revenue of $17,-632.39. This difference was due, of course, not alone to the absence of jitney competition but also to a de-crease in operating expenses.

We are now using safety cars of the Birney type exclusively, and trying to give the maximum of service as the best preventive for any jitney in the future securing a certificate of "convenience and necessity." With the elimination of unfair jitney competition, the use of safety cars and with supplementary motor bus service on a limited scale, I believe there is a future for the street railway in our smaller cities.

J. MOSS IVES,
Receiver.

Some Features of Safety Car Design*

Author Says Good Word for Rebuilt Car—Approves Design Described by Mr. Adams—Favors Double-Truck Safety Type as to Riding Qualities and Maintenance

BY HENRY CORDELL
Master Mechanic Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

SEVERAL operators have designed and built cars which, in their opinion are the ideal. Some of us have remodeled old cars and feel that they are the last word in safety car construction, from a rebuilding standpoint. The Chicago, North Shore & Milwaukee Railroad has rebuilt some of its two-man cars and contemplates rebuilding additional cars that are suitable for one-man operation. I am of the opinion that too little thought is given to rebuilding of the cars one has, when they are adaptable to one-man operation. I believe we should ignore the amount of extra weight if the bodies are in fair condition and the electrical equipment consists of later types of controllers and motors.

There is one thing certain in my mind—that a car built under the old idea, where a little too much material was used rather than just enough theoretically to stand the service, has proved to be worthy. The average old car can be rebuilt for $1,500 or $2,000—a saving of from $4,000 to $5,000 as compared to the cost of a new safety car. Why not get the use out of it by spending a few dollars? If the old car is sold, the receipts would not go far toward the purchase of a new car.

With modern motors the power consumption is not such a great drawback, considering passengers handled on a larger car. We find on a safety car weighing around 17,000 lb. a current consumption of under 1.3 kw.-hr. per car-mile as against 2.3 kw.-hr. for a car weighing 34,000 lb. However, we can carry on this car forty seated passengers as against thirty-two on the safety car and stand a corresponding larger number, giving a better ride due to double-truck construction.

Maintenance on a safety car is of an unknown quantity as yet with a good many companies. Of course, the cost is very low the first year or so, but will it remain at this low figure of say 2 cents per car-mile after a few years? We have all heard the expression that we can afford to retire a safety car after five or six years and buy a new one. Few companies will do this, and then the mechanical departments will have some grief explaining why the maintenance costs are running up.

In order to obtain the lightest type of one-man car we went to single-truck construction. I personally feel we should have been better off if we had retained the double trucks. First of all, the riding qualities of a double-truck car are not obtained. Second, a great deal of flange wear occurs—more than is proportional as compared to a double-truck car. For example, the wheels under a double-truck car weighing 52,000 lb. used in city service will give a mileage of 298,000, whereas the wheels under a 17,000-lb. single-truck safety car give only 80,000 to 85,000 miles. The flanges wear rapidly because nearly all track layouts built during the last twenty years have been constructed to suit double-truck cars with a wheelbase of from 4 ft. 6 in. to 6 ft. 6 in. We can't expect a car with an 8 ft. or 9 ft. wheelbase to take the same curves and special work, at a rate of speed even higher than that of a double-truck car, without showing the effects.

I note a movement afoot for increasing the weight of safety car parts that experience has taught us were too weak. We have overlooked the fact that we have heavy overloads at times, amounting to as much as two-thirds of the light weight of a safety car weighing sixteen or seventeen thousand pounds. We know this condition cannot but produce stresses which break the backbone, so to speak, of the car and cause unnecessary repairs.

The car built by the Chicago Surface Lines described in Mr. Adams' paper† is in line with my idea of a one-man car. It will be noticed that there is only a difference of 112 lb. per seated passenger in dead weight between the single-truck car and the double-truck car mentioned in the paper. This is a good figure when you consider the difference of 7 ft. 11½ in. in length and 6 in. in width, not taking into consideration the additional weight of the extra truck and motors.

The aluminum stanchions and railings make a very good installation and are easy to keep clean, require no paint, and even with a higher initial cost I am inclined to believe it would be cheaper in the long run.

I would be very glad to know final results of the aluminum pipe installation on the air-brake equipment. I have some doubt of it lasting in operation, having a tensile strength of only about one-half that of wrought-iron pipe. I believe that breaking will occur due to the vibration.

The handling of passengers in a safe, quick and economical way depends on door width, height of step, method of fare collection and the operator.

Quick handling of passengers can be accomplished safely with double doors with an opening of 23½ in. each, divided by a stanchion and railing through the center of the platform, dividing boarding and alighting passengers. With selective control from the operator's valve, arranged so that either door or both doors, if so desired, can be opened, both flexibility and safety are provided.

There is no reason why one-man car operation with full safety control should not be used on interurban properties particularly on branch lines where the traffic is not very heavy. The size of the car to which safety control may be applied is entirely immaterial, and it would be just as safe to operate with one man a car weighing 75,000 or 100,000 lb. as one weighing 16,000 lb.

*Abstract of discussion of paper by H. H. Adams at meeting of Illinois Electric Railways Association, Chicago, March 15-16, 1922.

†See issue of this paper for March 25, page 520.

Midwinter Convocation of Engineers in Chicago

On March 21 and 22, under the joint auspices of the Western Society of Engineers and the Chicago sections of eight national engineering societies, a general convocation of engineers was held to inform the engineers of the community about the engineering problems of Chicago now pressing for solution and the part they should take in carrying them through. In the first three sessions held on March 21 and the morning of March 22, gas and electric utilities problems were the principal questions under discussion. In the afternoon session E. J. Noonan, chief engineer of the Chicago Terminal Commission, spoke on the "Railroad Transportation in Chicago," discussing in particular the location and construction of the new terminals which are planned to improve the railroad terminal situation in Chicago. Bion J. Arnold, following on the same general topic, recommended that the steam railroads co-operate to the extent of providing three through routes through the city on much the same system that is followed by the surface and elevated lines in routing cars through the loop and not merely to it as was formerly the case. A paper by Harry P. Brown, Western editor ELECTRIC RAILWAY JOURNAL and BUS TRANSPORTATION on "The Possibilities of Developing Chicago's Transportation Facilities," was read in his absence by W. W. DeBerard. This paper is printed in abstract elsewhere in this issue.

Institute of Transport to Celebrate Historical Events

The Institute of Transport of London expects to arrange suitable celebration of the centenary of the opening of the Stockton & Darlington Railway in 1825 and of the locomotive trials at Rainhill in 1829. It was at these latter trials that the famous engine "Rocket," built by George Stephenson, established the supremacy of steam engine over the then known method of steam transport, namely, stationary steam engines.

It is expected that these celebrations will be held in connection with the annual congresses of the Institute in the years in question.

Wisconsin Men Hold Liberal Views on Their Competitive Problems

Joint Convention of Electrical and Gas Associations Held in Milwaukee—The Two Associations Combined Into the Wisconsin Utilities Association—Railway Men Discuss Bus Competition and Selling Transportation and Make Inspection Trip Through Milwaukee Company Shops

JOINT sessions of the Wisconsin Gas Association and the Wisconsin Electrical Association in connection with their annual meeting in Milwaukee extended over the three days of March 22, 23 and 24. The principal business disposed of by the convention was ratification of the action of the two executive committees in uniting the electric light, railway and gas utilities of the state into one association named the Wisconsin Utilities Association. The electric railway and electric light associations combined several years ago. Of the new organization J. P. Pulliam was elected first president, he having served as president of both the gas and electrical associations during the past year. Other officers elected were: Ewald Haas, Milwaukee, vice-president; G. C. Neff, Madison, treasurer, and J. N. Cadby, Madison, executive secretary. C. R. Phenicie, Green Bay, was elected chairman of the electrical section; Bruno Rahn, Milwaukee, chairman of the gas section, and B. W. Arnold, Oshkosh, chairman of the railway section, with Dudley Montgomery, Madison, as assistant.

In his president's address, Mr. Pulliam said that more than $50,000,000 will be spent in Wisconsin by the various utility companies during the course of this year in new construction work, extensions and improvements. A careful study given the business situation by the various utility companies has given rise to a conservative belief that from now on a gradual upturn of all industry may be expected. Since utility companies blazed the way for industrial growth, the utilities are leading the way with their expansion programs. That shows in terms of money that they have confidence in the general industrial and business outlook. Those cities in which they have been permitted to earn their just revenues will benefit from this program sooner than those wherein the rates have been held so low as to make postponement of improvements imperative because of inability to finance new work.

The public and the newspapers are beginning to investigate and discuss the situation of the utilities and their problems more thoroughly, and this, together with the liberal response to security offerings, gives our business a brighter outlook. Mr. Pulliam said that the recent sleet and snow storms which so seriously interfered with utility services and caused great damage of property generally may have their compensation in bringing forcibly to the attention of the public and the regulatory bodies the importance of the industry and the need of permitting utilities to earn sufficient return to be able to accumulate reserve funds to meet such emergencies. The public in those cities where utility services were interrupted are loud in their praise of the heroic work done by the utilities to restore service. Many of them have written letters to the different companies telling managers they never realized before how dependent they were upon the utilities for their daily necessities, comfort and conveniences.

Railway Men Discuss Bus Competition

W. G. Brooks, Westinghouse Electric & Manufacturing Company, served as chairman of the informal meeting of electric railway men on the afternoon of March 22, at which particular interest in the problems connected with motor bus competition was manifested. Charles E. Warwick, Green Bay, Wis., told of the passing of an ordinance in that city requiring a license fee of $100 per year and limiting operation of buses to streets other than those occupied by car lines. The legality of this ordinance, however, had been challenged by one of the bus operators and he had succeeded in securing an injunction which prevented the city from enforcing the ordinance. The city now is planning to put the matter up to a referendum vote unless the injunction is dissolved.

Mr. Warwick said he thought the people in his community were in favor of the street railway company because it had not made the bus competition a personal matter or openly attacked it, and hence there had been no disposition aroused to help the under dog. He said he considered that high class street car service was the best way to deal with jitney competition.

F. W. Walker, general manager Milwaukee Northern Railway, expressed the thought that motor bus competition should be considered in a broad-minded way. He pointed out that the electric interurban lines had entered the transportation field after the steam roads and had justified their position by developing a new kind of service. The buses are now doing the same thing and they have a right to operate, for they represent an advance in the art of transportation. The electric railways, however, came into existence by assuming all of the obligations and regulations to which the steam roads were subject, but this is not true of the buses. Under present operating conditions they are subsidized just as much as the steam railways were when the government gave them land grants. They practically escape all except personal taxes and have the use of the highways free. Furthermore, they are not being assessed at anywhere near their real value as personal property. For example, a truck valued at $5,000 was subject to a tax of only $153, total.

These matters are being brought to the attention of tax authorities. Buses and trucks should be charged so much per mile, based on capacity. Mr. Walker gave it as his opinion that the charge for buses should be ½ cent per mile up to a capacity of ten passengers, ¾ cent per mile for a capacity of ten to twenty passengers and 1 cent per mile for a capacity of over twenty passengers. They should be required to file their schedule and report the number of trips and pay the corresponding road charge at the end of each month. Mr. Walker pointed out that while the amounts he had suggested might not be right, the principle of a charge for the use of the road on a capacity basis was. With such an arrangement in force, a bus would be carrying its just part of the public burden, and on this basis he maintained that if a motor bus operator can make a profit he should be allowed to continue in operation wherever there is a demand for bus service without regard to competition.

Speaking of the effect of truck competition on the business handled by the Milwaukee Northern Railway, Mr. Walker said that on short-haul business, up to 25 miles, the freight business of the company had stopped increasing, but the long-haul business is continuing to grow. He considered that the way to meet this competition was through frequent service. He is sending the freight forward on an hourly basis and said that this is bringing business to the company.

Mr. Walker laid great emphasis upon the view that it is wrong to consider that buses should not be permitted to operate in territory already served by an electric railway. Such a theory is not sound. If the buses can operate in territory already served and pay their proper part of the public burden, then if the electric line cannot continue in business in the face of this competition it is obsolete and ought to go out of business.

B. W. Arnold, Oshkosh, expressed the view that there is little to fear from jitney competition in city service, as it has been pretty well established that the jitneys cannot live. The competitive interurban bus, however, is a different proposition and the amount of money it earns is dependent upon how much business the electric line permits the bus to take away from it. He told of an experience with one bus line which was in competition with the electric interurban line operated by the Eastern Wisconsin Electric Company.

These buses had been operated out of the terminal cities just ahead of the interurban. They would pick up passengers at the interurban terminal and cut in ahead of the cars and delay them while the buses picked up passengers at points along the route. This practice led to a number of rather bad accidents, and some encounters between trainmen and bus operators. This all culminated finally in an ordinance in Oshkosh which required that bus operators should have a permit. The City Council thereafter issued permits to non-competitive bus lines, but not to competitive lines. Mr. Arnold then succeeded in inducing the competitive bus operators to give service into territory otherwise unserved, offering full cooperation of the interurban line in that kind of operation. This plan was carried out and railway and bus are now working together rather than in competion.

R. M. Howard, LaCrosse, Wis., expressed the belief that the old law of the survival of the fittest is going to obtain. All the railways can ask is that the bus be maintained on an equal basis of responsibility and obligation to the public and then let the best man win. The buses must expect to pay some kind of a tax to cover the destruction of the roads over which they operate.

Mr. Munger, Milwaukee Electric Railway & Light Company, told how this company has placed buses in operation over the 18 miles of concrete road between Milwaukee and Waukesha paralleling the interurban line and in competition with independent buses. The fare charged on the company's buses is the same as that charged by the independents, which is lower than the railway rate. The railway's buses are operated on the same schedule as the independent buses and are now carrying about an equal number of passengers. In other words, if the company had not started the operation of buses, the independent bus lines presumably would now be carrying double the number of passengers which they actually are hauling.

Mr. Munger spoke about one bus line which the Milwaukee company has been operating for about four years, connecting Lake Geneva with the end of one of its interurban lines and giving a service not otherwise provided. This bus line has done very well and now the company is considering the installation of bus service beyond the ends of other interurban lines, first to bring further business to the interurban lines and second to keep independent operators out. One thought that has been in the minds of the railway company in going into the bus business is the probability that the authorities would more quickly attack the railway company to force a proper payment for the use of the road, and any restrictions that resulted would, of course, apply to competitors as well. The combination of independent buses and company buses both in competition with the interurban line to Waukesha has of course seriously affected the revenue of the railway.

N. C. Rasmussen, Wausau, Wis., said that the street railway system in Merrill, Wis., had been discontinued and three light buses substituted for the railway service. This change to buses was made as an alternative to rebuilding the railway system. Mr. Rasmussen concurred in the view of the Milwaukee company that the quickest way to bring the proper regulation of the buses is for the electric railways to get into the bus business.

B. W. Arnold expressed disagreement, saying that he thought the Milwaukee company was probably the only one in the state that could afford to fight buses with buses. He considered that the proper way to go about this was to give support to a bill before the Legislature which would bring about an equitable distribution of taxes over buses and other means of transportation. He contended, however, that the railway companies should get into the bus business to provide a feeder service for the railway lines now operating, but he thought that for the railway to get into competition with itself was just inviting the sheriff.

Selling Transportation

After a brief discussion of the field of the trolley bus, the discussion turned to the subject of ways and means to merchandise transportation. All who took part in this discussion emphasized the importance of good service. Mr. Burch, Waukegan (Ill.) city lines, illustrated the point by saying that in 1918, when large double-truck cars were operated on a twenty-five-minute interval, 2,000,000 passengers were carried. During 1921, as a result of an eight-minute headway during non-rush hours and a four-minute headway during rush hours, with service given with one-man safety cars, the number of passengers carried was 4,500,000. This increase was the more convincing because it had been made in spite of the closing down of the Great Lakes Naval Training Station, which had been a heavy contributor to traffic on the lines in 1918 and 1919. Jitney competition also disappeared with the improvement in service.

Dean Treat, Standard Oil Company, having for many years been a railway operator, spoke of the value of having an outsider criticise the service given by the company. He said that the man on the ground is so close to his problems that he does not realize the faults as readily as one from the outside. He spoke also of the great desirability of having superintendents and inspectors get out and ride the cars during the peak periods.

Ross W. Harris, Madison, Wis., spoke of the great improvement in public relations which comes from a public understanding of the service provided and emphasized the importance of this understanding as a merchandising asset. To illustrate the point, he reviewed the arrangement between company and city in Memphis, Tenn., and told how excellently the plan in effect there, which embodies a city representative and a company representative and himself as neutral, for working out all problems in connection with the local street railway service.

Mr. Warwick, Green Bay, Wis., said that the way to merchandise transportation is first for the company to sell the business to itself and then sell it to the employees, who act as the salesmen to serve the public. Keep the merchandise for sale constantly exposed to the convenience of the public so that the people can partake of it as often as they will and be pleased. This means a smooth roadbed, clean, comfortable cars and trainmen who are courteous and appear to be real, civilized fellows. Trainmen should be taught to study their patrons just as a clerk in a store studies his customers. The one-man car operator has many duties to perform, so that he needs to be highly trained not only as an efficient operator but also how to treat people who want to buy a little of the service. One of the principal duties of the superintendent of transportation now is to revamp the minds of the trainmen who have gone through this long period of inflation and get them to know that the people of America must now be treated with consideration and given full value for the money received. The Green Bay company is using a series of car cards placed on each bulkhead and changed twice a month on which the caption "Street Car Movies" appears and a short advertisement. The text of these advertisements is designed to have a good appeal to patrons and at the same time to get trainmen to conform to the same ideas.

Rates Should Include Demand Charge and Haulage Charge

F. W. Walker, in speaking of merchandising transportation, said that in addition to good service, the basis of charge should be so arranged as to take into account a demand charge and a haulage charge. He said it would be considered ridiculous to charge twice as much to haul freight 10 miles as to haul it 5 miles. The same sort of rates ought to apply to passenger haulage, for the long-haul passenger should not be required to stand the loss on the short-haul passenger. The long-haul passenger should be carried for less per mile. In working out these ideas and in trying to provide rates to meet the competition offered by the Chicago & Northwestern Railway, motor buses and private automobiles, the company has in effect the following rates: A 1,000-mile book at 2 cents a mile, a twenty-five-ride ticket at 2¼ cents per mile, a single ride ticket at 2¾ cents per mile, cash fare of 3 cents per mile, a monthly forty to sixty-two ride ticket with a rate graduated from 2 cents per mile for short haul to 1.65 cents per mile for the longest haul. In addition to these rates, the company also has a special clergymen's rate, special rates for conventions and round trip party rates. It makes a particular point of

having the tickets of all denominations on sale at convenient locations. In addition to the railway offices, they are sold at stores and at various points in all cities along the route, in order to make it as convenient as possible for patrons to buy transportation, the theory being that the easier it is to buy transportation the more they will buy. A 100-mile book carrying the same rate as the single-ride ticket is also provided for the convenience of farmers who board cars at crossroads and cannot buy a ticket.

Similarly, the company has made its merchandise freight rates to favor the good customers. The farmer who ships milk every day gets a better rate than the intermittent shipper. A shipment in excess of 5,000 lb. to any one consignee carries a rate lower than that for smaller shipments. There is a special commodity rate for standard packages. There is a rate for merchandise having large bulk and small weight. Rates are also provided to include collection and delivery at any point, or for haulage only. There is a seasonal rate whereby the winter cost of handling shipments is put on the winter business. The summer rate applies during the nine months from March 15 to Dec. 15. Thus the farmer who ships his milk by interurban all the year around gets a 5-cent rate for nine months and a 15-cent rate for three months, averaging a cost for the year considerably under 30 cents. On the other hand, the farmer who ships by truck all summer and falls back on the interurban in the winter pays the high rate of 45 cents, or a figure corresponding to the cost of handling his business.

Mr. Walker said that one of the things that has been very effective in bringing business to the Milwaukee Northern Railway is the prompt settlement of claims. All claims are approached by the claim agent as though the shipper would not have put in the claim if he did not have one. The company assumes that the employees are at fault and are trying to cover up. If investigation finally develops the fact that the shipper is at fault, then a conference with him is arranged and all of the cards are laid on the table and then he is informed that the company wants to pay him if he feels that he is entitled to something. Mr. Walker says that nine out of ten claims thus refused by the company are withdrawn. But if the company is in any way to blame, the claim is promptly paid and never refused. This policy has induced very good feeling toward the company and has been a strong influence in holding customers who were solicited by other transportation lines. It has the result that if a customer is thinking of quitting the interurban line, he at least gets in touch with the interurban line first, and Mr. Walker says that if it is possible to make some special arrangement to hold his patronage, this is done.

No profit on the pick-up and delivery service provided by the railway at all points is charged the shipper, except for a very small margin to cover any possible error in the estimate of costs. In making up the rate on express matter, a demand charge is included in the figure for the first 100 lb. The rate on the first 100 lb. is then higher than the rate of the American Railway Express Company, and for a small package weighing 10 to 20 lb. it is 50 per cent higher. But by making up the charge on this basis, it is not necessary to penalize the long-haul shipper to make up for the losses on the short haul. Mr. Walker says that the earnings of the Milwaukee Northern Railway, resulting from the merchandising effects of these passenger and freight rates, have shown a very rapid growth. Less than 12 per cent of the total passengers on this road pay cash fare, while more than 88 per cent are using some form of ticket.

On the morning of March 23 the electric railway men were taken to the Cold Springs Shops of the Milwaukee Electric Railway & Light Company in one of the new twenty-five-passenger White buses and, after inspecting the shops, were brought back to their hotel in one of the one-man, two-man, double-truck safety cars, of which the company has a number in operation. Points of particular interest in the shops were the system of spray-painting cars, which has reduced the cost of painting by nearly 50 per cent. A new system of reclaiming oil that has recently been put into effect was said to be returning good oil at a cost of about 10 cents a gallon. The oil is reclaimed to within the limit of 10 per cent of the original specification and the average actually accomplished is within about 4 per cent.

Interest was also shown in a wheel lathe, which by a change in the pinion had been speeded up so that eighteen pairs of wheels are turned a day, requiring one machinist and part of the time of one helper. The same helper also assists on the wheel press adjacent. At a very well attended and much enjoyed banquet on the evening of March 23, P. A. Grau, Milwaukee, acted as toistmaster; the Rev. M. S. Rice, Detroit, Mich., was the principal speaker.

Among the papers presented before one of the joint sessions were two on the controlling elements in rate making and valuation of utilities for taxation purposes respectively. One is abstracted below; the other will be covered in a later issue.

Value of Service as an Element in Rate Making*

The Application of the Service-at-Cost Theory Is Decreased in Proportion to the Essentiality of Public Utility Service and Must Be Abandoned If It Unduly Restricts the Use of Service

By Lewis E. Gettle
Member of Wisconsin Railroad Commission

THE limitations of the cost-of-service doctrine may be discussed generally as limitations imposed by the value of the service. In a sense the question of the value of the service is the old doctrine of charging what the traffic will bear. Rate and price fixing will always break down when it reaches a point where it restricts the use of the product.

The strict application of the cost-of-service theory, which has been attempted in many cases, seems to me to result in part from a failure to analyze the conditions which have led to the present development of the public utility business, and to some extent from a misinterpretation of the essential nature of that business. The most fundamental form of public utility is the public highway. Nowadays it is very rarely that we find a public highway supported on a toll basis. This public utility is supported by general taxation with no attempt to distribute the cost in proportion to its use. An effort in this direction was defeated in Wisconsin at the last session of the Legislature when the bill for assessing automobiles for highway purposes failed of passage. The vote of the Legislature may be considered an expression of the general public attitude toward the distribution of the cost of highway maintenance, and this attitude does not countenance a distribution of that expense on a cost basis. If our highways had been developed on a toll road basis it is altogether probable that we would have had a rate scheme more or less closely approximating the cost of the service. To some extent we have evidence of this in the rates on toll bridges in Wisconsin at the present time, although it must be admitted that the schedules are very imperfect. Another stage in the development of the municipal public utility is also represented by the public sewer system.

The closer the public utility service comes to being an absolute essential, not merely a convenience, the greater must be the departure from the cost-of-service theory of meeting its expenses. The modern waterworks system, also, illustrates this principle. The proportion of water rate schedules have been fixed quite largely by custom, which is merely another way of saying that they have recognized what experience has shown the different classes of service to be worth in proportion to each other. The same conditions which have resulted in the support of highways and sewer systems out of general public funds apply to a considerable extent to waterworks systems. I think it may be safely stated that when the application of cost-basis rates restricts the use of the service below the level necessary for the maintenance of public health, the cost-basis rate must be abandoned. Probably we would be safe in going much farther than this by saying that when a cost-

*Abstract of paper presented before joint meeting of Wisconsin Gas Association and Wisconsin Electrical Association, Milwaukee, Wis., March 23, 1922.

basis rate seriously interferes with that degree of development in the use of conveniences which we associate with modern civilization, the cost basis must be modified and adjusted and the value of the service must be recognized as an element in rate fixing. The past two years have given us some illustrations in Wisconsin of the limitations imposed by the value of the service upon rates for gas.

It is highly important that the public utility company distinguish between the dissatisfaction which grows out of misunderstanding or agitation and that which grows out of the limited value of the service. The first cause of dissatisfaction can almost always be corrected where it is intelligently handled. The necessities of the past few years have led to rate increases in Wisconsin for individual companies involving a great many thousand customers almost without a single complaint of the results, because the commercial relations of the companies were such that misunderstandings were cleared up and prejudices removed.

Analysis of the rate situation so that where any dissatisfaction exists the utility may determine in what degree it is due to the limited value of the service is a first essential to proper commercial relations and to the proper development of a rate schedule. Despite all that has been said in favor of the cost-of-service basis, the utility which fails to recognize that in developing its system for the service of a municipality it has assumed the obligation of serving the residents of that city in the broadest possible way.

Costs are of great importance and their complete analysis is almost fundamental to the construction of a rate schedule, but a schedule which recognized only costs would ordinarily be unworkable and unsatisfactory. A rate schedule must be based upon judgment, experience and common sense as well as upon costs. I want to stress the limitations upon the use of costs, in the belief that a realization of those limitations makes the intelligent and workable use of the costs more likely of attainment.

Business Economics Holds Europe in Pawn*

A Review of Conditions in the Principal European Countries Based on a Three Months' Trip Recently Completed—The Relation of the United States in the Economic Rehabilitation of These Countries Is Outlined

By Brigadier-General Guy E. Tripp
Chairman of the Board of Directors Westinghouse Electric & Manufacturing Company, New York, N. Y.

THE political leaders of Europe, the military and naval caste and the diplomats have had their day at juggling with the balance of power and now it is settling day, and furthermore, settlement with plodding economics cannot be made in their debased currency.

Of course, I have but little doubt that wars will be, in the future as they have been in the past, the European method of settling international differences; in fact, all indications point in that direction. The enmity between France and Germany is more deep-seated now than it has ever been and it casts an ominous shadow on the future, and the menacing situations all over southeastern Europe do not forecast a long period of peace.

However, one would think that all Europe is too sick to fight again soon.

It would seem necessary for her to inaugurate a reign of sound economics before she can get well, and we American business men are particularly interested in observing how she is progressing in this direction because her disease is contagious.

I have recently visited Germany and find a curious condition of affairs. To a casual observer the country is enjoying great prosperity. Factories are running to their capacity. Railroads and street railways are being improved. Building trades are brisk and there is no unemployment. Workmen are more efficient than before the war and the output per man-hour is greater than the pre-war average.

I visited several of the largest manufactories in Berlin and observed that they had plenty of raw materials, including copper. The wages paid were about one-sixth the rate paid in the United States. Their export business constitutes but a small portion of their business, home consumption being responsible for their activity, and demand was so great that many manufacturers were extending their works.

The impression which I received was that Germany is improving and building itself up as a national industrial machine which will be a formidable competitor in the world's markets when it is in the position to enter these markets.

But the reverse of that picture is the almost hopeless condition of her State finances.

The mark is worth less than ½ cent in our money; in other words, German paper money is almost worthless. The people themselves don't like to take it. Let me give you an illustration. I was unable to secure rooms in any hotel in Berlin because the city was crowded with visitors on account of a race meeting and automobile show, and I went to a boarding house. When I left, the landlady asked me to pay her in American money, saying that, if I had none with me, she would prefer to wait and have me send it to her after I returned to New York. She said she was saving all the America money she could get. Here is perhap a case of a debased currency too sic to get well; people may soon refus it altogether and thus hard money— gold or siver—be gradually introduce into circulation. This would, of course involve repudiation of the national deb and industrial ruin.

In the meantime Germany is ap parently enjoying prosperity; an wages, while low in comparison wit ours, are constantly on the increase but people with fixed salaries are suf fering badly from the depreciation o the currency. Of course, the situatio is enormously complicated by the in demnity demands which are admittedl more than she can pay. Notwithstand ing she is wealthy as national wealt is usually measured—that is to say, i farm lands and buildings, well-buil cities, railroads, factories, etc.—it i wealth which is not available to pa foreign debts, except by the method of the Middle Ages when the victor pu the conquered population to the sword— men, women and children—and seize the country for their own.

The Germans do not admit that they were conquered in the first place; and in the second place, if they were conquered, they still have their wealth which under existing conditions is wealth only where it stands—that is to say, in their own hands. She cannot pay the indemnity as it now stands therefore there has been no progress toward a solution of her fiscal problems. Germany, in short, is all dressed up and nowhere to go.

France is not an industrial nation in the sense that the word is used to describe Germany, England and the United States, and its economic problem is more nearly a state problem than in case of England or Germany; that is to say, if her government finances could be put in sound condition, her troubles would be largely over because she can support her population without a large export trade.

France is a great fertile plain with the finest peasant population in the world, but they don't like to pay taxes. Perhaps they think they paid enough taxes to support the brilliant people of the Court of Louis to last for two or three centuries. Be that as it may they don't like to pay taxes, and the French statesman is reluctant to assess them.

The French also like their taxes in homeopathic doses, which accounts for the municipal tax frontiers.

Every large city has its custom office at city limits and imposes a small tax upon goods being brought into the city. For example, if you take a drive out of Paris, you must measure the gasoline in your tank and pay a duty if you come back with more gas than you went out with. The French hate taxes so badly that their system of assessment and collection is a very sketchy one.

Then, of course, France expects a

*Abstract of address presented at the annual dinner of the New England Street Railway Club, Boston, Mass., March 2, 1922.

arge indemnity from Germany and I an assure you that she intends to get ll that Germany can pay; and I don't lame her for that. Until she is satis- ed that the maximum is forthcoming he will continue to maintain a large rmy, consequently her expenditures till largely exceed her income.

France has not made any substan- ial progress toward balancing her udget, but her currency is not so hope- essly debased as that of Germany. f she could increase her taxes, or ather actually collect them, and re- uce her expenditures in order that ncome should at least equal the outgo, hen it might be possible to peg the ranc at a stable value and stop its uctuation, which is so deadly to busi- ess. That is to say, if she had a gold eserve which would permit of the re- emption of the paper franc at 10 cents, or example, let specie payments be esumed at that figure. It would be bitter pill to swallow and might equire a scaling of her internal debt; r, in other words, partial repudiation; ut it would result in a stable cur- ency.

Italy has, in addition to her debased urrency and her deficit, the problem f over-population in a country of hich a very substantial portion is ountainous and cannot be cultivated, lthough even you New England armers would be surprised to see what n Italian can do with a rocky moun- inside.

A large emigration from Italy to outh America may be one of the nswers to over-population.

I have no figures, but my impression as that the clergy, military and naval fficers, soldiers, police and holders of ffices in government bureaus consti- uted quite a large proportion of the opulation. The financial burden of upporting these non-producers must e tremendous. Italy's currency fluc- uates in value to the detriment of usiness, and she might also adopt the lan of stabilizing it by establishing gold redemption value of the lira at ss than its old parity, but the opera- on would be a more painful one than n the case of France because her urrency is more debased.

It is characteristic of England that e should be the first to make real rogress in setting her house in order. er problems were and are very formi- able, but every little while you see her ally settling something and then rning her attention to something else. er action regarding Egypt is the test step. I was in Egypt in Feb- uary of this year and found there a ncerted cry of Egypt for the Egyp- ans.

One can understand the racial instinct be free from domination of another ce; but, when you see the great ings the English have accomplished that country and the relief that they ve given to the native who was al- ost literally taxed to death under the le of the Khedives, you wonder that they would dare to reinstate the old régime. I couldn't discover that Eng- land had interfered with their social customs.

Great Britain met the situation through an arrangement under which the Egyptians form their own govern- ment and run their own political affairs, with a provision for British protection of her investments and the establish- ment of a kind of Monroe Doctrine. In spite of her Irish problem, her Egyptian problem, her Indian problem and her very perplexing home industrial problem, the exchange rate on the pound sterling is steadily rising and there is every reason to believe that it will soon be established on the pre- war parity of $4.86. She is taxing incomes heavily, perhaps more heavily than any other nation in the world, and will probably balance her budget next year. It is truly a wonderful showing, and she is entitled to the respect and confidence of the world.

When the Versailles conference carved a lot of new little states out of Germany and Austria on the ideal- istic theory of self-determination of peoples, it at the same time set up an equal number of new trade barriers and the flow of commerce became more clogged at the very time when an easier flow than ever was demanded.

All these new countries established custom offices on their frontiers and in addition to all this the old countries inaugurated Chauvinistic policies and raised new tariff barriers to encourage home industries. If trade could be freed from these artificial restrictions to a large extent, it would greatly help the situation.

The European situation would be in- teresting to us if we were merely onlookers, but we are more than spec- tators. We are vitally interested both as a creditor and as a commercial nation. At this moment there is no public sentiment here which would sup- port the cancellation or reduction of the foreign debts which are owed to us, and I think public sentiment is right. It might be a wise policy for us to waive interest payments, but it seems to me that until Europe has worked out some definite plan for stopping her financial toboggan it would be idle for us to attempt to stop it by interposing a surrender of our claims only to have its benefits swept away by further deficits. If the time should come when a compromise of the amounts due us would clearly help a solvent and eco- nomical but overburdened people, then I should not expect the United States to insist on its pound of flesh. How- ever, it is easy to generalize. The application of any remedy whatever is very difficult, and much must be left to the inexorable workings of economic laws; in fact, about all that can be done is to remove the obstacles in order that these laws may work freely.

In my opinion, the United States has nothing to be ashamed of; we went into the war with no thought of mate- rial gain. We did our best and did a great deal, and we came out of it with clean hands. We paid our own way and lent our wealth liberally, and we cannot now be justly criticised for waiting until Europe has shown its ability and intention to live within its income before we compromise our loans. I do not for a moment say that she is not doing all that she feels she can safely do to accomplish this end. But I do say that her large standing armies and navies and expensive gov- ernment bureaus, even if they are necessary, are not the character of expenses which this country feels called upon to finance.

The Public You Serve Is Your Judge*

The Mass of the American Public Is Essentially Fair and Generous— Its Judgment as to Satisfactorily Adequate Service Cannot Long Be Wrong

By E. MARK SULLIVAN
Corporation Counsel, Boston, Mass.

YOU have your difficulties, and they are with the great public which you serve. The motto, not only of you railway men but of every man dealing with the public, is "Service," and no service, however adequate, essentially adequate, can be satisfac- torily adequate if the public fails to appreciate it.

You men have for years permitted yourselves to be regarded as persons engaged in the chief enterprise of rob- bing the public through the instru- mentality of the cars and railways which you operate. You have failed adequately to take the public into your confidence. I have an abiding con- fidence in the great mass of the common people. They have never been ultimately, nor for long time, wrong.

When the great Washington came here to New England to take control of the Continental troops the most he sought or hoped for was conciliation with the mother country on terms of honorable peace and conciliation. But public opinion ruled otherwise. When that vast territory we know as Louisiana was offered us for little or nothing by France the great Jefferson was opposed to accepting it, and only yielded because he listened to the voice of the great mass of the common people. Lincoln himself came to Wash- ington as the newly elected President, hoping only that slavery might be re- stricted as to its territorial extent, and finally became the Great Emancipator only because he had a perfect sense

*Abstract of address at the New England Street Railway Club, Boston, Mass., March 23, 1922.

of the persistent demand of the common people of the country. Even that other man who in time became his successor —Woodrow Wilson—became great because he in the end listened to the voice of the common people.

BOSTON ELEVATED SUCCESS DUE TO GOOD PUBLIC RELATIONS

The American people are fair. They are by every instinct generous. I wish to pay my tribute tonight to Hon. James F. Jackson and his associates for the efforts which they are making to give to this great city a decent and adequate transportation system. And they are enjoying at the hands of the people of Boston today a sympathy and an intelligent tolerance that I believe few railway managers ever enjoyed in recent years. And the reason of it all is that no man goes to their office inquiring regarding the economics of that railway system without receiving prompt and generous explanation to every question of inquiry that is put to them.

The public are generous. They want to understand your problems. Why should they be retained within the inner offices of some dark chamber, as some dark mystery? The minute the railway employees say, "We want greater wages," the generous heart of the people says, "Give it to them," even though the fact still remains that the great mass of the people are themselves employed at wages which are perhaps extremely inadequate for a decent living, and the wage which you are paying these very men who seek for more is far in excess of what they are getting. That is born not of an economic understanding of your difficulties, but of a generous impulse of the heart. Come to them, you railway men of New England, come to them frankly; speak to them often; bring to your council boards men who are fairly representative of them, not of the railway employees, but of the great body of the public itself that you seek to serve. Speak to them frankly, not in those confusing tables of statistics that hardly anybody can read who has not helped to construct them within your counting rooms, but speak to them in simple terms, and you will find that they will give to your messages of frankness a generous response which will be encouraging to you, that will make your offices things of honor to yourselves and others instead of things of infamy as they are too often viewed by the great mass of the common people.

You are too often damned in case the public you serve are unreasonable, but it is because they do not understand. We ask for so much from our municipalities, and next to that from our public service corporations, not thinking that after all there is a countervailing proposition that must follow, until finally we find the whole economic system oppressive. After all, all these things come out of the loins of the common people. They are not quick to understand it. Indeed, most of these economic problems are so involved that oftentimes even you don't see clearly the proposition that lies immediately before you. Then how can they? But, be generous with the great mass of the common people. They have always been right in the history of this country. They have instinct for right. They have a nat impulse for generosity. They wo deal generously with you. I feel th after all there is applicable to yo situation with relation to the pub what was said and is often said by t French people: "To know all is understand all."

Possibilities of Developing Chicago's Transportation Facilities*

Chicago Needs Some Subway Facilities Now and a Comprehensive Syste Ultimately — Tremendous Immediate Betterments Possible in Existing Surface and Elevated Lines Prevented by Condemnatory Municipal Sentiment—Buses Rapidly Becoming a Factor

BY HARRY L. BROWN
Western Editor ELECTRIC RAILWAY JOURNAL and BUS TRANSPORTATION

THE whole aspect of the transportation system in Chicago could be changed almost over night if the present destructive, insincere, condemnatory sentiment toward the traction companies as fostered by the municipal authorities were to be replaced with a spirit of co-operation and fair dealing. The inadequacies of the present facilities may be almost wholly attributed to the inability of the companies to finance improvements, and this inability is altogether a result of the belligerent attitude just mentioned. The real marvel is that so much service is given and that so much progress has been made by the present companies with the limited facilities at their command and under the conditions prevailing.

The efforts of the city hall have been concentrated on an endeavor to get a 5-cent fare, despite the fact that the courts have repeatedly held this to be impossible. As to the subway project, sufficient money has already been paid into the city's traction fund by the street car riders to pay the entire cost of a stretch of subway extending from Chicago Avenue to Sixteenth Street. This, if placed at the disposal of the present elevated railways, subject to proper rental charges, would make possible an improvement in service of most important consequence to every section of the city now served by the "L" lines.

One of the greatest handicaps to any increase and speeding up of elevated service is the fact that the usable capacity of thirteen tracks is limited to the capacity of but two tracks through the loop. The subway suggested is the initial step proposed by the Traction and Subway Commission in its very able plan for a comprehensive subway, elevated and surface lines system. This initial piece of subway would open the way for a tremendous improvement in "L" service, provided again that the fundamental credit of the companies were restored through proper attitude on the part of the municipal authorities and the people generally, so that the additional equipment needed could be financed.

If this initial step in the subway pl were completed, it would so relieve t situation that the further subway co struction could follow along in a norm program as needed without burdeni the city beyond its financing capaci or beyond an amount that could carried by the resultant earnin There has been much discussion as the best location for the north a south bore of the initial subway throu the central business district. The Tra tion and Subway Commission recor mended that it be placed under Sta Street. With the recent very wonde ful development of the Upper Michig Avenue district, there has been mu agitation for putting the initial bo under Michigan Avenue. My own opi ion is that it might better be put und Wells Street in order that it may nearer to the future east and we center of the loop district.

The first stretch of subway north a south through the loop district co nected up with the elevated syste would make it possible to relieve th elevated loop of all of the north a south trains, thus making the enti capacity of the loop available for th west side elevated trains. This wou increase the capacity of the whol elevated system substantially, an afford an improvement in service tha would be very notable.

The next logical step in subway de velopment would be a pair of east an west subways for the use of servic cars. This would gradually relieve th vehicular congestion in the loop di trict and make it possible to cut prob ably fifteen minutes from the runnin time of the west side surface cars.

Chicago is in need of some subwa facilities now, and a comprehensiv subway system ultimately. But ther are tremendous possibilities of improv ing present traction facilities if, withou any subway construction at all, th present companies were in a positio to finance betterments. There are number of improvements of very far reaching effect in the minds of the loca traction officials which would be carrie into execution if they could be backe up with the assurance that the furthe investment in the properties would no

*Abstract of paper presented at Mid-winter Convocation of Engineers, Chicago, March 22, 1922.

jeopardized in the manner in which te present investment has been. At te same time the service now being ndered and the general property of te companies is excelled in few if any er cities. Our local companies are uipped with the brains and the will t give Chicago the greatest transpor- ion service known to the art, if given air opportunity.

In a general consideration of the nsportation facilities of Chicago, ere is a new kind of transportation t has reached such a point of de- opment that it merits very serious sideration. I refer to the use of tor buses. Chicago already has the icago Motor Bus Company operat- it on the north side, which is now rying nearly ten million passengers p year and operating sixty buses 50,000 miles a year. This is only a ginning, for the operations of the pany are limited to the north side, ugh plans are formulated for ex- ding the service to the boulevards of south side and possibly the west e. The Depot Motor Bus Lines, Inc., operating a special service for com- ters and shoppers between the Union Northwestern stations and the te Street shopping district. This pany carried approximately 600,000 sengers during the year 1921 with equipment of eleven buses. Several lines are operating from terminals he elevated lines out into the neigh- ing territory beyond. The Edge- ter Beach Hotel is operating a regu- y scheduled bus service for the primarily of its own guests.

There are a number of other routes he city over which buses could be rated to provide a service that ld be much appreciated. There is the possibility in the comparatively r future of the establishment of t may be called rapid transit motor service. This would consist, for mple, of a de luxe non-stop, high- ed bus service between the loop and h thickly populated centers as the son Avenue district, the Sixty-third eet district, or some of the west side ers. A necessarily high rate of would be charged and it would act, in the main, people accustomed driving their own automobiles and e willing to pay for a service com- able in speed and comfort with of their own car, though cheaper, relieving them of the down-town king nuisance. Such a service could be said to compete particularly existing railway lines for it would te largely its own traffic.

milarly, the bus lines already in ration may not be considered to be y in competition with the rail ems of transportation. Strictly king, they may haul some people would otherwise use the street cars levated lines, but in large propor- their patronage comes from a y created traffic which did not exist his section before the bus service inaugurated.

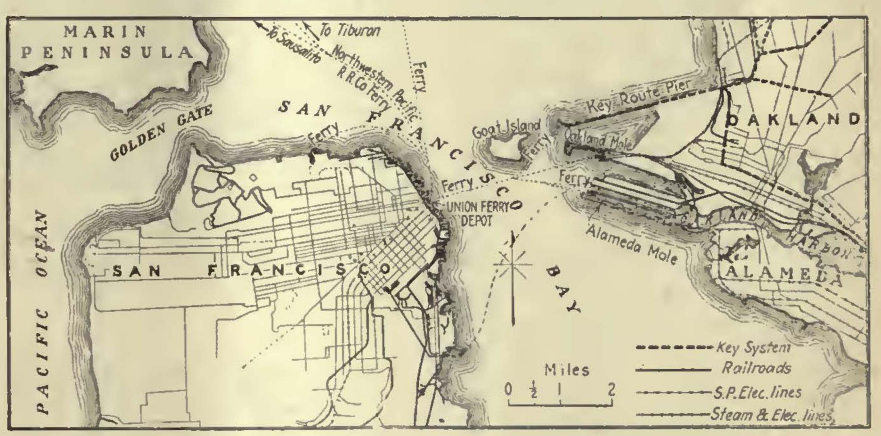
s long as all such bus lines are ated so as to be supplementary or complementary to previously existing transportation lines, they should likewise be given every encouragement. The development is economically sound, as it increases the means of communication, but any substantial duplication of service is dangerous not only to the older transportation agency but to the new one as well. Chicago has had one example of the effect of duplication of service in the Oak Park "L" and the lesson should not be lost.

This leads up to the great desirability, from the standpoint of the people, of having all of the transportation facilities of any one community under the control of one transportation organization. That is the practice in many European cities. Unified operation of all the elevated, surface and subway rail systems and surface bus lines assures the use of each in the field for which it is particularly suited and results in the most complete service at the lowest cost. It brings about a co-ordination of facilities and an efficiency in their use which cannot be gained through independent operations. Hence without attempting to go into detail, an enlightened settlement of Chicago's transportation problem would dictate that an early consideration of all transportation facilities should be effected. This, of course, means the working out of a contract between the city and the transportation companies which will insure good service at the lowest cost to the people of Chicago and the opportunity to the company to earn a return on the investment which will continuously attract to the business the large sums of money needed to extend its facilities in keeping pace with the growth of the city.

Key Route Discussed by W. R. Alberger

At Meeting of Pacific Traffic Association Vice-President of San Francisco-Oakland Terminal Railways Tells of the Goat Island Terminal Project and Gives Operating Data of Railway System

W. R. ALBERGER, vice-president and general manager San Francisco-Oakland Terminal Railways, read a paper entitled "The Goat Island Terminal Project" at the meeting of the Pacific Traffic Association held in San Francisco on March 7, 1922. This title does not indicate the scope of the entire paper, because after telling all that he could about the project of his company to extend its lines to Goat Island in San Francisco Bay, Mr. Alberger gave his hearers a great deal of general information regarding electric railway operation and the operation of the "Key System" in particular.



SAN FRANCISCO AND SURROUNDINGS, DRAWN TO SHOW RELATION TO GOAT ISLAND TO EXISTING TRANSPORTATION FACILITIES

First as to the Goat Island proposition, he traced the history of the island and said that it has long been looked upon by railroad engineers as a proper terminal point for transcontinental railroads. As late as September, 1920, Admiral Joseph F. Jayne, commandant of the Twelfth Naval District, outlined a plan for a terminus at Goat Island by the extension of a trestle or pile bridge from the Key System Mole to the eastern side of Goat Island; thence through a tunnel or by a track skirting the island around to the northwestern side, at which point it was proposed to build a ferry terminus.

In 1900 when the Key System was first projected, its promoters had in mind the development of Goat Island as a terminal, but the earthquake and fire of 1906 threw such an unexpected burden of traffic upon the Key System and its affiliated street car lines that the plan of making the island a terminus was abandoned. On Feb. 9, 1922, however, the San Francisco-Oakland Terminal Railways filed with the Secretaries of War, the Navy and Commerce an application for permission to do certain things toward creating a terminal. It also requested the government to establish bulkhead and pierhead lines. If a favorable decision is received the company will proceed along the following lines:

1. Extend the present solid fill as far as the government will permit.

2. Build from the end of that fill to the vicinity of the northeast corner of Goat Island a trestle or bridge, or

trestle and bridge, and upon the extensive shoal lying north of the island create a terminal by surrounding a portion of the shoal to be used with a loose rock wall and then, by dredging the sand from the bottom of the bay to the inclosed space within the rock wall, create the terminal site.

The procedure outlined is similar to the method adopted in the construction of the solid fill a few years ago. The large ferry terminal would then be established near the northwest corner of the island. The plan is to create a union terminal that can be used by the company's lines or any other lines, electric or steam, and also by automobiles.

Operating Facts Regarding the Terminal Railways

Leaving the subject of Goat Island, Mr. Alberger took up the more general one of street railway problems, illustrating them from the experience of his company. For example, in the matter of taxes those of the company increased in 1921 over 1920 nearly $50,000 or almost 15 per cent. He pointed out also that a street car company is obligated to furnish ample transportation facilities on its different lines, a sufficient number of cars at proper headway to accommodate the traffic. His company operates every car upon a definite time schedule. A careful check of car operation during twenty-four hours indicated that 92 per cent of all the cars pass a given central point exactly on time.

In 1921 the company carried 111,759,675 passengers with only one fatality, and that not caused by the negligence of the company or its employees. During the year the cars made 16,887,649 revenue-miles, which is equivalent to one car making 2,612 round trips by the shortest route between Oakland and New York, or an average of more than seven such round trips daily. The company had a total of 3,554 accidents, an increase of ninety-three over the previous year. Of these, 2,480 were beyond the control of the company or its employees, and of the 2,480 accidents 2,224 were occasioned by automobiles running into the cars. The accidents over which the employees had control decreased 174 during the year.

Again, electric cars require more inspection and cost more for upkeep than the steam railway cars. They each make hundreds of stops per day, many requiring emergency brake applications and reversals of electric power. On this property in 1921 the cars averaged 181 miles per day. They were inspected a total of 256,798 times and thoroughly cleaned 186,385 times. More than 600,000 windows were cleaned.

Operation of Key System Expensive

The operation of the Key Division of the property, including ferry boats and connecting trains, is very expensive. On this system the rates of fare, he explained, are the lowest, both single trip and commutation, for the kind of service furnished, in the entire world. The average rate per mile, one way fare, for the longest haul of 13 miles, is 1.38 cents. For the average haul it is 2 cents per mile. The average rate per mile for monthly commutation tickets, costing $4.80 for the longest haul, is 0.6 cent, and for the average haul 0.87 cent. The trans-bay rates, both one way and commutation, are not, and never have been, remunerative.

The commissary department of the Key Division during 1921 earned nearly $122,000 net from the operation of its restaurant, news stand and bootshining stand. This was 23 per cent of the entire net income of the division. In other words, notwithstanding the facts that in 1921 nearly 16,000,000 people were carried, that the boats made 39,388 trips, or 113,024 boat-miles, and that 314,560 trains made 3,188,129 car-miles to and from seven different east bay localities, nearly one-quarter of the entire net income of the division came from selling food, gum and periodicals and from shining shoes. The remaining three-quarters came from transporting millions of people according to their desires with the large amount of transportation facilities which were furnished as described.

Convention of Southwestern Association

THE latest bulletin of the convention committee gives formation, supplementary to the appearing in the issue of this p for March 4, regarding the first convention of the Southwestern trical & Gas Association and the So western Geographic Division, N.E. This will be held at the St. Anth Hotel, San Antonio, Tex., May 3 to clusive. Those planning to attend urged to make hotel reservat promptly through the convention mittee, S. J. Ballinger, San Ant Public Service Company, chair The committee has arranged for sp rates at the St. Anthony, Menger Gunter Hotels and can obtain rates at Travelers, Lanier, Crockett, Hut and other first-class hotels.

The convention will open on Wed day morning, May 3, at 9.30 o'cl with a general session in the ballr of the St. Anthony Hotel, and gen sessions will be held each morning ing the convention in the same r The afternoons will be devoted departmental sessions.

American Association News

Membership Placard Sent Out

THE committee on company and associate membership has distributed, throughout the association, copies of an attractive membership card in colors for display in offices. The committee suggests that the card be framed and hung in the offices of member company executives and especially in those of purchasing agents, where it is hoped that it will be a reminder of the advantages of the membership. A reproduction of the card in one color was given in the issue of the ELECTRIC RAILWAY JOURNAL for March 4, page 353.

Rousing Dinner Meeting of the Connecticut Company Section

RAILWAY men from all parts of Connecticut flocked to New Haven on March 21 to attend the first dinner meeting of the Connecticut Company section for the current year. The Connecticut Company orchestra made its first appearance at the dinner, which was served at the Hotel Garde and attended by 176 members and guests.

S. W. Baldwin, of the legal department, presided in the absence of President Chapman. W. J. Flickinger, assistant to the president, opened the program with a report of the Midyear Meeting of the American Association. J. K. Punderford, vice-president and general manager, supplemented the story of the Indianapolis meeting, and explained the local fare situation in the towns of Norwalk and Bridgep

The plan was to call for rep from the division managers, but t was time for reports from only W. J. Kingdon, Stamford division, told of his experience with motor operation, and J. B. Potter, Bridge division, who told of the situatio his territory. The members pre were pleased with this plan of ha reports from the divisions.

The next speaker was H. H. No ELECTRIC RAILWAY JOURNAL, who s of the permanency of the electric way industry, and pointed out the p of the motor bus in relation to ele railway service. President L. S. St the principal speaker of the even then gave a frank and interesting regarding buses and their relatio regular trolley service. He also tr the history of the jitney from the of its inception on the Pacific C Mr. Storrs quoted statistics of op tion of the Connecticut Company encouraged his associates by his st ment that conditions on the prop are improving.

Big Growth for Camden Sect

AT THE last meeting of the P Service Railway company sec Camden Division, the election of new members was announced. meeting was of a social nature, boxing bouts, clog dancing, singing orchestral music. There was also exhibition of feats of strength by "strong man" of the section.

Recent Happenings in Great Britain

South Eastern Railway Electrification—Statement of What May Be Expected Along These Lines in Future

(From Our Regular Correspondent)

ANNOUNCEMENT was made by the chairman, Cosmo Bonsor, to the joint meeting of the South Eastern and the London, Chatham & Dover Railway companies, regarding the long-projected scheme for the conversion to electric traction of the suburban lines of the two associated companies. He referred to the destruction of the companies' short-distance metropolitan traffic by railway and omnibus competition, and said that the revenue obtained outside the metropolitan area was threatened by the extension of road competition.

Ambitious Electrification Project Postponed

Before the war the directors were preparing plans for the electrification of the companies' system within a radius of 20 miles of London. The war postponed the scheme, and at the end of the war government control had so diminished railway credit that it was impossible to raise the capital. The Trade Facilities Act was passed last autumn, and the directors immediately took the opportunity that it gave of asking for a government guarantee as to principal and interest of new capital. They were able to show the government that with seven London central passenger stations they had a splendid position for distributing passengers and would be able to increase development in Surrey and Kent. The proposals met with favorable consideration, and the explanation that it was impossible to ask the shareholders in present circumstances to consent to a direct obligation by the issue of capital was also accepted by the government committee on the subject. It would be necessary to form a construction company. Its capital would be small, and it would not trade for profit. It would have borrowing powers sufficient to cover the cost of construction. The money borrowed would carry the government guarantee both as to principal and interest, and would be obtained on the most favorable terms.

Long-Term Leasing Arrangement Proposed

The works would be the property of the construction company and when complete would be let to the two associated railways on lease for twenty-five years at a rent sufficient to repay the capital and interest at the expiration of the lease, when the works would become the property of the two companies. The opportunity was unique, the arrangement good, and the figures as to results were estimated to be extraordinary. Taking a very moderate increase in the number of passengers, along with an ascertained decrease in working expenses, the directors estimated that in the second year of working not only would the rent be earned but there would be a good margin of profit which would increase as years went on.

On Mr. Bonsor's announcement it may be remarked that the arrangement which he outlined is a peculiar one so far at any rate as British railways are concerned. I believe that at present the South Eastern and Chatham Companies do not possess Parliamentary powers to use electric traction, and that the plan outlined by Mr. Bonsor will enable the work to be put in hand without the delay of getting Parliamentary powers. The Ministry of Transport has power to issue orders to facilitate railway development, and evidently these are sufficient to meet the present case. The Ministry, I understand, made an order some time ago. The difficulty of raising capital will be overcome by the government guarantee. Probably it is on account of these special arrangements that the difficulty encountered by the London, Brighton & South Coast Railway in raising loan capital (as explained below) has not emerged.

Electrification to Continue as Circumstances Permit

The chairman of the London-Brighton & South Coast Railway, C. Macrae, made it quite clear at the annual meeting of the company that while the electrification of the London suburban lines would be continued as circumstances permit, the conversion of the main line to Brighton is still a matter for the future. He said that the extension of the electrical system to the railway from Balham Junction to West Croydon, which passed through a congested area, was nearing completion, and it was hoped that this section would be open for electric traction by Sept. 1 next. This section, however, formed only a small part of the whole scheme which had been prepared by the company's consulting electrical engineer, Sir Philip Dawson. The full scheme had been submitted to the Ministry of Transport, and it included the electrification of the whole of the suburban area as well as the equipment of the main lines to Brighton and Lewes, with which in course of time it was hoped to proceed. The outlay of capital would be very considerable, and as the present time was not opportune for raising money the directors had determined that until the times improved extension of electrification should be confined to those sections of the suburban system where the needs were greatest. The grouping and amalgamation of companies, as provided by the Railways Act, 1921, was having a paralyzing effect on schemes of electrification. The London & Brighton Company was to be amalgamated with the South Eastern & Chatham and the London & South Western Companies. Each of these companies had a different system of electrification, so that there was a bar on the London & Brighton Company going ahead with its own program. The Ministry of Transport had, however, appointed a committee to report on the steps advisable for the companies concerned to take on the electrification schemes they had in contemplation. In regard to capital for developments, the directors had thought that there might be a possibility of obtaining powers from Parliament to raise money by borrowing without being put under the obligation that the exercise of borrowing powers should be contingent on a previous issue of three times the amount of share capital. Application was made for a Parliamentary bill for the purpose, but objections were raised by debenture and preference stockholders and others. In the meantime the appointment of the Ministry of Transport committee above referred to was made, and as the main reason for the promotion of the bill was to obtain capital for electrification work, the advisability of waiting for the report of the committee became obvious. The directors had accordingly deemed it wise to withdraw their bill from Parliament.

R. H. Wilkinson, general manager of Bradford Corporation Tramways, in the course of an inquiry regarding an application by his municipality for further borrowing powers, made the remarkable statement that owing to the increased cost of tramway track construction 75 per cent of the town Council's lines would eventually have to be abandoned unless some form of transport cheaper than the tramcar was adopted.

Surface Lines Spurred to Advertise

The London County Council, spurred on no doubt by the intense competition of motor buses, continues to advertise its tramway undertaking vigorously. A recent poster informs the public that the total cost of the system has been £14,500,000, and that the capital repaid out of revenue to date amounts to £6,000,000. The sum paid last year for interest on and redemption of capital was £600,000. It is proudly added that when the balance of capital indebtedness has been paid off Londoners will own the finest tramway in the world, and debt charges will be nil.

The first year's working of all-night tramcar services in Glasgow has resulted in a loss of £1,098.

At the British Industries Fair, held in London early in March, an exhibition of some of the artistic designs for London underground railway posters received much attention from foreign buyers who visited the Fair.

In the House of Commons on March 13 it was officially announced that the Treasury had agreed to guarantee a loan to be raised by the London underground railway companies for the extension and improvement of its tube railway system. This means that the long-contemplated developments are likely to be put in hand soon.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Paving Requirement Modified

Commission Unwilling to Pass Added Burden of New Paving on to Car Riders

In spite of a contract calling for repairing of Yale Avenue, Swarthmore, Pa., the Philadelphia (Pa.) Rapid Transit Company has been freed from all obligations except those included in repairing its own tracks and paving between them and for 18 in. on either side. This decision, handed down by the Public Service Commission on Aug. 16, 1921, and just published, is based on the principle that the ordinance provisions were unjust and unreasonable, would result in increased expenses to the company that would devolve upon the public and that anything which stands in the way of securing reasonable and adequate service or imposes upon the public an unnecessary burden of increased rates opposes the public policy of the State.

The borough of Swarthmore, in submitting the case to the Public Service Commission, protested that the municipal ordinances should be the factor used by the Public Service Commission in determining the duties of the railroad company. The company admitted the jurisdiction of the commission, as did the city, but contended that its duties must be determined by the commission upon the facts disclosed by the evidence by applying the commission's principle of what is a just and reasonable standard.

The report of the commission reviews the history of the case and shows that the Philadelphia, Morton & Swarthmore Street Railway and the borough of Swarthmore made a contract in September, 1900, whereby the traction company was given permission to operate on the streets of the borough, and in return agreed to reconstruct the paving on Yale Avenue from curb to curb. Under the type of paving adopted originally and with the wear and tear to which the roadway was then subjected the cost to the railway of meeting its paving obligation was about $490 a year for the entire area involved. Since then, however, the situation had changed and the type of paving originally installed had become entirely inadequate. When the time came to pave with new and more expensive material it was sought to shift the added burden to the railway.

The commission pointed out that the railway offered evidence, which was not contradicted, to show that its total annual revenues from the Borough of Swarthmore in 1919 were $10,080 and its yearly operating expenses in conducting that service $9,070. It is obvious, therefore, according to the commission that if the complainant's contention was sustained and the ordinance provisions made enforceable, either in the courts or before the commission, one of three eventualities would occur:

(a) The company would be so shorn of revenues that the public, including the Borough of Swarthmore, would ultimately be deprived of all street car service.

(b) The rate of fare imposed upon the Swarthmore patrons would be increased so high as to be practically prohibitive.

(c) The financial burden of maintaining the Swarthmore service would have to be passed on to and be borne by other car riders of the Philadelphia Rapid Transit Company in Philadelphia and elsewhere, who are not immediately concerned in the Swarthmore service.

In consequence of the condition of affairs thus recited the commission ruled as follows:

> Any or all of these contingencies are violative of the basis upon which proper public utility regulation rests. The utilities no longer function as private enterprises. They have public duties to perform. They are required to render adequate service at reasonable rates, and the rates must produce the revenue to maintain that service. To require the car riders to pay what would appear to be exorbitant rates, or to accept the alternative of being obliged to forego the benefits of all service because the operating company's revenues are required to be diverted in order to meet such ordinance obligations, is as unwise a public policy as it is bound to be destructive of the service which the public require and which such carriers are expected to render.

In short, the commission, after reviewing briefly the intent of the legislation creating that body, said that "it would be a waste of argument to attempt to establish the obvious, namely, that the commission is called upon to exercise the police power of the State when rates are involved, but cannot do so where service, facilities and practices, affecting intimately the same public, are involved."

Wage Agreement Reported

Railway employees of the Dominion Power & Transmission Company, Hamilton, Ont., are reported to have reached an agreement on wages as a result of the efforts of a board of conciliation which was appointed under Federal labor laws to arbitrate the dispute. The proceedings of the conciliation board were interrupted while the parties were brought together. The definite results were not announced, but it was stated that a basis of agreement had been arrived at and that when the contract is drafted it will receive the ratification of the board of conciliation without further litigation.

New York Hearings Postponed

Frank Hedley, president of the Inter borough Rapid Transit Company, New York, N. Y., said on March 24 at the hearing of the Transit Commission that he would advance his program for the purchase of 350 cars now contemplated during the next five years if the Interborough could get from the Manhattan Railway, which owns the elevated railway system, a reduction in the present rent for the elevated lines.

Mr. Hedley said that if the city would provide the necessary storage yards and shop facilities, and if there were no difficulties about power, it would be possible to begin to put the cars into service in about seven months after a start was made. The purchase of additional cars would permit the Interborough to extend its period of maximum operation so as to spread the rush-hour traffic over a longer time.

Ex-Justice Clarence J. Shearn, special counsel of the commission, said Mr. Hedley would be questioned concerning the possibility of improving the service in non-rush hours at a subsequent hearing.

Upon the representation of James L. Quackenbush, general counsel of the Interborough, that the crucial period in the negotiations of that company with the Manhattan Railway for a reduction of rent would occur during the week ended April 1, the commission adjourned its inquiry into Interborough service until the afternoon of March 30 and agreed to postpone the Interborough valuation hearing, scheduled for March 29, for a week. Mr. Quackenbush said that Dwight W. Morrow of J. P. Morgan & Company, representative of the 5 per cent bondholders, was expected to return on March 27.

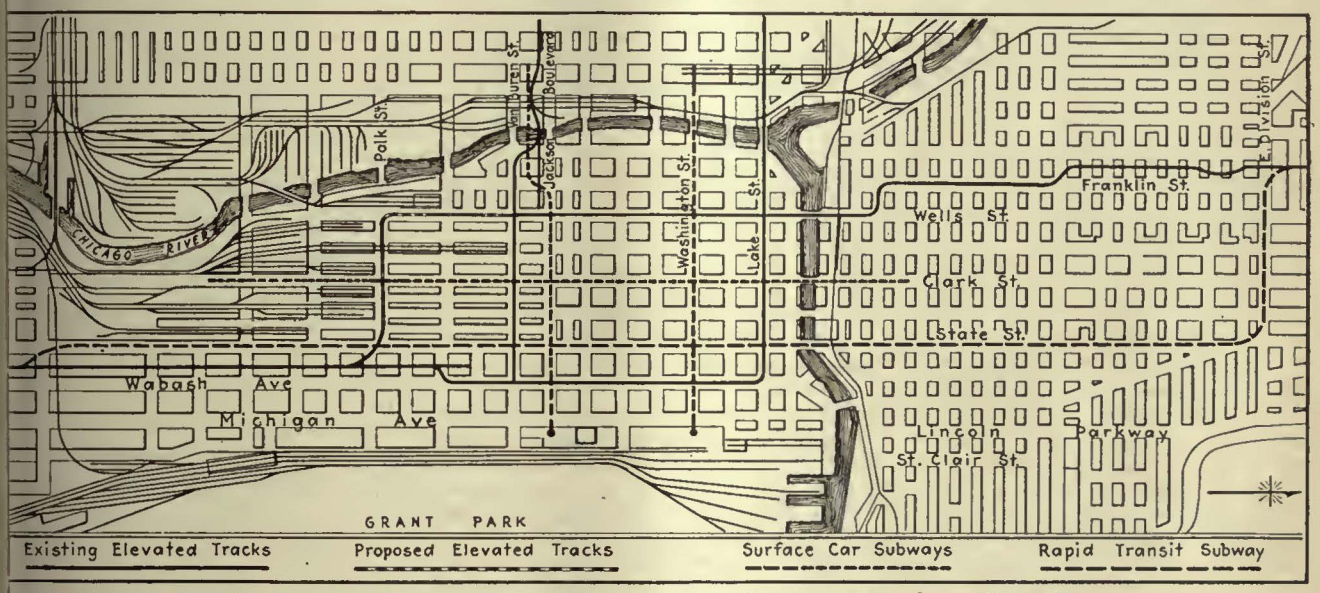
Engineering Congress Should Be Internationally Promoted

A very pronounced feeling exists in engineering circles in Washington, D. C., that the proposed Engineering Congress to be held in connection with the Philadelphia Sesquicentennial should be promoted in a national and international way, and that this can best be done by the Federated American Engineering Societies. Local promotion of the congress would be handicapped, it is believed, by the assumption that Philadelphia engineers naturally would be inclined, by the incidental benefits to their city, to represent such a gathering as certain to be a momentous occasion. If the arrangements were handled by the national machinery which the organizations in many branches of engineering have set up it is believed a distinctly different impression will be created.

Another Subway Plan for Chicago

ommittee of Local Engineers Prepares Plan for Local Transportation Committee, Giving Locations and General Designs for Initial System in the Central Business District

A COMMITTEE of five Chicago engineers comprising Bion J. Arnold, airman of the Board of Supervising ngineers, Chicago Traction; R. F. elker, Jr., city supervisor of transrtation; Harold Almert, representing e American Society of Engineers; harles E. Fox, Illinois Society of Arditects, and Joseph H. Prior, Western ciety of Engineers, appointed by the cal transportation committee, Chicago ty Council, made its report to the ansportation committee on March 27, resenting locations and general degns for an initial subway system.



MAP SHOWING ROUTE OF SURFACE CARS AND RAPID TRANSIT SUBWAY LINES PROPOSED BY ENGINEERS TO CHICAGO COUNCIL COMMITTEE

is committee of engineers has served thout pay as the result of a resolun passed by the transportation comttee of the City Council on Feb. 21, 22, requesting recommendations for guidance.

The engineer committee recommended e immediate construction of two st and west and one north and south v-level subways for the use of surce cars, and one high-level north and uth subway for rapid transit purses. The surface car subways are nned for Washington Street and ckson Boulevard, extending from ant Park on the east to Clinton reet on the west; and under Clark reet, extending from Thirteenth reet on the south to Grand Avenue o the north. The subway for rapid nsit purposes would be located under te Street and extend from a junctn of the South Side Elevated Railad at Eighteenth Street to Division reet on the north, thence west in ivision Street to a junction with the rthwestern Elevated Railroad near anklin Street.

The Washington Street surface car bway would be connected with the present Washington Street tunnel under the river, which is so constructed that connection could be made to it at either end without changing the permanent structure. The subway under Jackson Boulevard would connect with the tunnel under the river at Van Buren Street. Through these two east and west subways, about 80 per cent of the surface line cars that now serve the northwest and southwest portions of the west side could be operated. The Clark Street subway would serve to handle approximately 45 per cent of the surface cars now operating through the business district and serving the north and south parts of the city. It could take care of practically all of the through-routed cars, while the morning and evening rush-hour trippers could be operated on loops now in place on the surface. These three surface-line subways would all be built with two tracks.

The engineers estimate that the Washington Street subway could be constructed as a tunnel and not seriously disturb the present utilities in the street, at a cost of approximately $4,500,000. The subway in Jackson Boulevard could be similarly constructed at a cost of about $4,900,000. Owing to the limited space between the top of the Illinois Tunnel Company's structure and the surface of the street, the construction of a subway in Clark Street would necessitate taking care of the utilities now in the street by means of suitable utility galleries. For this reason the engineers estimate the cost of this subway, including the cost of taking care of the utilities and the new tunnel under the river, at about $9,000,000.

Stations for these surface-car subways would be located between State Street and Michigan Boulevard in both of the east and west tunnels. There would also be two transfer stations, each two blocks long, in the Clark Street subway, one at Jackson Boulevard and one at Washington Street, and each having an extension westward from Clark Street to Wells Street. There would be a through station on Clark Street at Harrison Street.

RAPID TRANSIT SUBWAY

The rapid transit subway would be constructed as a two-track low-level subway in State Street, so arranged that it can later be made a four-track subway. Owing to the limitations imposed by the location of the Illinois tunnel, the construction of this subway would necessarily involve taking care of the property of the utility companies now in the street. The engineers state that this can best be accomplished by locating the two tracks first constructed on one side of the street, preferably the west side, permitting the construction of the complete unit on the west side of the street including the utility gallery, and thus not preventing the building of the east tracks, with their utility galleries, when needed for a comprehensive subway system.

Stations of sufficient length to accommodate ten-car trains would be located at Twelfth Street, Harrison Street, Jackson Boulevard, Washington Street, Chicago Avenue and at Division and Clark Streets. The estimated cost of this subway is $16,000,000.

If the State Street subway is constructed as described, the engineer committee states that it could be best utilized in conjunction with the present elevated system, but that this would involve the construction of an extension of the elevated system in Wells Street from Van Buren Street to Polk Street, and then east to a connection with the main line of the South Side Elevated Railroad. This would involve an ex-

penditure of about $1,200,000, which should be furnished by the elevated railroad companies. Arrangements should be made at the same time for the elimination of the grade crossings on the elevated lines at Van Buren and Wells Street. This extension and grade separation, if built and operated in conjunction with the State Street subway, will double the track capactiy of the elevated lines serving the West Side.

The subway system as just described is so planned as to form the nucleus of and connect up with any one of the three comprehensive plans previously submitted to the local transportation committee, namely, the Arnold plan of 1911, the Harbor and Subway Commission Plan of 1913 and the Chicago Traction and Subway Commission plan of 1916. All of these systems provide for either the unification of existing transportation systems or the independent operation by the city of a comprehensive rapid transit subway.

A summary of the total cost of the initial subway scheme as recommended by the committee of engineers follows:

Washington Street Subway	$4,500,000
Jackson Boulevard Subway	4,900,000
Clark Street Subway	9,000,000
Total cost street car subways	$18,400,000
Rapid Transit Subway, State Street	16,000,000
Total estimated cost all subways	$34,400,000

These estimates are all for structures only, ready for the installation of tracks and equipment.

It is interesting to note that the amount of money in the city traction fund, as paid from the proceeds of surface lines operation, is now approximately equal to the total cost of these initial subways recommended by this committee of engineers.

Supplemental Report Suggests Another Subway

In addition to the matter appearing in the report of the committee of engineers as abstracted above, a supplemental report was also presented to the local transportation committee March 27, in which reference was made to the rapid growth of the district lying east of State Street and between the Chicago River and Lincoln Park. There has been much agitation for a subway to serve this district. With regard to this, the supplemental report states that special transportation, in the form of a subway for this district, while desirable from a municipal point of view and attractive from the standpoint of ease and low cost of construction, cannot, in common with the initial subways recommended, now be justified on the basis of earnings on the capital investment required.

Should the present development continue, however, even for a short period of time, transportation for the district should be provided, and probably by means of a subway connecting the outlying districts north and south and passing along the east margin of the city and following the suggestion contained in the Traction and Subway Commission's report of 1916. This subway would extent from a portal at about Eighteenth Street and Indiana Avenue, on the south, following Indiana Avenue, to Twelfth Street, thence north in the parkway east of Michigan Avenue, under the river to St. Clair Street, and thence swinging into North Michigan Avenue, at Chicago Avenue, up the parkway east of Lake Shore Drive and under Lincoln Park, with a portal located at North Avenue. This subway would connect with the Grant Park ends of the west side subways opposite Jackson Boulevard and Washington Street, thereby providing facilities for looping or rerouting cars from all parts of the city.

Columbia Increases Service

More Cars Being Run Under Police Protection—Arbitration Refused by South Carolina Company

There has been no recurrence of violence by strikers on the lines of the Columbia Railway, Gas & Electric Company since the early part of last week. The police continue to guard each car by a detail which follows in an automobile, but the number of policemen in each automobile has now been reduced from four or five to two. By March 28 twelve cars had been put in service, beginning operations at 7 a.m. and running to 7 p.m.

Efforts by the union to get somebody to arbitrate the trouble so far have been unsuccessful. Among those suggested have been the industrial relations committee of the Chamber of Commerce and an arbitration board to be appointed under the Gerald Arbitration Act, but the company has refused to submit what it conceives as its "business affairs" to arbitration, and if an effort is made to enforce the Gerald Act the company has declared that it will test its constitutionality. In a statement issued March 25 R. Beverley Herbert, attorney for the company, said in part:

> We wish to call the attention of the public to the fact that there was no dispute with the union or our former employees about wages or the hours of work. The union accepted the wage scale and hours we offered. The dispute was as to whether or not we would submit to arbitration the question of discharging an employee whose services were not satisfactory to the company. We think any one who will consider the matter will understand that we could not employ men and let them or any one else other than the company decide whether their services were satisfactory and whether we would continue to employ them.
>
> We have nothing against the former employees and are not opposed to unions or union labor. On the other hand, we have genuine sympathy for labor and for our former employees. When they went on a strike we put the cars in the barn and let them stay there a month, hoping that the men would come back to work and we then gave them every opportunity to come back to our employment before we employed other men. We tried to make them understand our position and to see that we were in earnest. We think they have failed to understand that either we will have to operate the street railway as a business concern or cease to run the cars at all. With us it is not a question of going back to the old contract. It is a question of running the street railway company without arbitration or going out of the street railway business.

Improvements Planned for Rochester Lines

An inclusive program of track reconstruction and service improvements for 1922 for the Rochester lines of the New York State Railways was recently outlined by Charles R. Barnes, commissioner of railways. The contemplated improvements will cost about $500,000. The plan provides for the installation of cross-town service in the northern part of the city, tapping the Clifford, Portland, Hudson, Joseph, Clinton Avenue; St. Paul, Lake Avenue, Dewey Avenue and Driving Park Avenue lines. The Dewey Avenue service will be extended from Ridge Road to Stone Road. Trackless trolley cars will be used on both the cross-town lines and the Dewey Avenue extension. The Clinton Avenue north line will be extended from the present terminus to Keeler Street, a distance of 1,750 ft.

Service will be extended on the Lyell Avenue line by utilizing the tracks of the Rochester, Lockport & Buffalo Railway. Owl-car service will be furnished soon on the Park and Dewey line.

Mr. Barnes' statement says that consideration is being given to the extension of service in Chili Avenue and Culver Road sections of the city by the installation of trackless trolleys.

A terminal building and loading platform will be erected at Ontario Beach Park in time for the summer travel.

In his statement itemizing the improvements Mr. Barnes says that extensions of service in the past have not kept pace with the growth in population and area of the city. He also said that it was the consensus of opinion among street railroad men of the country that on account of the cost of track construction supplemental city service could best be furnished by buses.

Commission Demands Further Improvements

In a letter to Franklin T. Griffith, president of the Portland Railway, Light & Power Company, Portland, Ore., the Public Service Commission demands that the company expend during 1922 the sum of $500,000 in maintenance, construction and reconstruction work. The letter stated that during the hearing held in February, 1920, and preceding the issuance of an order increasing car fares there had been filed with the commission certain expenditures in the amount of $819,950 necessary to the rehabilitation of the company's trackage layout. Further, that as of Dec. 31, 1921, there had been expended upon the items set out in the exhibit the sum of $386,470, with an additional $78,000 on track reconstruction. Expenditures during 1921, with maintenance added, will bring the total expenditures on reconstruction and maintenance somewhat in excess of $520,000. The letter states that the investigation convinces the commission that it can equitably require the expenditure of a sum of not less than $500,000 on maintenance and construction in 1922.

Nashua Property Making Good Progress

The part electric railways play in the l[ife] of a community with some salient f[acts] about this method of transporta-t[ion] as an industry was made the sub-j[ect] of an interesting and instructive t[alk] fest recently at the Nashua, N. H. C[oun]try Club. The remarks were con-t[rib]uted by three well-known men in t[he] railway industry, Edward Dana, g[en]eral manager of the Boston Elevated R[ail]way, W. H. Burke of the Stone & W[eb]ster management division, also of B[ost]on and J. A. Queeney of the Rail-w[ay] Sales department of the General E[lec]tric Company, Schenectady, N. Y. T[hro]ugh the influence of E. W. Holst, e[ng]ineer of the Nashua Street Railway, t[he]se three men were brought to N[as]hua.

Mr. Queeney took occasion to remark t[ha]t under the two years' guidance of M. Holst the Nashua Street Railway h[as] made rapid strides and that it was o[nl]y a comparatively short time ago w[he]n the system was on the red ink s[id]e of the ledger. Some of the out-s[tan]ding topics discussed at the recent Mid-Year Meeting of the American E[lec]tric Railway Association at Indian-a[po]lis, Ind., were referred to by Mr. D[ana] in his talk. He also gave some f[ac]ts about the Boston Elevated Rail-w[ay], commenting on its financial condi-t[io]n for the last year and declaring that it was on the principle that patrons o[f] the road and not the general public s[ho]uld pay for the cost of their trans-p[or]tation, that the present board was o[pe]rating reducing fare costs where p[ra]ctical. Mr. Burke gave some inter-e[st]ing statistics on the railway industry a[t] the beginning of the inflation period a[nd] by means of a chart showed labor c[os]ts, revenues, etc. He said that the n[um]ber of passengers had increased s[te]adily on the average in recent years i[n] a ratio of about 10 per cent.

Railway Unable to Perform Paving Work

President Wheelwright of the Vir-g[in]ia Railway & Power Company, R[ich]mond, Va., has informed the Di-r[ec]tor of Public Works that owing to it[s] serious financial condition his com-p[an]y will be unable to meet the fran-ch[is]e provision calling for an expendi-t[ur]e of $225,000 for paving and re-b[ui]lding of tracks. Accordingly Direc-t[or] Saville announced that the entire p[av]ing scheme for the year under the R[ic]en bond issue would have to be r[ev]ised.

In his letter expressing his regrets to Mr. Saville, Mr. Wheelwright said it w[as] embarrassing for the management to have to take the position ostensibly of "laying down" since this procedure w[as] far from its desire. In alluding to th[e] company's financial condition he sa[id] that for the past year to Jan. 1 th[e] company had failed to earn bond in[te]rest and taxes on the Richmond st[re]et railways by the sum of $297,057 ar[d] that for the past two months the si[tu]ation had become acute. He said that the Council's failure to meet the urgent pleas of the company for relief in the matter of fares and franchises had been responsible for the railway situation in Richmond steadily growing worse.

Arbitration Board Deadlocked

No indication is forthcoming as to the prospects of a settlement of the Indiana, Columbus & Eastern traction line wage dispute by the arbitration board, which at present is deadlocked on the appointment of a third member. The line was a part of the Ohio Electric Railway before that system went into the hands of receivers. S. H. Hutchins, Columbus, Ohio, and C. W. Rich, Springfield, the two arbitrators, plan to hold a meeting soon in an effort to select the third man. Mr. Hutchins is also a member of the arbitration board which is attempting to solve the wage dispute between the company and its employees on the city lines in Lima, Ohio. The others on the Lima board are: C. A. Anderson, Lima attorney, and John Sweeney, Lima contractor. The old wage scale was 46 cents an hour. This is being continued pending settlement of the dispute. The company is proposing a reduction in the rate.

Investigation Made Into Serious Accident

An investigation is being made by Jerome Kuertz, Director of Street Railways, and officials of the Cincinnati (Ohio) Traction Company to determine the cause of an accident on one of the company's cars on March 24, which cost the life of a woman and injured nine other passengers. The accident occurred when a Clifton-Ludlow car got beyond control and slid down Clifton Avenue, one of the deepest grades in the city used for electric railway transportation, and crashed into a Vine-Burnet car.

Walter Draper, vice-president of the traction company, after viewing the scene of the accident and inspecting the car upon its arrival at the carhouse, said that the mishap was one of those things which could not be avoided, despite precautions. Both Mr. Draper and Commissioner Kuertz said that from all appearances both the motorman and conductor used every preventive to stop the car when it started on its runaway flight.

Condemns Radial Legislation

The Council of St. Catherines, Ont., unanimously indorsed a report of its special railway committee, in which hydro-radial legislation contemplated by the provincial government was condemned as prejudicial to the rights and vested interests of municipal corporations. The government was urged to take no further action toward nullifying previous hydro-radial enactments until a conference has been held between the government, the Hydro Electric Power Commission and the municipalities concerned.

News Notes

Association Formed.—An employees' association has been formed among the people employed by the Olean, Bradford & Salamanca Railway, Olean, N. Y. John Nutt, Olean, is president, assisted by an executive committee of eleven men.

Men Accept Present Scale. — Employees of the Scranton (Pa.) Railway have voted to renew their wage contract for another year. The agreement continues in effect until April 1, 1923. The company refused the men's request for an increase of 6 cents an hour.

Get Together Features Fun. — The Beaver Valley Traction Company, New Brighton, Pa., held a get-together of all employees and their families recently. In the language of the circus, the big show was at 7:30 p.m., but for late men a meeting was held at 1 p.m. At the evening gathering there were music, singing, monologues, readings, speeches, and other fun. A safety exhibit was a main feature of the evening.

Car Runs Down Hill.—The brakes of a Belt line car of the Public Service Railway failed to work on the up-grade on Newark Avenue, Jersey City, N. J., on March 28 and the car started down the hill, smashing into a loaded one-man Hudson line car. Twenty-four people suffered injuries. At the office of John F. O'Toole, assistant to the president of the Public Service Railway, it was said that it was not known just what the trouble was but that an investigation was being made.

Read "Service News."—In order to acquaint its employees with information about the company doings and other news the Savannah Electric & Power Company, Savannah, Ga., is publishing a monthly bulletin entitled *Service News*. The issues, distributed among the employees each month, contain some effective suggestions such as "Cultivate the feeling that the company wants to please its patrons," "Smilingly sell safe, satisfactory service" and "Kourtesy Kurtails Kicks."

Wages Reduced.—A reduction of 7 cents an hour in wages paid motormen was made April 1 by the Pine Bluff (Ark.) Company. Reductions will also be put into effect with all other employees of the railway department. The reduction was caused by a recent City Council ordinance requiring the company to reduce fares from 7 to 6 cents for cash fares. Motormen, who also serve as conductors, were paid 36 to 46 cents an hour. The new scale is 29 to 39 cents an hour. The motormen are on duty from ten to eleven hours each day, working seven days. This is the first reduction in wages made by the Pine Bluff company since 1918.

Financial and Corporate

Interurban to Be Sold

One of Oldest Traction Companies Is Unable to Continue Selling of Service —Cars and Track Only Assets

The stroke of midnight on March 25 tolled the passing of one of Cincinnati's oldest traction companies, the Interurban Railway & Terminal Company, with its Cincinnati (Ohio) terminal on Sycamore Street. For many years now the traction company has fought a losing fight, steadily working always with the debit side outweighing the credit side. The discontinuance of the Interurban Railway & Terminal Company follows much litigation by bondholders of the company, who won their fight to have the road closed and the property sold to the highest bidder. A month ago the State Public Utilities Commission granted a committee of bondholders authority to abandon the line. The cars and rolling stock will be placed on the market and the tracks torn up and sold for scrap. The passing of the Interurban Railway & Terminal Company also marks the disappearance of electric railway transportation between Cincinnati and New Richmond and Cincinnati and Lebanon.

When the interurban boom of the late '90s reached its zenith a company was formed in 1898 called the Cincinnati & Eastern Electric Company. It built an interurban line to New Richmond. Then in 1899 another company was formed called the Suburban Traction Company. It built a line part way to Bethel, Ohio, through Mount Washington. Still another company, the Rapid Railway, built a traction line to Lebanon, Ohio. Finally, in November, 1902, these companies consolidated as the Interurban Railway & Terminal Company and elected George R. Scrugham, president. Associated with Mr. Scrugham were W. E. Hutton, Charles H. Davis, Leo H. Brooks, deceased; George H. Worthington and others.

Two disastrous fires are part of the history of the Interurban Railway & Terminal Company. One destroyed the Sycamore Street terminal, with a loss of $100,000, and the other destroyed the carhouse at Coney Island with a loss of nearly $75,000. The company's chief asset will be its track and rolling stock.

Brooklyn Company Rejects Commission's Valuation Invitation

The Brooklyn (N. Y.) City Railroad on March 27 made public a resolution adopted by its board of directors regarding the appraisal of the valuation bureau of the New York Transit Commission. The resolution, passed at a board meeting on March 17, followed a general discussion by the directors of an outline of the appraisal presented by Vice-President H. Hobart Porter.

The directors believe that for reasons they set forth in detail they are not justified in expending the large amount of money necessary to examine and analyze the valuations referred to in the letter of the commission of Feb. 23 and to prepare the detailed criticism and objections which are invited.

Improved Conditions Continue

The Muskegon Traction & Lighting Company, Muskegon, Mich., is keeping up the good work started in January. As a result of that month's operation the company actually showed net earnings, but after interest charges a deficit remains. In February there was a balance after interest charges amounting to $32.43. For two months the electric railway has been operating without bus competition and has shown that it can meet its expenses better when the bus, as competitor, has been removed. The company carried 338,659 passengers in February. The improved business conditions on this property were referred to in the ELECTRIC RAILWAY JOURNAL, issue of March 11.

Deficit After Dividends

During 1921 the Omaha & Council Bluffs Street Railway, Omaha, Neb., carried 68,726,479 revenue passengers, as against 72,055,229 during 1920. Passengers carried on transfers: 1921, 18,907,734; 1920, 18,938,721.

The financial statements for 1921 and 1920 follow:

	1921	1920
Revenue from transportation	$4,262,852	$4,497,728
Other revenues	352,737	309,801
	$4,615,589	$4,807,529
Operating expenses	3,482,284	3,603,678
Net operating revenue	$1,133,305	$1,203,851
Taxes assignable to railway operations	437,620	427,862
Operating income	$695,685	$775,989
Plus non-operating income	38,966	29,914
Gross income	$734,651	$805,903
Total deductions from gross	637,457	637,490
Net income	$97,194	$168,414
Profit and loss adjustments	18,207	7,552
Adjusted net income	$78,986	$160,861
Preferred stock dividend requirements	200,000	20 ,000
Deficit	$121,013	$39,139

The total expenditure for additions and betterments during 1921 was $51,848, consisting mostly of costs of paving streets not previously improved and also laying heavier rails.

In its physical valuation reports now being considered by the Nebraska State Railway Commission for rate-making purposes, the company shows the following valuation totals for the system:

Four-year average, $21,740,254; 1919 reproduction, $25,126,177; present value (as of Sept. 1, 1919), $23,291,772.

Friendly Suit to Foreclose Commenced

Suit in foreclosure of a mortgage securing bonds amounting to $150,000 against the People's Traction Company which operates the interurban line between Galesburg and Abingdon, Ill., has been filed by C. S. Harris in the Circuit Court, naming the Western Railways & Light Company, the People's Traction Company, the Galesburg Railway, Lighting & Power Company, and other companies concerned, as defendants. The suit is a friendly one brought by the bondholders merely to protect their interest and speed up the negotiations for the exchange of securities now in progress.

The suit is brought in the name of the People's Trust & Savings Bank, Galesburg, trustee for the bondholders, two-thirds of the bondholders having made written request of the trustee to protect their interests by foreclosure of the mortgage.

All's Not Well in Radford

Electric railway service was suspended temporarily in Radford, Va., as a result of a controversy in which City Council, the Radford Water Power Company, which operates the street railway, and the jitneys are involved. Trouble began when a bus operator began carrying passengers between Radford and East Radford for 5 cents after the railway had secured the approval of the City Council to put into effect a 7-cent fare. Accordingly the railway reduced its fare to 5 cents and the bus operator carried passengers for what they gave him. That evidently was the last straw or ride in this case as the car was put in the carhouse. It is stated that the jitney operator will be allowed to run his bus until his license expires in May.

Successor Company Organized at Lafayette

Articles of incorporation were filed with the Secretary of State on March 24 by the Lafayette (Ind.) Street Railway Company, Inc., the concern that is taking over the local lines at Lafayette, sold under foreclosure recently. The capital stock is $250,000 and Julius Berlovitz, Richard B. Sample, Charles L. Murdock, J. G. McKee and Allison E. Stuart are named as directors.

The directors have named the following officers: President, Julius Berlovitz; secretary, J. G. McKee; treasurer, Charles L. Murdock. Mr. McKee is a former traction line auditor, and was employed on the Murdock lines for several years. Mr. Murdock is the son of Charles M. Murdock, president of the First Merchants National Bank.

It was stated recently that a deed to the property recently purchased by the company will be issued April 1, and plans have already been made for the rehabilitation of the car lines. Engineers are now negotiating with various companies for rails, cars and other new equipment.

London Outlook Cheerful

hairman of Underground Railway Group Looks Forward to Gradual Improvement in Future

In the latter part of February there ere issued the directors' reports and ccounts for 1921 of the London "com- on fund" companies. These are the etropolitan District Railway, Lon- on Electric Railway, the City & South ondon Railway, the Central London ailway, and the London General Om- bus Companies. Over all the compa- es had a specially successful year, rgely owing to increased fares, and vidends—though nothing to boast out in an absolute sense—were ex- ptionally high. The ordinary stock the District Railway got a dividend 1 per cent—the first on this stock r many years.

The gross revenue for the year of the five companies was £13,085,557. Their revenue liabilities, namely working expenses, rent, rent charges, interest on loans, debentures, guaranteed and preference stocks, and reserves for depreciation and obsolescence, amounted to £12,176,285, leaving £909,272 for the common fund, to be distributed among the companies in percentages fixed by agreements. The Metropolitan District got £109,113, the London Electric £320,552, the City & South London £54,556, the Central London £104,483 and the London General Omnibus Company £260,568.

The accompanying tables show the working results for each company.

Lord Ashfield spent an arduous day in presiding and delivering his chairman's address at each of the five meetings of the companies in the London "combine." It was no wonder that he suggested that in future there should be a joint meeting, as many of his remarks are applicable to all the companies. In addressing the shareholders of the Metropolitan District Railway he said that if it had not been for the coal strike from April to June of last year and the subsequent trade depression, the results from the increased fares in London would have reached expectations.

The volume of traffic in London was a barometer measuring the country's prosperity. Lord Ashfield set out in detail the proposals he had made to the Government last autumn for relieving unemployment by carrying out the authorized developments of the underground system, if the Government would guarantee the new capital (as provided for in the Trade Facilities Act) and if the Government would secure the General Omnibus Company against piratical competition for ten years.

PARTICULARS OF PASSENGERS CARRIED, NUMBER OF CAR-MILES RUN, ETC., OF LONDON GROUP IN YEAR 1921 COMPARED WITH YEAR 1920

	Metropolitan District Railway		London Electric Railway		City & South London Railway		Central London Railway		London General Omnibus Company Limited		Total	
	1921	Increase+ or Decrease —	1921	Increase+ or Decrease —	1921	Increase+ or Decrease —	1921	Increase+ or Decrease —	1921	Increase+ or Decrease —	1921	Increase+ or Decrease —
		(Estimated)										
assengers carried—												
rdinary	80,122,744	—15,197,435	94,678,210	—18,025,516	21,824,780	—4,618,959	32,628,737	—6,700,236	761,251,405	—6,702,244	990,505,876	—51,244,390
Workmen	22,524,130	— 1,814,166	19,024,844	—13,921,312	7,390,284	—4,620,941	3,873,388	— 663,284	.....	.....	52,812,646	—21,019,703
eason..	27,666,850	— 374,015	19,317,850	+ 377,630	2,611,700	— 72,228	6,963,000	+ 508,760	.....	.....	56,559,400	+ 440,147
Total .	130,313,724	—17,385,616	133,020,904	—31,569,198	31,826,764	—9,312,128	43,465,125	—6,854,760	761,251,405	—6,702,244	1,099,877,922	—71,823,946
umber of ar-miles un in re- tion to raffic re- eipts ..	18,416,940	—1,145,551	24,727,829	—3,134,634	6,897,970	—493,839	7,728,525	—340,520	86,858,559	+1,015,467	144,629,823	—4,099,077
ileage of nes own- (first rack)...	M. Ch. 24 68	M. Ch.	M. Ch. 23 77	M. Ch.	M. Ch. 7 26	M. Ch.	M. Ch. 6 70	M. Ch.	M. Ch.	M. Ch.	M. Ch. 63 1	M. Ch. .. ..

COMPARATIVE STATEMENT OF THE OPERATIONS OF THE FIVE COMPANIES IN LONDON, PARTIES TO THE AGREEMENT AND SUPPLEMENTAL AGREEMENT MADE UNDER THE LONDON ELECTRIC RAILWAY COMPANIES' FACILITIES ACT (1915) YEAR 1921 COMPARED WITH YEAR 1920

affic receipts after the operation of the common fund under the terms of the London Electric Railway Companies' facilities act agreement, dated Dec. 21, 1915, and supplemental agreement, dated Dec. 8,	Metropolitan District Railway		London Electric Railway		City and South London Railway		Central London Railway		London General Omnibus Company Limited		Total	
	1921 £	Increase+ or Decrease — £	1921 £	Increase+ or Decrease — £	1921 £	Increase+ or Decrease— £	1921 £	Increase+ or Decrease— £	1921 £	Increase+ or Decrease — £	1921 £	Increase+ or Decrease— £
1921.....	1,849,581	.....	2,040,010	+223,091	446,999	+19,008	661,479	+83,096	7,500,572	+566,241	12,498,641	.....
penditure.....	1,351,208	.....	1,368,771	—18,523	301,441	—20,470	468,428	—16,704	6,936,082	+260,844	10,425,930	.....
Net receipts.....	498,373	+164,041	671,239	+241,614	145,558	+39,478	193,051	+99,800	564,490	+305,397	2,072,711	+850,330
iscellaneous receipts (net).	164,180	—41,328	136,804	+ 1,868	34,309	+ 2,000	68,071	— 5,247	183,552	—64,376	586,916	—107,083
Net income.....	662,553	+122,713	808,043	+243,482	179,867	+41,478	261,122	+ 94,553	748,042	+241,021	2,659,627	+743,247
terest, rentals and other fixed charges.....	326,760	— 611	295,544	+ 9,278	46,811	— 2,808	46,039	— 8,032	152,474	+ 43,890	867,628	+ 41,717
Balance.....	335,793	+123,324	512,499	+234,204	133,056	+44,286	215,083	+102,585	595,568	+197,131	1,791,999	+701,530
serve for contingencies and renewals.....	65,000	+ 20,000	65,000	+ 20,000	36,000	+11,000	29,000	+ 9,000	335,000	+ 50,000	530,000	+110,000
Balance.....	270,793	+103,324	447,499	+214,204	97,056	+33,286	186,083	+ 93,585	260,568	+147,131	1,261,999	+591,530
vidends on guaranteed and preference stock..... ..	198,430	+ 29,400	126,947	.....	42,500	.... ..	21,600	.....	.....	.....	389,477	+ 29,400
Balance.....	72,363	+ 73,924	320,552	+214,204	54,556	+33,286	164,483	+ 93,585	260,568	+147,131	872,522	+562,130
d balances from last year's accounts.....	20,537	— 1,561	22,350	+ 1,408	18,820	— 930	15,161	+ 3,399	58,843	— 883	135,711	+ 1,433
Total amount available for dividends and further reserves.....	92,900	+ 72,363	342,902	+215,612	73,376	+32,356	179,644	+ 96,984	319,411	+146,248	1,008,233	+563,563
vidends on ordinary stocks and shares.....	32,350	+ 32,350	303,158	+ 198,219	48,100	+25,900	120,000	+ 52,500	251,483	+137,163	755,091	+446,132
te per cent.....	1%	+ 1%	3½%	+ 2½%	3½%	+ 1½%	4%	+ 1½%	8% (Free of tax)	+ 3% (Free of tax)	3.92%	+2.26%
lances carried forward to next year's accounts.....	60,550	+ 40,013	39,744	+ 17,393	25,276	+ 6,456	59,644	+ 44,484	67,928	+ 9,085	253,142	+117,431

Note—In consequence of the Government control of the Metropolitan District ilway in 1920, the traffic receipts and expenditures for that year are not comparable with those for the year 1921 and are omitted. In the previous year the receipts included £705,347 received as Government compensation.

As the Government declined to agree, a revised scheme had been sent in, and he hoped it would be accepted. Meantime the nature of it could not be disclosed. Expenditure on capital account of £707,000 had been incurred during the year for new rolling stock. In spite of current prices being at the maximum, it was impossible to refrain from ordering new cars, in view of the congestion of traffic. The price was 275 per cent above the pre-war price. To help to meet the cost a temporary loan of £400,000 was obtained from the company's bankers. New overhaul shops for all underground railways were being built at Acton at an estimated cost of £350,000.

FALL IN WAGES

In regard to the fact that a dividend (1 per cent) was being declared on the ordinary stock of the company (which very rarely receives any dividend) he said that it was practically paid out of the proceeds of the second half of the year, and arose largely from the distribution of the common fund of the associated companies having been revised as from July 1, 1921. In general, he considered the results for the year extremely satisfactory. This was the first time since 1882 that the company had declared a dividend on its ordinary stock and on that occasion the distribution was only three-sixteenths per cent. He had reason to hope that it would be possible gradually to increase the dividend in future years.

At the meeting of the London Electric Railway, Lord Ashfield, referring to the reductions in wages under the sliding scale as cost of living fell, said that the reductions in wages during 1921 meant a saving of £240,000 to the four associated railways. As for the fall in prices of materials, it occurred rather late in last year, and as the associated companies carried large stocks the benefit from the fall has hardly accrued. The average price of coal last year was 52s. 6d. per ton. For the current year to date the cost was less than 32s. 6d. per ton. The one factor which prejudiced the situation was a heavy falling off in the volume of traffic. However, the economies that could now be counted on would appear sufficient to maintain the companies in their present position, so that when the revival came, the companies should occupy a strong position.

AN UNPROFITABLE EXTENSION

At the Central London Railway meeting Lord Ashfield said that 1921 was the first year during which the extension railway from Shepherd's Bush to Ealing had been continuously worked. Under an agreement with the Great Western Railway that company maintained the railway and worked the train service. For doing this the company received a share of the traffic receipts. This share had barely been sufficient to meet the expenses, and the results were very disappointing. The number of passengers carried during the year was about 3,200,000, while the number of passengers using the Ealing stations and the Metropolitan District Railway was more than 9,000,000. The discrepancy was due to the higher fares on the new route. The rates in vogue there were necessitated by the fact that the new railway was a part of the Great Western Railway, on which the fares were 75 per cent in advance of the pre-war rate. Negotiations were in progress for an adjustment of fares.

BIGGER TUNNELS NEEDED

At the City & South London Railway meeting, Lord Ashfield said the conditions had not been favorable for the company making a start for the reconstruction of the railway (particularly for enlarging the tunnels which are smaller than those on the other and more modern tube railways). The number of passengers for the year showed a decline of 23 per cent and the drop was more severe than in the case of any of the other railways in the group. It was hoped that an application for guarantee of additional capital by the Government under the Trade Facilities Act would be obtained. In looking to the future, he saw no reason why the position of the company should not improve.

The brief abstract just given indicates that with reviving trade and a maintenance of present fares until circumstances justify their reduction the underground companies should do fairly well.

More Rolling Stock Purchased Under Equipment Trust Plan

Putnam & Company, Hartford, Conn., are offering for subscription $171,000 of Connecticut Company equipment trust 5 per cent gold notes Series E. The trustee of the issue is the Security Trust Company, Hartford. The notes are dated April 1, 1922, and will mature in twenty semi-annual installments. They were offered at prices to yield about 5.35 per cent.

These notes are a direct obligation of the Connecticut Company under an equipment trust agreement between it and the Security Trust Company of Hartford, Conn., trustee. The title to the equipment under this agreement remains with the trustee until both principal and interest of all notes shall have been paid in full.

The total cost of the equipment is $229,000, of which 25 per cent, or $58,000 will be paid in cash. The notes therefore represent 75 per cent of the purchase price. The equipment consists of thirty-five standard 28 ft. single-truck steel safety cars with air-brakes and two 25 h.p. motors, each car having a seating capacity of thirty-two passengers, and three 40 ft. double-truck steel safety cars with air-brakes and four 25 h.p. motors, each seating fifty-two passengers. These cars are of the most modern design and construction. The double-truck safety cars are in use on the line between Torrington and Winsted, 12 miles distant. They were described in the ELECTRIC RAILWAY JOURNAL of Feb. 18, page 276.

Previous issues of the equipment notes were as follows:

Series A	Dated Oct. 15, 1915
Series B	" Sept. 15, 1916
Series C	" Jan. 15, 1920
Series D	" May 15, 1920

Of these Series A and B have been paid in full, while of Series C $45,000 has matured and been paid and of Series D $26,000 has matured and been paid.

The bankers point out that the company paid about $850,000 of these notes during the worst period of electric traction business, and that cash to meet these maturities has always been deposited with the trustee in advance of the due date. It is also explained that on July 15, 1922, there will be due from the company to the State of Connecticut about $778,000, of which $363,000 covers funded tax obligations, and $415,000 is on account of current taxes. To meet these payments the company has a cash reserve of $650,000. The balance is to be provided for during the next three months.

Financial News Notes

Loss Continues.—Filing of the regular monthly report for February of the operations of the Springfield (Ohio) Street Railway with the city manager, on March 25, reveals that the company has made no financial improvement over the month of January. A loss of $4,579 was sustained in February, as compared to a loss of $5,704 for January.

Property Sold.—Property of the Conway Street Railway, extending from Conway, Mass., to South River, on the Fitchburg line, a distance of 7 miles, operation of which ceased some time ago, has been sold to H. Jacob & Son, junk dealers, North Adams. The dealers said they would try to resell it as it stands.

Nueces Company Reorganizes.—The Nueces Railway, Corpus Christi, Tex., which owns and operates the street car lines of that city, has been organized with a capital stock of $10,000. Incorporators are R. W. Morrison, E. H. Eldridge and E. R. Kleberg. The trolley lines in Corpus Christi have not been operated since the fire destroyed the power plant several weeks ago. The power plant is being rebuilt.

Surplus of $656,226.—The West Penn Traction & Water Power Company, Pittsburgh, Pa., and its subsidiaries report gross earnings for the year ended Dec. 31, 1921, of $14,189,776, an increase of $581,827 over the earnings a year ago. The operating expenses decreased nearly $6,000. The net income increased from $1,256,495 in 1920 to $1,464,508 in 1921. After deducting preferred dividends amounting to $808,282 a surplus remained of $656,226.

Traffic and Transportation

Fares Reduced on Some Eastern Massachusetts Divisions

Fare reductions and zone extensions will go into effect on April 21 in the Lynn, Salem, Lawrence and Brockton districts of the Eastern Massachusetts Street Railway.

The trustees say that the Salem, Brockton, Lawrence and Lynn districts have been making the best financial showing during the past few months and in accordance with the service-at-cost plan under which the road is operating they are entitled to the lower fares.

In the Lawrence district, tickets will be sold at the rate of seventeen rides for 95 cents; in Salem at the rate of seventeen rides for $1, and in Lynn at the rate of nineteen rides for $1 or 5 cents a ride.

A twelve ride $1 ticket will be issued in Methuen and other outlying towns in the Lawrence district, where the only fare now is 10 cents cash. In the Brockton district, a fourteen ride, $1 zone ticket to surrounding towns is increased to fifteen rides. The city zone ticket remains good for seventeen rides for $1.

Lower Fares Issue of Election

Immediate action for lower fares at Hartford, Conn., is among the items in the platform of the Democratic party for the municipal election that will take place on April 4. Richard J. Kinsella, Democratic nominee for Mayor, says, if elected, he will favor and insist upon a reduction of 25 per cent, or four fares for 25 cents instead of three, the present scale. The salient features of his platform are:

1. Reduce fares at once to four fares for a quarter.
2. Have Hartford division separated from the system as a unit for computing operating costs and receipts.
3. Decrease overhead by curtailing suburban trolley service during "hollow" hours of the day and night.
4. Maintain receipts in Hartford by improved service during rush hours and by increased number of passengers due to lower fares.

It is argued that the Republican administration has opposed action looking toward lower fares in Hartford. Decreasing the overhead expense, the Democratic nominee declares, would not work a hardship on the trolley system financially.

Pass Plan in Effect

The Cedar Rapids & Marion City Railway, Cedar Rapids, Iowa, has installed the monthly personal pass to give a reduced rate to regular riders. The line runs from the business district of Cedar Rapids to the suburb of Kenwood, thence to Marion City, a distance of 6 miles. A one-way cash fare is 18 cents, but books containing ten tickets are sold for $1.50. Under the pass plan a person who pays $1 a month will be entitled to ride at 10 cents per ride. Thus, if he rides twice each working day, or fifty times a month, his fare will be 12 cents instead of 18 cents. The plan went into effect on March 15.

Misunderstandings Cleared Up

Virtually all points of difference between the California State Railroad Commission and the Los Angeles Board of Public Utilities were settled on March 22 at a conference of members of the two bodies, it was announced by representatives of each, and assurances were given that closer co-operation between the commission and the board would follow.

Friendly suits, as previously requested by the Railroad Commission in a letter to the board, to test the question of jurisdiction over utilities in Los Angeles will be instituted either by the Railroad Commission or by the Board of Public Utilities, according to J. D. Kennedy of the utilities board, who stated that the conference held in the office of President Brundige of the commission "has resulted in a closer relationship and a far better understanding of our respective functions."

The first of these suits is expected to follow a decision by the Railroad Commission on a petition from the Hollywood Board of Trade asking that the Los Angeles Railway Corporation be required to extend five of its lines into the Hollywood district to compete with the Pacific Electric lines, which serve Hollywood exclusively. The Los Angeles Railway lines have a 5-cent fare and the Hollywood Board of Trade petitioned this service in face of the 10-cent fare charged by the Pacific Electric Railway, and as granted by the Railroad Commission in its decision of Dec. 24, 1921, for increased fares on the various lines of the Pacific Electric Railway.

The attorney for the Hollywood Board of Trade at the rehearing of the Pacific Electric Hollywood rate case, held on March 20, 21, 22 and 23, set forth that the commission has the authority to order the Los Angeles Railway to extend its lines into Hollywood, while opposing counsel of the Los Angeles Railway set forth certain arguments and court rulings that neither the State Railroad Commission nor Los Angeles Board of Public Utilities had the authority or legal power to order these line extensions. Ex-commissioner Edgerton and former president of the State Railroad Commission represented the Los Angeles Railway Corporation as special counsel in arguing against the petition of the Hollywood Board of Trade to the commission to order these extensions of lines.

Reduction in Round-Trip Tickets Announced

New tariffs have been filed with the Public Service Commission by the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., providing for reduced rates to Clinton, Brazil, Paris, Sullivan and other points. When asked about the reduction, General Manager E. W. Walker said that it was the intention of the traction company to meet the desire of the people for cheaper transportation by putting into effect greatly reduced round-trip rates. He said in part:

> The company has been catering to the transportation needs of Terre Haute and vicinity for very nearly a half century; it will celebrate its fiftieth anniversary in 1926. Its stockholders have invested millions of dollars in building up a plant and equipment, and it has never expected to make any money other than by legitimately meeting the needs of the community for transportation, and doing this at a price which would stimulate the freest use of the facilities provided. Its investment is a fixed investment, and it has no opportunity during dull times to pull up stakes and move to another place.
>
> Looking back over the last few years, during which we have heard so much about the high cost of living, it will be remembered that only in the case of interurban fares has the Traction company at Terre Haute contributed to this high cost of living. These fares were increased by general order of the Public Service Commission at the time fares and charges were being increased by the federal government on the steam railroads. Its fare on the city street car lines is the same now as it was in 1866, and has never been higher.

Mr. Walker said that the reduced rates were voluntary on the part of the company and would become effective on March 28.

Railway Is Entitled to Higher Rate

H. F. Dicke, general manager of the Utah Light & Traction, Salt Lake City, Utah, in answer to a petition of Charles Anderson and others seeking a return to the old 5-cent fare schedule states that his company is entitled to higher fare and if the Anderson petition is pressed, he will solicit the commission for such fare increase. In his opinion instead of decreasing the rate of fare the company is entitled to an 8-cent cash rate with tickets selling for 7½ cents. He states that he is not asking for this rate at this time but reserves the right to file petition for such increase if the case proceeds to a hearing.

In the company's affirmative defense, additional investments are said to have raised the valuation of the company's property from the $8,468,278, fixed by the utilities commission Jan. 15, 1920, to $8,721,485 at the first of the present year. Operating costs in 1919 are said to have been $1,395,752, in 1920 $1,634,008, and in 1921, $1,747,253. At the same time the number of revenue passengers increased from 33,908,484 in 1919 to 34,710,922 in 1920 and then dropped off to 31,135,305 in 1921, while decreases are again shown for the present year of 236,257 in January, 213,019 in February and 79,660 in the first half of March. Unless a change comes, it is predicted, the company may not expect more than 30,000,000 revenue passengers for 1922.

Interstate Act Interpreted

Court Issues Temporary Injunction in Which Jurisdiction of I. C. C. Over Electric Lines Is Denied

Ordinarily the electric railway engaged in interstate commerce does not come under the jurisdiction of the Interstate Commerce Commission. In order to do so the electric railway must be operated as a part or parts of a general steam railroad system of transportation, must be engaged in the general business of transporting freight in addition to its passenger and express business, or it must be operated as part of a general steam railroad system of transportation or be engaged in the general transportation of freight. If a road is not thus engaged or being thus operated it is not within the Interstate Commerce Act nor within the jurisdiction conferred on the Interstate Commerce Commission, even though the road may be engaged in interstate passenger business.

This, in short, is the ruling just made by Circuit Judge Donahue and District Judges Killits and Westenhaver in the District Court of the United States for the Northern District of Ohio, Eastern Division, in the case of the village of Hubbard against the United States of America, the Interstate Commerce Commission and the Pennsylvania-Ohio Power & Light Company. To the court it seemed that the interpretation just mentioned was the only proper one and the effect of several amendments to the Interstate Commerce Act made since the decision in the so-called Omaha Street Railway case.

With respect to the general principles governing the matter the court says:

> The establishment of the Labor Board to settle controversies between carriers and employees, the guaranty for a limited period of a fixed return upon railroads, the grouping of railroads into classes and requiring rates to be fixed so as to allow a fair return to be earned on the property as a whole, the control assumed and exercised over the construction of new railroads, and the making of extensions and the issuance and sale of securities, are all parts of a general scheme from which all street or interurban electric railways are excluded unless possessing these characteristics.

With respect to the line of the Pennsylvania-Ohio Electric Company the court says that "plainly and admittedly the defendant railway was not operated as a part of a general system of steam railroads for transportation." After referring to the fact that the freight service of the company appeared to consist of packages and parcels and that this service was more nearly like what is called express than freight traffic, such an incidental and relatively insignificant and unimportant freight business could not be called the general transportation of freight in addition to the company's express business. The conclusion of the court was to the effect that the order of the Interstate Commerce Commission was in excess of any power and jurisdiction conferred upon it by the Interstate Commerce Act and that the order of that body assuming jurisdiction is void and without effect. In consequence the court signified that "the motion to dismiss will be denied and a preliminary injunction will be granted as prayed."

The court also ruled that in the case of the South Covington & Cincinnati Street Railway, cited by the defendant, the decision was wholly inapplicable and dealt with entirely different questions.

The Interstate Commerce Commission decided last fall that the franchise contract entered into between the predecessor of the Pennsylvania-Ohio Power & Light Company and the village of Hubbard, Ohio, fixing the rates between Youngstown and Hubbard was without effect where the rates so fixed resulted in unjust discrimination against interstate commerce. In consequence the Youngstown company was ordered by the commission to increase its rates by putting into effect upon five days notice a one-way cash fare of not less than 20 cents between Youngstown and Hubbard, and a commutation rate of not less than $5 for fifty-four rides. In the words of the commission the company was directed "to cease and desist from practicing the undue prejudice, undue preference and advantage found to exist in the relation of intrastate to interstate passenger fares." The decision of the Interstate Commerce Commission was reviewed in the ELECTRIC RAILWAY JOURNAL for Dec. 17, 1921, page 1091.

Transportation News Notes

Fares Reduced.—Fares on the lines of the Pine Bluff (Ark.) Company were reduced 1 cent on March 22, the reduction being from 7 to 6 cents for cash fares. Five-cent fares may be secured by purchasing books of fifty tickets. An effort is also being made to secure 5-cent fares for school children. This reduction came as a result of an ordinance passed at a recent meeting of the City Council.

Freight Rates Cut.—Freight rate reductions were announced on March 15 by the Cincinnati & Dayton Traction Company to Detroit and other Michigan points on the same basis as steam railroads. Officials of the traction company in announcing the reduction said that the company would make second day delivery to Detroit and about three-day delivery to other Michigan cities. This reduction, it was stated, is effective not only in Detroit, but to points on other railways.

Getting Used to Tokens.—Since the Connecticut Company, New Haven, Conn., placed tokens on sale for transportation there has been a slight increase in travel on the company's lines in the Hartford Division. Manager Scott said that an increase was expected and that a gain, though trifling, was noticeable. Those who are regular commuters on trolleys are now becoming accustomed to the purchase of tokens, although trolley men say it is surprising how many continue to pay the full 10-cent fare.

A Tower Will Guide You.—Baltimore, Md., has become a City of Towers. To expedite the traffic this new device was recently put into service at Charles Street and North Avenue. When you are to move your vehicle a green light will be flashed, and a red light will warn you to stop. There is still another guide for you—watch the amber light. It indicates that a change is to be made. The tower at Charles Street and North Avenue is equipped with a siren which is sounded on the approach of fire engines.

Rehearing Denied.—Application by the city and county of Denver for rehearing of the rate case of the receiver of the Denver (Col.) Tramway has been denied by the United States Circuit Court of Appeals. The Appellate Court on Dec. 29, 1921, rendered an order sustaining the findings of the Federal District Court, which is the authority for the collection of the present rates of fare, and upholding the contention of the receiver that the franchise under which the company is operating is not a contract in so far as the rate of fare of 5 cents stipulated therein is concerned.

Commutation Tickets Reasonable.—The Public Service Commission of Pennsylvania dismissed the complaint of the patrons of the Pittsburgh, Harmony, Butler & New Castle Company, against the rates charged by the company. The commission found from the evidence submitted that the commutation ticket rates were reasonable and not discriminatory as compared with the cash fare rates. The company has established a zone basis of fares, with a minimum charge of 6 cents for each passenger. The zone rate is an average of 2.98 cents per mile. Tickets are sold in groups of forty-four and sixty, good on any part of the line. The charges are made upon the principle that the shorter the commutation distance, the larger the rate as compared with flat fares.

Wants Jitneys Prohibited.—Electric railway service in North Little (Ark.) is threatened with discontinuance if the City Council fails to pass an ordinance prohibiting "jitneys" from running parallel with the car tracks within a distance of three blocks from the car route, and granting the company the exclusive right of operating buses on certain streets within the city limits. This is the ultimatum delivered by P. C. Warren, manager of the Inter-City Terminal Railway. He stated that the company lost $2,240 during the month of February. D. H. Cantrell, president of the Little Rock Railway & Electric Company, represented the Inter-City Terminal Company at a recent City Council meeting. The matter will be taken up later and definitely decided.

Personal Mention

Frank H. Warren, Editor

Indianian With Keen Sense of the Verities Put Into Job Fitting His Natural Talents

Two events stand out like Mars at perihelion in the life of Frank H. Warren, claim agent of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind. The most important event of his life, of course, occurred on Jan. 8, 1878, when he was introduced to the world about 20 miles east of the Indianapolis Street Railway. The next important event came almost forty-four years later to the day, when Mr. Warren received a check from the ELECTRIC RAILWAY JOURNAL for an article on salesmanship. The first event is of course a little hazy in Mr. Warren's mind, but he is dead sure that the celebration of the second event completely out-classed that of the first. In comparison with these two peaks, everything that happened in between sinks into insignificance.

FROM MAIL CLERK TO EDITOR

This is Mr. Warren's own estimate. Another event took place in his career, however, which others are inclined to think stands second only to the memorable event of 1878. It occurred a few days ago when Mr. Warren had thrust upon him the editorship of the *Safety Valve*, a real magazine for the employees of the company, the first issue dated February, 1922. Ever since 1878 Mr. Warren has been headed editorward, but he didn't realize it until R. R. Smith, vice-president and general manager of the company, and other officers broke the news to him that he had been appointed editor of the company's new house organ.

It is said that all good men and true have either taught school or sold books. Mr. Warren confesses to having done both. In the course of that work he took a few vacations at normal schools and a university, along with some outside efforts, and finally succeeded in persuading Indiana University to give him two years credits. His education ended right there. He then took a correspondence course in which he learned about all the railroads in the world, later passed the examination for railway mail clerk, and went to work.

AN EXPERT ON NAMES

After learning the names of all post offices in that small section of the country west of the Alleghanies, Mr. Warren looked around for more worlds to conquer and seized on law as the most helpless victim. It took him just one year in a law office to master that subject, and then he became interested in claim work through an accident in the family. To Mr. Warren it looked like a pretty soft job. Throwing all possible safeguards about his effort to get a job, Mr. Warren went to Elmer Slick of the Union Traction Company of Indiana and suggested to him that he would be a winner in Mr. Slick's department. This was slick work, of course, but after slinging mail for Uncle Sam all day and at the same time doing odd jobs for Elmer, Mr. Warren abandoned Uncle Sam to his fate in order formally to hook up with the Indiana Union. He put in about five years with that company as assistant claim agent, and then spent about a year with the Interstate Public Service Company as safety agent. He then took a hand at selling, but what he really learned there was the wonderful stabilizing force of a salary. Then, Mr. Warren landed in the New York office of the Globe Indemnity Corporation and spent three months inquiring his way about in the Bronx and Brooklyn. It was about this time that Mr. Smith, general manager of the South Bend line, rescued Mr. Warren from his almost aimless wanderings and took him back to his Indiana home among the cornfields.

Claus Spreckels, New Manager at San Diego, Reviews Plans

Successor to Mr. Clayton at San Diego Not in Sympathy With California Association in Opposing Publication of "Bus Transportation"—Prepared to Use Buses in San Diego

CLAUS SPRECKELS, the new general manager of the San Diego (Cal.) Electric Railway, chosen at the last annual meeting of the company, "grew up in the business," it might be said, as all of his business life has been spent in the employ of the company. He began service at the age of twenty years as a bookkeeper, in 1911 was elected secretary and treasurer of the company, and the next upward step made him general manager. He has succeeded William Clayton, who had been managing director of the company for twenty-one years.

Mr. Spreckels was born in San Francisco in 1888, and received his education in the public schools of that city. He is the son of John D. Spreckels, president of the San Diego Electric Railway and of the Arizona & San Diego Railway. Claus Spreckels looks on things in a practical light, and hence refused a chance for a college education and started work for the electric railway instead, so that he could "learn the business from the ground up."

LEARNING FROM THE GROUND UP

"I couldn't see where a knowledge of the classics would help me run the electric railway," he said, "and that is what I wanted most to do. Practical experience looked to me like a more sensible way to attain my object, so I got on the payroll and worked up, acquiring such technical knowledge as I needed by my own efforts."

Mr. Spreckels said there would be no radical change of policy in the company due to his selection as manager. His aim will be to give the best possible service with the revenue provided, but to eliminate lines that do not pay their way and substitute less costly service. In this connection he expressed a strong liking for the motor bus, or "motor street car," as he prefers to call it.

"I think the motor street car is bound to develop into the logical solution of the transportation problem for districts where the traffic is not heavy enough to warrant building a trolley line," he said. "And as far as San Diego is concerned, we intend to meet all the needs for transportation. We are here to furnish transportation and we will do it.

"BUS TRANSPORTATION" MEETS REAL NEED

"And while on that subject, I want to say that I am not in sympathy with the position of the California association in opposing publication of BUS TRANSPORTATION by the McGraw-Hill Company. I think the new publication meets a need and furnishes transportation men all the latest developments in this latest means of transportation."

The new general manager got right into the middle of things when he took charge of the affairs of the company, and one of the first things he did was to announce a plan whereby the Adams Avenue line would be discontinued and replaced by a bus line. The residence suburbs of Normal Heights and Kensington Park, which are outside the city, are served by the Adams Avenue line, which was also within the city limits. The City Council gave approval to the plan subject to a satisfactory arrangement of details. However, residents of the two suburbs have entered vigorous protest against discontinuance of the electric trolley, and plans for the bus service have been temporarily halted to give the residents time to see if they can work out a plan they have proposed.

CITIZENS MUST PAY FOR PAVING

The company has agreed to consider a proposal to retain the trolley line on condition that residents relieve the company of all paving costs and to supply enough funds to the company to pay half of the cost of rebuilding the Adams Avenue line. This is esti-

mated at $190,000, and the paving, it is estimated, will cost $70,000. Thus it will be necessary for those wishing to retain the trolley service to raise $165,000. It is proposed to issue stock in the railway company to the subscribers to the fund for rehabilitating the line.

Citizens active in the movement to retain street car service have estimated that between $5,000,000 and $6,000,000 is represented in the real estate investments dependent on the Adams Avenue line for transporation, and assert they can well afford to advance this sum rather than allow the company to tear up its tracks and put on motor buses.

The Adams Avenue line has a total of 2.35 miles. The present roadbed and track is in such bad shape that repairs are useless, owing to the nature of the ground, and reconstruction is imperative if cars are to continue in operation. Reconstruction, if undertaken, will be of the highest type track, with twin steel ties imbedded in concrete, the same as was used in reconstructing the Broadway line downtown a few months ago. Manager Spreckels stated that this type of work would be used for all reconstruction henceforth in San Diego.

A citizens' transportation commission, appointed by Mayor John Bacon shortly after his election last fall, and consisting of Stephen Bjornson, chairman; H. F. Worth, secretary, and James H. App, in a preliminary report to the City Council recommended that the company be allowed to substitute motor buses operating on Madison Avenue for the Adams Avenue line, and the City Council has given tentative consent.

Bus Service May Be Started

Unless an agreement is reached with the citizens who are endeavoring to retain the trolley car service, Manager Spreckels announces, the bus service will be instituted. A bus has already been designed for the purpose, following the plans of Manager Spreckels, and a model of the car has been run over the proposed route. On the trial trip the full length of the Adams Avenue line was made in 12 minutes, including ten stops for discharging and receiving passengers. A 20-minute headway is maintained on the trolley line.

Other officers elected at the annual meeting of the San Diego Electric Railway Company were: John D. Spreckels, president; William Clayton, vice-president; Fred Whitehead, secretary; Read G. Dilworth, treasurer.

The same set of officers also was elected at the same time to occupy the same positions respectively in the Point Loma Electric Railway Company and the San Diego & Colorado Ferries Company.

William Clayton, retiring as managing head of the San Diego Electric Railway Company after twenty-one years of service, retired from the management in order to be relieved of some of the active work, it was stated at his office. He recently celebrated his sixty-third birthday and feels he is entitled to a rest. Besides his duties as vice-president of the San Diego Electric Railway Company, Mr. Clayton retains executive control over some other of the Spreckels interests in San Diego, so has enough to do to keep him comfortably occupied. Claus Spreckels was his natural successor in the executive chair, as the young man will some day be called on to look after all of his father's large interests, and the management of the electric railway was considered the logical starting point.

Mr. Clayton is rather proud of his record of twenty-one years as executive of the San Diego Electric Railway with never a strike nor labor trouble of any kind, nor of any serious friction with the San Diego public.

Major Smith to Assist President

On the double quick Major Earl H. Smith has marched into two important executive positions. Though he is just

E. H. SMITH

forty-two and thus scarcely old enough to have more than handled one big job, Major Smith has mastered one and is well started on his second. For Major Smith is not only editor of the Fairmont *Times*, Fairmont, W. Va., a paper which he founded, but he is now tackling the job of acting as assistant to the president of the Monongahela Power & Railway Company. He will direct the public relations of the company, and have charge of publicity.

Though his new position is somewhat removed from his previous work, in reality Major Smith has simply exchanged the game of marbles for the game of discovering the public, for he has known the men who promoted the traction company since they hooked rides, cookies and holidays together.

Since leaving college Mr. Smith has spent most of his life in the newspaper game, and some time ago founded the Fairmont *Times*. He served in France during the European War, and upon his return assisted President Alexander in an informal way. He now becomes formally associated with the company.

Obituary

E. H. Ives

Edward H. Ives, assistant general superintendent of the Detroit (Mich.) United Railway, died on March 19 as a result of injuries received when an interurban train of the Detroit United Company struck the automobile which he was driving. His wife, three children and a friend were also killed.

Mr. Ives, with his family, was on the way to Capac, when the car skidded on the ice-covered highway a mile south of Rochester, Mich., directly in front of the interurban train. One daughter jumped from the machine and was uninjured. These facts were ascertained since the publication of the item about Mr. Ives in the issue of last week.

Mr. Ives had been connected with the Detroit United Railway for twenty-six years. He had worked up to his position of assistant general superintendent from carhouse boy. He was promoted to the office of assistant division superintendent and superintendent, and before his last position was assistant schedule chief and later second assistant general superintendent.

Mr. Ives has been popular with the company and with city officials. The city hoped to keep him when the Municipal Railway and the Detroit United lines were combined.

John A. Hurley, retired manufacturer of Bridgeport, Conn., died at his home in that city March 20. Mr. Hurley was born in New Haven, April 30, 1854. When young he removed to Meriden, Conn., where he became vice-president of the Connecticut Breweries Company. While in Meriden he built the electric railway from that city to Lake Compounce, known as the Meriden, Southington & Lake Compounce Street Railway. Mr. Hurley was later associated with the Hurwood Manufacturing Company, and more recently was engaged in the insurance business.

Walter G. Oakman, noted financier and railroad builder, died on March 18 in New York, N. Y. He was in his seventy-seventh year. Mr. Oakman was best known to New Yorkers as president of the Hudson Companies, which financed the tunnel system that links New York City with New Jersey. He had also been interested in the Interborough and the Brooklyn Rapid Transit companies. He was graduated from the University of Pennsylvania in 1864, leaving college to join the Union armies and fight in the closing months of the Civil War. Later he entered the railway field, and became division superintendent of the Delaware, Lackawanna & Western Railroad. He was a director of the Brooklyn Rapid Transit Company, Brooklyn Heights Railroad, Hudson & Manhattan Railroad, New York Municipal Railway and many other transit and banking companies.

Manufactures and the Markets

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

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Industrial Machinery Division Formed

The Bureau of Foreign & Domestic Commerce, Washington, D. C., announces the formation of an Industrial Machinery Division to provide American manufacturers of machinery with assistance from the government. A pamphlet has been issued describing the functions and aims of the division, together with the service which is available.

William J. Clark Honored

William J. Clark, pioneer in the commercial development of electric railways in the United States and a member of the staff of the General Electric Company for thirty-four years, has been appointed advisory manager of the E. railway department. During his connection with the company, he has been manager of both its railway and foreign departments, managing director of the British Thomson-Houston Electric Company, manager of the Cincinnati office and manager of the London office of the General Electric, as well as holding other positions of importance.

Mr. Clark, who was born in Derby, Conn., in 1854, was instrumental in obtaining the legislative charter authorizing the construction of the first electric railway in the world intended for freight traffic. This was at Derby and Ansonia, Conn. In 1888, he joined the Thomson-Houston Company, of Lynn, Mass., and induced that company to purchase the Van Depoele electric railway patents, which from a patent standpoint were essential to the fullest possible development of that industry. Later he played an important part in the commercial exploitation of these patents as well as the series parallel control, Sprague's multiple-unit train control, Curtis' steam turbine and other inventions. In 1896, at Milwaukee, Mr. Clark made the first, in this country, of what is now termed "physical valuation" of a large electric public utility.

In 1908 he was expert on Cuban affairs for the War Department. In 1906 and 1907 he was the chairman of the ways and means committee of the National Civic Federation, in which connection he financed the extensive investigation of municipal ownership conducted by the federation in this country and in Europe; and he was a member of the commission which made the investigation. He was also connected with the Republican national committee in the years 1880, 1884, 1896, 1904.

Mr. Clark is a member of all the important electrical and railway engineering societies in the country. He makes his headquarters at the New York office of the General Electric Company.

WILLIAM J. CLARK

The duties of his new position, as indicated by the title, will be entirely advisory.

Foreign Trade Convention in Philadelphia

Ways of developing foreign markets for American goods are the concrete problems to be discussed at the Ninth National Foreign Trade Convention in Philadelphia, May 10, 11 and 12, when the best business brains and experience of the nation will concentrate on these questions.

The federal government will be represented through the Department of Commerce. Whether Secretary Hoover will be present is uncertain, but the Department will have a large number of its best executives and experts at the convention. Many of these will come direct from their posts abroad and thus will be able to give up-to-the-minute and first-hand information on foreign trade matters.

The big problem before the convention is how to sell abroad the estimated 20 per cent surplus of American production over domestic consumption. One suggested means is the incorporation in all foreign loans hereafter negotiated in this country of a condition that all or a large part of the proceeds be spent here for American goods. Another means of financing foreign trade that will be stressed is the employment of the gold surplus in the United States.

One general session will be devoted to taxation and currency questions. Shipping matters will be taken up at another, and the tariff and exchange at a third.

How Boston Will Spend Her Four Million

As was mentioned in the March 4 issue of the ELECTRIC RAILWAY JOURNAL the Boston Elevated Railway's 1922 budget will amount to approximately $4,000,000. The following details or the major items of expenditure from this budget are of interest:

For power station equipment	$1,000,000
For shops at Everett and Forest Hills	1,000,000
For new cars	1,100,000
For improved signal system	200,000
For Lechmere Square terminal	100,000
For new lobby building at Malden	50,000
For tools, sprinkler systems and miscellaneous equipment	150,000

ELECTRIC RAILWAY MATERIAL PRICES—MARCH 28, 1922

Metals—New York

Copper, electrolytic, cents per lb	12.75
Lead, cents per lb	4.75
Nickel, cents per lb	41.00
Zinc, cents per lb	4.99
Tin, Straits, cents per lb	29.125
Aluminum, 98 to 99 per cent, cents per lb	19.00
Babbitt metal, warehouse, cents per lb.:	
Best grade	32.00
Commercial	16.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.57½
Somerset mine run, Boston	1.87
Pittsburgh mine run, Pittsburgh	1.85
Franklin, Ill., screenings, Chicago	2.00
Central, Ill., screenings, Chicago	1.87
Kansas Screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$40.00
Standard open hearth rails, gross ton	$40.00
Railroad spikes, drive, Pittsburgh base, cents per lb	2.05
Tie plates (flat type), cents per lb	1.75
Angle bars, cents per lb	2.40
Rail bolts and nuts, Pittsburgh base, cents, lb.	3.87½
Steel bars, cents per lb	1.45
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	1.35

Hardware—Pittsburgh

Wire nails, cents per lb	2.40
Sheet iron, (24 gage), cents per lb	3.72½
Sheet iron, galvanized, (24 gage), cents per lb	4.42½
Galvanized barbed wire, cents per lb	3.05
Galvanized wire, ordinary, cents per lb	2.75

Waste—New York

Waste, wool, cents per lb	13.00
Waste, cotton, (100 lb. bale), cents per lb.:	
White	10.00
Colored	9.00

Paints, Putty and Glass—New York

Linseed oil, (5 bbl. lots), cents per gal	87.00
White lead, (100 lb. keg), cents per lb	12.25
Turpentine, (bbl. lots), cents per gal	87.00
Car window glass, (single strength), first three brackets, A quality, discount*	85.5%
Car window glass, (single strength), first three brackets, B quality, discount*	86.5%
Car window glass, (double strength, all sizes, A quality), discount*	85.0%
Putty, 5 lb. tins, cents per lb	5.50

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

Wire—New York

Copper wire base, cents per lb	14.12½
Rubber-covered wire, cents per lb	5.90
Weatherproof wire base, cents per lb	15.50

Paving Materials

Paving stone, granite, 4 x 8 x 4, f.o.b. Chicago, dressed, per sq.yd	$3.35
Common, per sq.yd	3.00
Wood block paving 3½, 16 treatment, N. Y., per sq.yd	2.17
Paving brick, 3½ x 8½ x 4, N. Y. per 1,000 in carload lots	49.50
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd	1.75
Cement, Chicago consumers net prices, without bags	1.94
Gravel, ¾-in., cu.yd., N. Y	1.75
Sand, cu.yd., N. Y	1.00

Old Metals—New York

Heavy copper, cents per lb	9.37½
Light copper, cents per lb	8.37½
Heavy brass, cents per lb	5.25
Zinc, old scrap, cents per lb	2.37½
Yellow brass, cents per lb (heavy)	5.25
Lead, heavy, cents per lb	3.81
Steel car axles, Chicago, net ton	$13.25
Old car wheels, Chicago, gross ton	16.50
Rails (short), Chicago, gross ton	13.75
Rails (relaying), Chicago, gross ton	13.75
Machine turnings, Chicago, net ton	5.25

Coal Prices Decrease on Eve of Strike

The eve of the coal strike has been marked by a further softening of the market. Commercial consumers of coal have turned a deaf ear to the quotations made, while railroads and public utilities, which have been the most active takers, are going out of the market as their stocking programs are completed.

Heavy production in the face of this apathetic demand make lower prices inevitable. *Coal Age* index of spot bituminous prices stands at 170 on March 27, as compared with 173 on March 20. Domestic demand has almost disappeared and only the diminishing output of the resultant sizes kept steam prices from slipping to lower levels in sections where bituminous is used for household purposes.

The industrial consumer had several motives for withdrawing, temporarily at least, from the market. Present consumption rates are so low that reserve stocks are almost topheavy; indications that an announcement of cuts in freight rates will soon be made and the persistent belief that non-union fields will be able to supply fuel needs above existing stocks are the main reasons. No one wants to be caught after the strike with a stock of coal on hand that cost more than its replacement value. That the non-union supply may be adequate is being shown by the increasing desire of those operators to take on forward commitments, and dull times are surely ahead for the coal man unless the present suspension is sufficiently prolonged to enable consumers to work off the reserve supplies.

Westinghouse Electric Company Announces Personnel Changes

Several changes in personnel have been announced by the Westinghouse Electric & Manufacturing Company, among them being transfers of various managers in district offices.

R. L. Rathbone, branch manager of the Cleveland office, will take up special duties in connection with merchandising matters, with headquarters in Cleveland. J. Andrews, Jr., manager of the industrial division, Pittsburgh office, has been appointed manager of the Cleveland office and C. D. Taylor succeeds Mr. Andrews in the Pittsburgh office. R. Seybold has been appointed manager of price statistics and he will act as secretary of the domestic sales committee, among other duties, and will assist W. S. Rugg, assistant to the vice-president in general duties connected with the vice-president's office. W. R. Keagy has been appointed office manager of the Cincinnati office and J. R. Deering office manager of the Los Angeles office. H. S. Walker succeeds M. E. Lanning as promotion man in the Denver office and I. G. Cline takes up the promotion work vacated by R. A. O'Reilly in the Chicago office. K. L. Graham succeeds to the post vacated by H. C. Hopkins as promotion man in the San Francisco office.

Track and Roadway

Portland & Oregon City Railway, Portland, Ore., will extend its line 9 miles from Carver, Clackamas County, to Viola on Clear Creek. Proposed work will cost $90,000.

New York State Railways, Rochester Lines, is planning to reconstruct about 5 miles of single track in Rochester during 1922. This will require new rails, track and pavenment.

Fresno (Cal.) Traction Company has under consideration improvements and extensions of its lines requiring a total estimated outlay of $150,000. Plans have not been revealed.

The Public Service Railway, Newark, N. J., is installing pilot lights on all single-track lines with turnouts on its southern division where one-man cars are operated. This gives the operator the advantage of being able to look straight ahead.

San Francisco-Oakland Terminal Railways, Oakland, Cal., has announced that it will begin work immediately on the double tracking on Fourteenth Avenue between East Twenty-first and East Twenty-second Streets. A switch will be installed to improve service on the Hopkins Street lines. The double tracking will cost approximately $8,500.

Washington Railway & Electric Company, Washington, D. C., expects to extend its Eleventh Street and Lincoln Park lines. The company, according to present plans, will build the Eleventh Street line from the terminal at Eleventh Avenue and Monroe Streets, N. W., to Spring Road, out Kansas Avenue, and connect with the Georgia Avenue line. Overhead trolley construction will be used. The total cost will approximate $107,940. The Lincoln Park extension will include work on East Capitol Street and will cost about $97,250.

Power Houses, Shops and Buildings

Athens Railway & Electric Company, Athens, Ga., will purchase within a few days two 200-amp, 2,300-volt, single-phase regulators of the induction type, self-contained.

Boston (Mass.) Elevated Railway has asked for bids on two underfeed stokers and clinker grinders and the erecting of these under two 1825-hp. B. & W. boilers at the South Boston power station.

Cumberland County Power & Light Company, Portland, Me., has started work on its new $1,000,000 power plant at Knightville. When completed the plant will add 10,000 kw. to company's facilities. The Foundation Company of New York has charge of the construction work.

Rochester and Syracuse Railroad has bought one automatic control equipment for the Macedon substation. This station has two 400-kw. rotary converters, and a change-over switch provides so that either converter can be thrown on the automatic control equipment as desired. The hand control equipment to be removed from the Macedon substation will be used at two other locations.

Professional Note

Union Investment & Contracting Company announces the opening of offices at 7 Dey Street, New York, and the continuance of its business in association with the T. A. Gillespie Company, contractors, and with the Wood Hulse Yates Company, Inc., engineers. The company is prepared to execute for clients investigations, reports and appraisals and to undertake the design, construction, financing and management of industrial and public utility enterprises and other engineering projects. The officers of the company are T. A. Gillespie, chairman of board; F. A. Yates, president; B. F. Wood, vice-president; W. S. Hulse, vice-president; T. H. Gillespie, vice-president and treasurer, and F. J. Nash, secretary.

Trade Notes

Service Motor Truck Company, Wabash, Ind., will supply the Greater Winnipeg Water District Railroad with eleven motor rail buses, at a cost of $176,000.

Irvington Varnish & Insulator Company, Irvington, N. J., announces a change in the ownership of the common stock of the company and the election of a new board of directors, consisting of William F. Hoffmann, Arthur E. Jones, Andrew Young, Carl Egner and D. Frederick Burnett.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has received orders from the Commonwealth Edison Company, Chicago, for three 12,000-amp., 60-cycle booster converters with transformer equipment, and one 16,000-amp., 25-cycle booster converter also with transformer equipment. The company also reports an order from the Consolidated Gas, Electric Light & Power Company of Baltimore, Md., for one 16,000-amp., 25-cycle booster converter with transformer equipment.

New Advertising Literature

The Truscon Laboratories, Detroit, Mich., have just issued a second edition of a thirty-two page booklet entitled "Science and Practice of Integral Waterproofing." The first fifteen pages are devoted to explaining why concrete requires waterproofing, and following this are specifications for various methods recommended. There is also a chapter devoted to the practical application of waterproofed cement plaster coat. This publication is being distributed free to those interested.

Bankers and Engineers

FARE COLLECTING ON A CORRECT BUSINESS BASIS

A one-man car equipped with an Ohmer Fare Register with a capacity of twelve different fare classifications.

By the use of Ohmer Fare Registers the principles of successful merchandising are applied to the electric railway business.

The amount of each transportation sale is publicly indicated and a printed record made of it. The passenger is given the satisfaction of a visible receipt for exactly what he pays.

The conductor finds that the easiest and the safest way is to be careful and honest. If he is worthy, he becomes a booster and a responsible salesman. If he is unworthy, he gravitates to some other property where Ohmer Fare Registers are not used.

Ohmer Fare Register Company
Dayton, Ohio

A convenient installation for a one-man car or motor bus.

Just lik

On every mile of t
with wood ties

And they have repeate
demonstrated a saving
$2,000 per mile over wo
tie construction in gra
ballast.

Dayton Resilient Ties (
reduce first cost; (2) gi
longer life to track; (3)
duce track and paving
pairs; (4) reduce upke
of rolling stock and (
reduce traffic noise.

Have the facts about lower cost track construction laid before you—write today!

THE DAYTON MECHANICAL TIE CO.
707 Commercial Building
Dayton, Ohio

Canadian Representative:
Lyman Tube and Supply Co., Ltd., Montreal, Quebec

DAYTON

finding $6,000

yton Resilient Ties will save you $6000 as compared concrete—*and the construction is permanent*

The time for track building and track rebuilding is nearly at hand.

No doubt you would have attended to several bad stretches of track before this except that you thought of the cost of the work in terms of wood tie construction.

—and that cost seemed prohibitive under present conditions.

Such construction IS prohibitive in comparison to the NEW method of putting down *permanent* track with Resilient Ties! Think of a saving of $6,000 per mile over wood ties using concrete foundation, or a saving of $2,000 per mile over wood ties using gravel ballast—

Is it any wonder that more and more electric railway men are turning each year to the *permanent low-cost construction made possible by Resilient Ties?*

This tremendous saving in hard-earned dollars is sufficient argument for any straight-thinking business man. Conservation must come, not by tightening our belts, so to speak, but by instituting better and more modern methods of construction at lower costs.

Resilient Ties are the last word in this respect. They not only provide a superior grade of track, but provide it at far less cost than does old-fashioned wood tie construction. And by their resiliency they do away with fully 30% of the distructive wear on rolling stock caused by jarring.

Resilient Ties cushion the shock on rolling stock!

ELECTRIC RAILWAY JOURNAL

Think "SEARCHLIGHT" First

ADVERTISING RATES

POSITIONS VACANT—Business Opportunities and other undisplayed ads, 8 cents a word, minimum $2.00 an insertion.

POSITIONS WANTED—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

ADD 5 WORDS for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

DISCOUNT OF 10% if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

ADS IN DISPLAY TYPE—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

RATE PER INCH for ads in display space:

1 to 3 in., $4.50 an in.	15 to 29 in., $3.90 an in.
4 to 7 in., $4.30 an in.	30 to 49 in., $3.80 an in.
8 to 14 in., $4.10 an in.	60 to 99 in., $3.70 an in.

POSITIONS WANTED

FOREMAN or master mechanic; 14 years' experience; age 35; high grade references, go anywhere. PW-402 Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

MASTER MECHANIC or general foreman; 22 years' experience on all types of railway motors, also one-man cars and line work; A-1 reference. PW-407, Elec. Ry. Journal.

MASTER mechanic, 24 years' experience on city and interurban railways and 3 years in charge of maintenance for company operation 225 motor trucks. PW-403, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

POSITION wanted as roadmaster or track superintendent by a roadmaster. Have proven ability in all kinds construction and repairs, also special work. References O.K. Desire change. PW-405, Elec. Ry. Journal.

SUPERINTENDENT construction. Catenary trolley. Trolley, high tension transmission, either pole or tower; capable handling complete layout; start $300 per month. PW-406, Elec. Ry. Journal, Real Estate Trust Bldg., Philadelphia, Pa.

SUPERINTENDENT of transportation, with a proven record of 17 years in electric railway field on large city and interurban properties, desires a change and will consider any good size property that requires a capable superintendent of transportation that has the ability to take over details and get results. Very successful in handling labor, capable of building up an organization that would add to value of any property. Best of references from men of highest integrity in railway field. Personal reasons for desiring change. PW-404, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Receivers Aftercoolers
Ingersoll-Rand Co.

Anchors, Guy
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Armature Shop Tools
Elec. Service Supplies

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Cambria Steel Co.
Midvale Steel & Ord. Co.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Babbitt Metal
Ajax Metal Co.
More-Jones B. & M. Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Supplies Co.
International Register Co., The

Bankers and Brokers
Coal & Iron National Bank

Batteries, Dry
National Carbon Co.
Nichols-Lintern Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Br. & Metal Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Heating Co
Elec. Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Amer. Chain Co., Inc.
Ry. Track-work Co.
Watson-Stillman Co.

Bending Apparatus
Elec. Railway Imp. Co.
Ry. Track-work Co.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
Cambria Steel Co.
Midvale Steel & Ord. Co.
National Tube Co.

Bond Testers
Amer. Steel & Wire Co.
Elec. Service Supplies
Rail Welding & Bonding Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Ry. Imp. Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Elec. Railway Imp. Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Ry. Track-work Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & M. Co.

Book Publishers
McGraw-Hill Book Co., Inc.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
Bates Exp. Steel Truss Co.
Creaghead Eng. Co.
Electric Ry. Equip. Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Nat'l. Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Wheel Truing Brake Shoe Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co
Safety Car Devices Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Tr. Br. Co.

Brooms, Track, Steel and Rattan
Amer. Rattan & Reed Mfg. Co.
Paxson Co., J. W.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
National Carbon Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite
National Carbon Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

Brushes, Wire Pneumatic
Ingersoll Rand Co.

Buses, Motor
Brill Co., The J. G.

Bushings
Natl. Fibre & Insulation Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.

Cables
(See Wires and Cables)

Carbon Brushes
(See Brushes, Carbon)

Car Lighting Apparatus
Elec. Service Supplies

Car Panel Safety Switches
Consolidated Car Heating Co
Westinghouse Elec. & M. Co.

Cars, Dump
Differential Steel Car Co., Inc.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cambria Steel Co.
Kuhlman Car Co., G. C.
Midvale Steel & Ord. Co.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.
Witt, Peter

Cars, Second-Hand
Electric Equipment Co.

Car, Self-Propelled
General Electric Co.

Castings, Brass, Composition or Copper
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
More-Jones Br. & Metal Co.

Castings, Funnel
Wharton, Jr., & Co., Inc., Wm.

Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.
Wharton, Jr., & Co., Inc., Wm.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Earll, C. I.
Electric Service Sup. Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Pantasote Co., The

Circuit Breakers
Cutter Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Dossert & Co.
Electric Railway Equip. Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Westinghouse Elec. & M. Co.

Cleaners and Scrapers, Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature and Field
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines
International Register Co., The
Johnson Fare Box Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Trac. B. Co.

Compressors, Air Portable
Ingersoll Rand Co.

Compressors, Gas
Ingersoll-Rand Co.

Concrete Reinforcing Bars
Cambria Steel Co.
Midvale Steel & Ordnance

Condensers
General Electric Co.
Ingersoll Rand Co.
Westinghouse Elec. & M. Co.

Conduits, Underground
Std. Underground Cable Co.

Connectors, Solderless
Dossert & Co.
Westinghouse Elec. & M. Co.

Connectors, Trailer Car
Consolidated Car Heating Co.
Elec. Service Supplies

Controllers or Parts
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Controller Regulators
Electric Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse Elec. & M. Co.

Conveying and Hoisting Machinery
Columbia M. W. & M. I. Co.

Copper Wire
Anaconda Copper Mining Co.

Cord Adjusters
Nat'l Fibre & Insulation Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Sup. Co.
International Register Co., The
Roeblings Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Electric Service Sup Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings, Frogs and Switches
Wharton, Jr. & Co., Inc., Wm.

Crossing Signals. (See Signals, Crosslog)

Crossings, Track. (See Track, Special Work)

Culverts
Canton Culvert & Silo Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Elec. Service Supplies Co.
Morton Mfg. Co.
Pantasote Co., The
St. Louis Car Co.

Dealers' Machinery
Archer & Baldwin
Electric Equipment Co.
Transit Equipment Co.

Destination Signs
Columbia M. W. & M. I. Co.
Creaghead Eng. Co.
Electric Service Supplies Co.

Detective Service
Wish Service, P. Edward

Dogs, Lathe
Williams & Co., J. H.

Door Operating Devices
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.

Doors and Shutters, Fireproof
Kinnear Mfg. Co.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

Doors, Steel, Rolling
Kinnear Mfg. Co.

Draft Rigging. (See Couplers)

Drills, Rock
Ingersoll-Rand Co.

Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Ingersoll-Rand Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.

Electrical Wires and Cables
American Elec. Works
Roebling's Sons Co., J. A.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. E.
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Day & Zimmerman, Inc.
Drum & Co., A. L.
Engel & Hevenor
Feustel, Robert M.
Ford, Bacon & Davis
Hemphill & Wells
Holat, Englehardt W.
Jackson, Walter
Parsons, Klapp, Brinkerhoff & Douglas
Richey, Albert S.
Sanderson & Porter
Smith & Co., C. E.
Stone & Webster
Witt, Peter

Engines, Gas, Oil and Steam
Ingersoll-Rand Co.
Westinghouse Elec. & M. Co.

Expansion Joints, Track
Wharton, Jr. & Co., Inc., Wm.

Fare Boxes
Cleveland Fare Box Co.
Johnson Fare Box Co.
Na'l Ry. Appliance Co.
Ohmer Fare Register Co.

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.
Cambria Steel Co.
Midvale Steel & Ordnance Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cleveland Fare Box Co.
Electric Service Sup. Co.
Star Brass Works

Fibre and Fibre Tubing
Continental Fibre Co.
Nat'l Fibre & Insulation Co.
Westinghouse Elec. & M. Co.

Field Coils. (See Coils)

Flaxlinum Insulation
Nat'l Ry. Appliance Co.

Floodlights
Electric Service Sup. Co.

Floor Plates
Amer. Abrasive Metals Co.

Flooring Composition
American Mason Safe Tread Co.

Forgings
Cambria Steel Co.
Columbia M. W. & M. I. Co.
Midvale Steel & Ordnance Co.
Standard Steel Works Co.
Williams & Co., J. H.

Frogs, Track. (See Track Work)

Fuses and Fuse Boxes
Columbia M. W. & M. Co.
Consolidated Car Heating Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Williams & Co., J. H.

Fuses, Refillable
Columbia M. W. & M. I. Co.
General Electric Co.

Gaskets
Power Specialty Co.
Westinghouse Tr. Br. Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse Elec. & M. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
Cambria Steel Co.
Midvale Steel & Ord. Co.
Standard Steel Works Co.

Gear Cases
Columbia M. W. & M. Co.
Electric Service Sup. Co.
Westinghouse Elec. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia M. W. & M. Co.
Electric Service Sup. Co.
General Electric Co.
Nat'l Ry Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
English Electric Co., Ltd.
General Electric Co.
Westinghouse Elec. & M. Co.

Gongs. (See Bells and Gongs)

Greases. (See Lubricants)

Grinders and Grinding Supplies
Railway Track-work Co.

Grinding Blocks and Wheels
Railway Track-work Co.

Guards, Trolley
Electric Service Sup. Co.
Ohio Brass Co.

Hammers, Pneumatic
Ingersoll Rand Co.

Harps, Trolley
Anderson M. Co., A. & J.
Bayonet Trolley Harp Co
Electric Service Sup. Co.
More-Jones Br. & Metal Co
Nuttall Co., R. D.
Star Brass Works

Headlights
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Pantasote Co., The

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

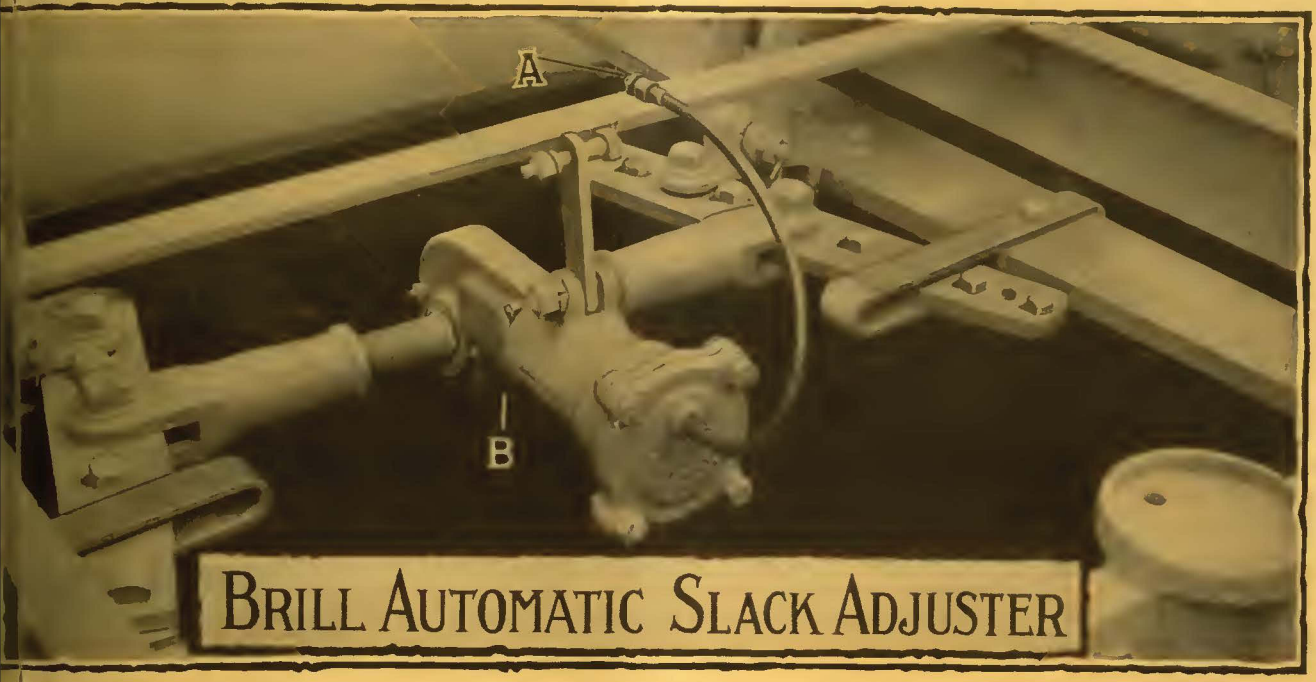
Heaters, Car (Stove)
Electric Service Sup. Co.
Smith Heater Co., Peter

Hoists and Lifts
Columbia M. W. & M. I. Co.
Ford-Chain Block Co.

Hoists, Portable
Ingersoll Rand Co.

Hose, Bridges
Ohio Brass Co.
Hydraulic Machinery
Watson-Stillman Co.
Instruments, Measuring, Testing and Recording
Elec. Service Supplies
General Electric Co.
Westinghouse Elec. & M. Co.
Insulating Cloth, Paper and Tape
Anchor Webbing Co.
General Electric Co.
Hope Webbing Co.
National Fibre & Insulation Co.
Westinghouse Elec. & M. Co.
Insulating Machinery
Amer. Ins. Machinery Co.
Insulation. (See also Paints)
Anderson M. Co., A. & J. M.
Electric Ry. Equipment Co.
Electric Service Sup. Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Insulators. (See also Line Material)
Anderson M. Co., A. & J. M.
Creaghead Engineering Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Pittsburgh High Voltage Insulator Co.
Westinghouse Elec. & M. Co.
Insulator Pins
Electric Service Sup. Co.
Hubbard & Co.
Insurance, Fire
Marsh & McLennan
Inventions Developed and Perfected
Peters & Co., G. D.
Jacks. (See also Cranes, Hoists and Lifts)
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
Duff Mfg. Co.
Elec. Service Supplies
National Ry. Appliance Co.
Watson-Stillman Co.
Joints, Rail
Amer. Chain Co., Inc.
Journal Boxes
Bemis Car Truck Co.
Brill Co., J. G.
Lamp Guards and Fixtures
Anderson M. Co., A. & J. M.
Electric Service Sup. Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Lamps, Arc and Incandescent (See also Headlights)
Anderson M. Co., A. & J. M.
General Electric Co.
Nat'l Elec. Specialty Co.
Westinghouse Elec. & M. Co.
Lamps, Signal and Marker
Nichols-Lintern Co.
Lanterns, Classification
Nichols-Lintern Co.
Lathe Attachments
Williams & Co., J. H.
Lightning Protection
Anderson M. Co., A. & J. M.
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.
Line Material. (See also Brackets, Insulators, Wires, etc.)
Anderson M. Co., A. & J. M.
Archbold Brady Co.
Columbia M. W. & M. I. Co.
Creaghead Eng. Co.
Dossert & Co.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
English Electric Co., Ltd.
General Electric Co.
Hubbard & Co.
More-Jones Br. & Metal Co.
Westinghouse Elec. & M. Co.
Locking Spring Boxes
Wharton, Jr. & Co., Inc., Wm.
Locomotives, Electric
General Electric Co.
Westinghouse Elec. & M. Co.
Lubricating Engineers
Galena-Signal Oil Co.
Universal Lubricating Co.
Lubricants, Oil and Grease
Borne, Scrymser Co.
Galena-Signal Oil Co.
Universal Lubricating Co.
Lumber. ((See Poles, Ties, etc.)
Machine Tools
Columbia M. W. & M. I. Co.
Watson-Stillman Co.
Manganese Steel, Special Track Work
Wharton, Jr. & Co., Inc., Wm.
Motor Buses
(See Buses, Motor)
Motor Leads
Dossert & Co.
Motormen's Seats
Brill Co., J. G.
Electric Service Sup. Co.
Wood Co., Chas. N.
Motors, Electric
General Electric Co.
Westinghouse Elec. & M. Co.
Motor and Generator Sets
General Electric Co.
Nails
Cambria Steel Co.
Midvale Steel & Ordnance Co.
Nuts and Bolts
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Oils. (See Lubricants)
Packing
Elec. Service Supplies
Power Specialty Co.
Westinghouse Tr. Br. Co.
Paints and Varnishes for Woodwork
National Ry. Appliance Co.
Pavement Breakers
Ingersoll Rand Co.
Paving Bricks, Filler and Stretcher
Nelsonville Brick Co.
Paving Material
Amer. Br. Shoe & Fdry Co.
Nelsonville Brick Co.
Pickups, Trolley Wire
Electric Service Sup. Co.
Ohio Brass Co.
Pinion Pullers
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
General Electric Co.
Wood Co., Chas. N.
Pinions. (See Gears)
Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Electric Service Sup. Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.
Pipe
National Tube Co.
Pipe Fittings
Power Specialty Co.
Standard Steel Works Co.
Watson-Stillman Co.
Westinghouse Tr. Br. Co.
Planers. (See Machine Tools)
Pliers, Insulated
Electric Service Sup. Co.
Pneumatic Tools & Accessories
Ingersoll-Rand Co.
Pole Reinforcing
Drew Elec. & Mfg. Co.
Hubbard & Co.
Poles, Metal Street
Bates Expanded Steel Truss Co.
Electric Ry. Equip. Co.
Hubbard & Co.
Poles & Ties Treated
International Creosoting & Construction Co.
Page & Hill Co.
Poles, Ties Post, Piling and Lumber
International Creosoting & Construction Co.
Page & Hill Co.
Poles, Trolley
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
National Tube Co.
Nuttall Co., R. D.
Poles, Tubular Steel
Electric Ry Equip. Co.
Elec. Service Supplies
National Tube Co.
Power Saving Devices
Nat'l Ry. Appliance Co.
Pressure Regulators
General Electric Co.
Westinghouse Elec. & M. Co.
Pumps
Ingersoll Rand Co.
Schutte & Koerting Co.
Watson-Stillman Co
Pumps, Vacuum
Ingersoll Rand Co.
Punches, Ticket
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N.
Punching Machinery
Watson-Stillman Co.
Rails
Cambria Steel Co.
Midvale Steel & Ord. Co.
Rail Grinders. (See Grinders)
Railway Safety Switches
Consolidated Car Heating Co
Westinghouse Elec. & M. Co.
Rail Welding. (See Welding Processes
Ry. Track-work Co.
Rail Welding & Bonding Co.
Rattan
Amer. Rattan & Reed Mfg. Co.
Brill Co., The J. G.
Electric Service Sup. Co.
St. Louis Car Co.
Registers and Fittings
Brill Co., The J. G.
Electric Service Sup. Co.
International Reg. Co., The
Ohmer Fare Register Co.
Rooke Automatic Reg. Co.
Reinforcement, Concrete
Amer. Steel & Wire Co.
Repair Shop Appliances. (See also Coil Banding and Winding Machines)
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Repair Work. (See also Coils)
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Replacers, Car
Amer. Chain Co., Inc.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Resistance, Grid
Columbia M. W. & M. I. Co.
Resistance, Wire and Tube
General Electric Co.
Westinghouse Elec. & M. Co.
Resistances
Consolidated Car Heating Co.
Retrievers, Trolley. See Catchers and Retrievers, Trolley)
Rheostats
General Electric Co.
Westinghouse Elec. & M. Co.
Roofing Car
Pantasote Co., The
Sanders, Track
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.
Sash Fixtures, Car
Brill Co., The J. G.
Scrapers, Track. (See Cleaners and Scrapers, Track)
Seating Materials
Brill Co., J. G.
Pantasote Co., The
St. Louis Car Co.
Seats, Car. (See also Rattan)
Amer. Rattan & Reed Mfg. Co.
Brill Co., The J. G.
Peters & Co., G. D.
St. Louis Car Co.
Second-Hand Equipment
Archer & Baldwin
Electric Equipment Co.
Shades, Vestibule
Brill Co., The J. G.
Shovels
Hubbard & Co.
Shovels, Power
Brill Co., The J. G.
Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Sup. Co.
Nat'l Pneumatic Co., Inc.
Signals, Indicating
Nichols-Lintern Co.
Signal Systems, Block
Electric Service Sup. Co.
Nachod Signal Co., Inc.
Union Switch & Signal Co.
U. S. Electric Signal Co.
Wood Co., Chas. N.
Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Slack Adjusters. (See Brake Adjusters)
Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Electric Ry. Equip. Co.
Elec. Service Supplies
More-Jones Br. & Metal Co.
Nuttall Co., R. D.
Smokestacks, Car
Nichols-Lintern Co.
Snow-Plows, Sweepers and Brooms
Amer. Rattan & Reed Mfg. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Soldering and Brazing. (See Welding Processes and Apparatus.)
Spikes
Amer. Steel & Wire Co.
Splicing Compounds
Westinghouse Elec. & M. Co.
Splicing Sleeves. (See Clamps and Connectors)
Springs, Car and Truck
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Taylor Electric Truck Co.
Sprinklers, Track and Road
Brill Co., The J. G.
St. Louis Car Co.
Steel & Steel Prods.
Cambria Steel Co.
Midvale Steel & Ord. Co.
Morton Mfg. Co.
Steps, Car
Amer. Abrasive Metals Co.
American Mason Safety Tread Co.
Morton Mfg. Co.
Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse Elec. & M. Co.
Storage Batteries. (See Batteries, Storage).
Strand
Roebling's Sons Co., J. A.
Structural Steel
Cambria Steel Co.
Midvale Steel & Ord. Co.
Superheaters
Babcock & Wilcox Co.
Power Specialty Co.
Sweepers, Snow. (See Snow Plows, Sweepers and Brooms)
Switch Stands
Ramapo Iron Works.
Switches, Selector
Nichols-Lintern Co.
Switches, Track. (See Track, Special Work)
Switches and Switchboards
Anderson Mfg. Co., A. & J. M.
Cutter Co.
Electric Service Sup. Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Tampers, Tie
Ingersoll-Rand Co.
Tapes and Cloths. (See Insulating Cloth, Paper and Tape)
Telephones and Parts
Electric Service Sup. Co.
Testing Instruments. (See Instruments, Electrical Measuring Testing, etc.)
Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter
Thread-Cutting Tools
Williams & Co., J. H.
Ticket Choppers and Destroyers
Electric Service Sup. Co.
Ties, Mechanical
Dayton Mechanical Tie Co.
Tie Plates
Cambria Steel Co.
Midvale Steel & Ord. Co.
Ties and Tie Rods, Steel
Barbour-Stockwell Co.
International Steel Tie Co.
Ties, Wood Cross. (See Poles, Ties, Posts, etc.)
Tongue Switches
Wharton, Jr., & Co., Inc., Wm.
Tool Holders
Williams & Co., J. H.
Tool Steel
Cambria Steel Co.
Midvale Steel & Ord. Co.
Tools, Track and Miscell.
Amer. Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Hubbard & Co.
Railway Track-work Co.
Tools, Thread Cutting
Williams & Co., J. H.
Towers and Transmission Structures
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Westinghouse Elec. & M. Co.
Track, Special Work
Barbour-Stockwell Co.
N. Y. Switch & Crossing Co.
Ramapo Iron Works
Wharton, Jr. & Co., Inc., Wm.
Transfer Issuing Machines
Ohmer Fare Register Co.
Transformers
General Electric Co.
Westinghouse Elec. & M. Co.
Treads, Safety, Stair, Car Step
Amer. Abrasive Metals Co.
Amer. Mason Safety Tread Co.
Morton Mfg. Co.
Trolley Bases
Anderson Mfg. Co., A. & J. M.
Electric Service Sup. Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.
Trolley Bases, Retrieving
Anderson Mfg. Co., A. & J. M.
Electric Service Sup. Co.
General Electric Co.
More-Jones Br. & Met Co.
National Ry. Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.
Trolley Buses
Brill Co., The J. G.
General Electric Co.
Westinghouse Elec. & M Co.
Trolley Material
Elec. Service Supplies
Ohio Brass Co.
Trolleys and Trolley Syste
Ford Chain Block Co.
Trolley Wheels. (See Whe Trolley)
Trolley Wire
American Elec'l Works
Amer. Steel & Wire Co.
Anaconda Copper Mining
Bridgeport Brass Co.
Roebling's Sons Co., John
Trucks, Car
Brill Co., The J. G.
Bemis Car Truck Co.
St. Louis Car Co.
Taylor Electric Truck C
Westinghouse Elec. & M.
Tubing Steel
National Tube Co.
Turbines, Steam
General Electric Co.
Terry Steam Turbine Co
Turnstiles
Car Turnstile Corp.
Damon-Chapman Co.
Elec. Service Supplies
Perey Mfg. Co., Inc.
Upholstery Materials
Amer. Rattan & Reed M.
Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co
Varnished Papers
Irvington Varnish & In lator Co.
Varnished Silks
Irvington Varnish & In lator Co.
Varnishes (See Paints, etc
Ventilators, Car
Brill Co., The J. G.
National Ry. Appliance
Nichols-Lintern Co.
Railway Utility Co.
St. Louis Car Co.
Vises, Pipe
Williams & Co., J. H.
Welded Rail Joints
Ohio Brass Co.
Ry. Track-work Co.
Rail Welding & Bonding
Welding Processes and Ap ratus
American Steel & Wire
Elec. Ry. Improvement C
General Electric Co.
Indianapolis Switch & F Co.
National Ry. Appliance
Ohio Brass Co.
Ry. Track-work Co.
Rail Welding & Bonding
Westinghouse Elec. & M.
Welders, Portable Electric
Elec. Ry. Imp. Co.
Ohio Brass Co.
Ry. Track-work Co.
Rail Welding & Bonding
Wheel Guards (See Fenc and Wheel Guards)
Wheel Grinders
Wheel Truing Brake S Co.
Wheel Presses (See Mach Tools)
Wheels, Car, Cast Iron
Assn. of Mfrs. of Chi Car Wheels
Wheels, Car, Steel and St Tired
Amer. Steel Foundries
Cambria Steel Co.
Midvale Steel & Ordnan
Standard Steel Works Co
Wheels, Trolley
Anderson Mfg. Co., A. J. M.
Bayonet Trolley Harp Co
Columbia M. W. & M. I
Electric Ry. Equip. Co.
Elec. Service Supplies Co
General Electric Co.
More-Jones Br. & Metal
Nuttall Co., R. D.
Star Brass Works
Western Electric Co.
Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co
Wire Rope
Amer. Steel & Wire Co.
Roebling's Sons Co., J.
Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min.
Bridgeport Brass Co.
Cambria Steel Co.
General Electric Co.
Kerite Insulator Wire Cable Co.
Midvale Steel & Ord. Co.
Roebling's Sons Co., J.
Westinghouse Elec. & M.
Wrenches
Williams & Co., J. H.

ALPHABETICAL INDEX TO ADVERTISEMENTS



PATENTED

A—Connects to pipe leading to airbrake cylinder.

B—Location of pawl release pin.

Guaranteed

In recommending the use of the Brill Automatic Slack Adjuster on Birney Safety Car Trucks, we do so knowing it will do everything it is intended to do in eliminatng hand adjustment, which necessitates taking cars out of service, thereby saving operating revenue which would otherwise be lost.

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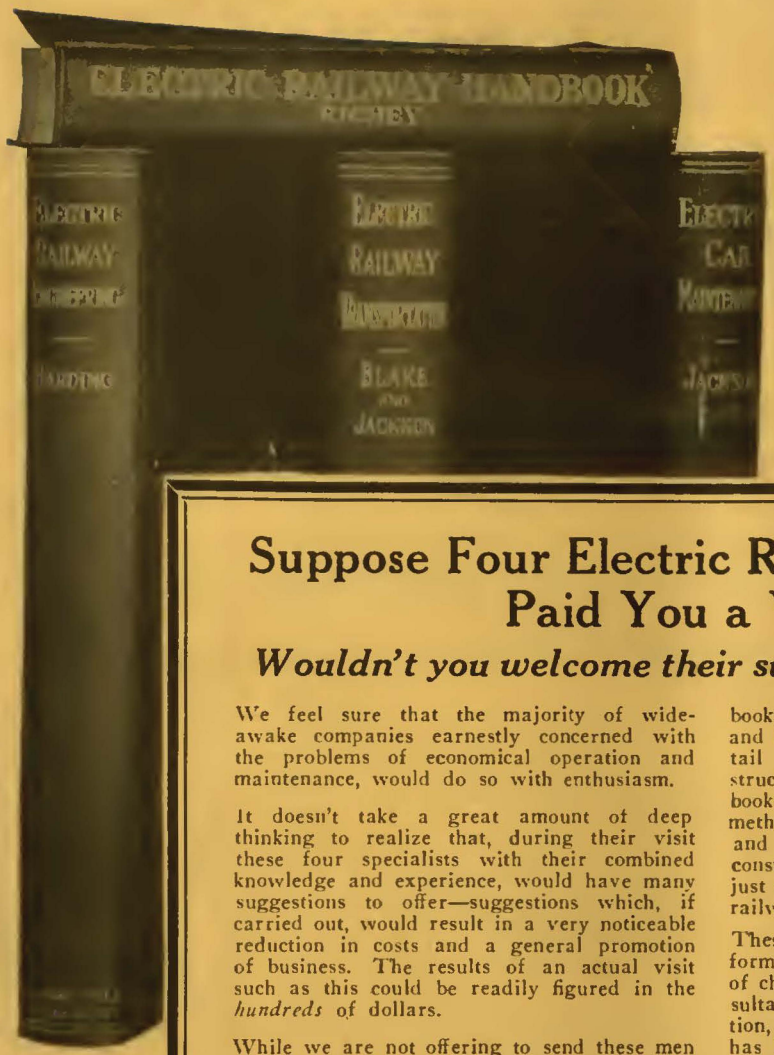

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