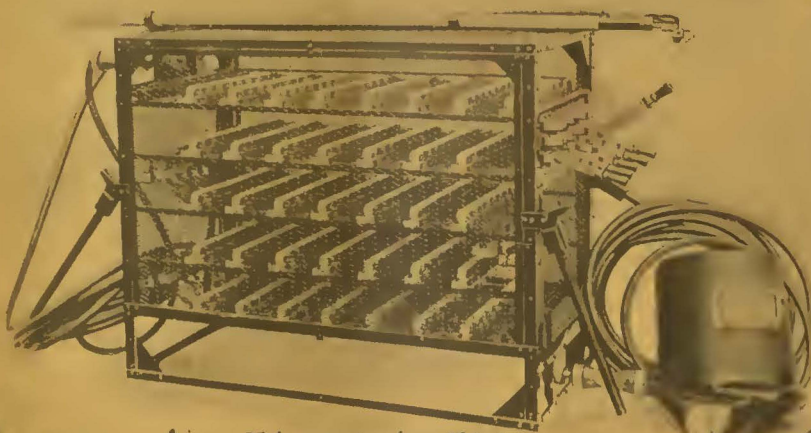
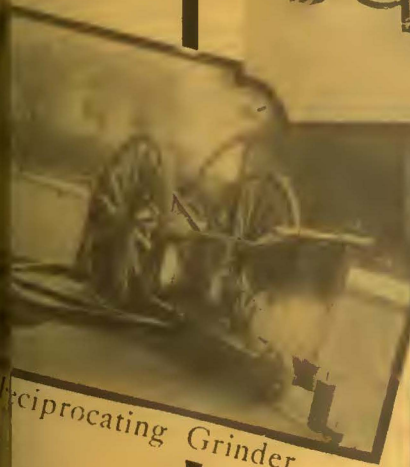


ELECTRIC RAILWAY JOURNAL



Ajax Electric Arc Welder



Reciprocating Grinder



Atlas Rail Grinder



Universal Rotary Track Grinder

A Labor-Saving Lesson

These times of stress have served one good purpose the railway companies have felt compelled to cut and almost entirely eliminate track maintenance. They have taught the value of labor saving devices for trackwork. Probably nothing else so clearly would have shown the fact that costs can be lessened by the use of labor-saving machines and tools.

This labor-saving lesson learned, it should be the plan to continue the use of such devices and to apply the idea with even greater intensity.

We offer complete outfits for efficient and economical work in track welding and grinding—proven appliances in use by 439 companies in every State and nearly every country in the world.

Write for details and present prices

Railway Track-work Company

3132-49 E. Thompson St.
Philadelphia, Pa.



Finance

"Joe," said the Vice-President, "our problems of financing this business of ours includes every phase of our activity. Your Operating Department is just as much involved as the Transportation, the Publicity, the Treasury and the Executive Departments. The physical worth and effectiveness of our rolling stock, our maintenance and our right-of-way equipment not only have a very definite influence upon our earnings, but they have a very important bearing on the public opinion of our enterprise and, therefore, on our prospects of securing local investors to buy our securities. With improving conditions of our industry, we must provide good attractive service to the public and the community. Your plan to order fifty light-weight double-truck cars for train operation during rush hours, with Westinghouse HL control, was approved unanimously by the Board yesterday."

"Fine, Boss," replied Joe; "I am glad our Board clearly appreciates the value of putting our equipment in bang-up shape. They are absolutely right about the effect this has on public good will."

"All right, Joe, go right ahead and make your plans for the future with this idea in mind."



Westinghouse

ELECTRIC RAILWAY JOURNAL

HENRY W. BLAKE and HAROLD V. BOZELL, Editors

HENRY H. NORRIS, Managing Editor

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You Are Interested—

The Second-Class Postal Bill Should Pass

IN 1918 the federal government collected from the publishers in second-class postal rates \$11,712,068, and in the last fiscal year this has grown to \$25,496,719. As a result of these high postal charges, publishers have had to increase their subscription rates, and many have ceased soliciting subscriptions from sections of the country where the high postal rate would make it unprofitable. Many papers have fallen by the wayside.

The publishers believe that a reduction in second-class postal rates would greatly increase the business done by the post office department, not only in second-class mail matter, but in postal matter in other classes. Every advertisement printed in their pages leads to considerable correspondence by mail before the order is placed and often the article purchased is sent by parcel post.

The publishers are not asking Congress to put postal charges back to the rate charged before the war. They ask simply the repeal of the last two increases, or those which went into effect in 1920 and 1921. The rates would then be 175 per cent more than the pre-war rate, and the publishing industry would continue to pay the federal taxes now paid by other industries.

Is it fair that the publishing industry, of all industries, should be singled out as the sole exception and compelled to struggle along under special war taxes? The reader, the ultimate consumer, is the one who suffers most from the reduced service which the publisher is forced to give. Especially, is this increase wise when the tax is being laid upon a means for bringing other revenues to the government and to individuals and for helping industry generally?

McGraw-Hill Co., Inc., Tenth Ave. at 36th St., New York

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American Machinist—European Edition
 (Published in London)




Subscription rates: \$4 in the United States, Canada, Mexico, Alaska, Hawaii, the Philippines, Porto Rico, Canal Zone, Cuba, Honduras, Nicaragua, Dominican Republic, Salvador, Peru, Colombia, Bolivia and Shanghai, China. Extra foreign postage in other countries \$3 (total \$7, or 29 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid, to any part of the world, 20 cents.

Change of Address—When change of address is ordered the new and the old address must be given. Notice be received at least ten days before the change takes place. Copyright, 1922, by McGraw-Hill Company, Inc.

Published weekly. Entered as second-class matter, June 23, 1908, at the Post Office at New York, under the Act of March 3, 1879. Printed in U. S. A.

Westinghouse Shurvent Renewable Fuses



Ferrule Type
Shurvent Renewable Fuse

In the history of fuse protection there
are three mile stones of progress


First: The introduction of the non-renewable cartridge enclosed fuse.

Second: The development of a renewable cartridge enclosed fuse with no scientific method of removing the hot gases from the fuse casing.

Third: The introduction of the Westinghouse "Shurvent" Renewable Cartridge Enclosed Fuse having a scientifically designed and positive path for the venting and cooling of the hot gases.

Folder 4472 describes in detail the various stages of this development.

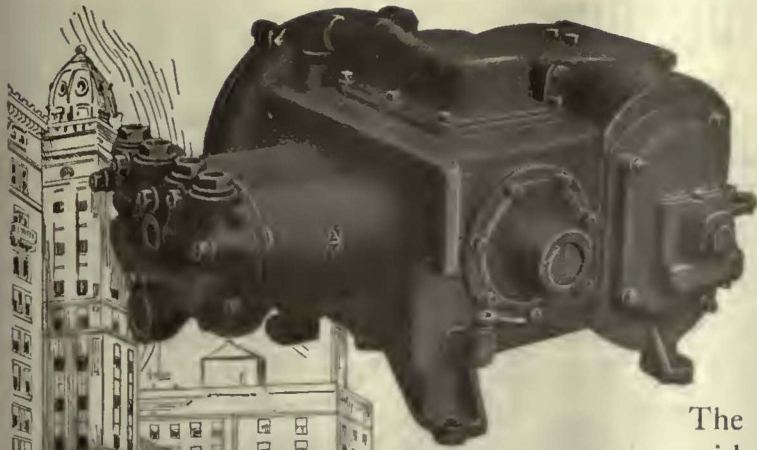
Westinghouse Electric & Manufacturing Company
East Pittsburgh, Pa.



Knife-Blade Type
Shurvent Renewable Fuse



Westinghouse



D-2-F Compressors

The Westinghouse D-2-F Air Compressor, with 25 cu.ft. displacement, is designed for medium-weight elevated and interurban train service. This is a rugged, simplified machine which has successfully met every requirement with respect to efficiency, durability and economy. The 50 new, modern, all-steel elevated cars for Philadelphia are equipped with D-2-F's.



ELECTRO-PNEUMATIC BRAKES

The new Philadelphia cars are also equipped with Westinghouse Electro-Pneumatic brakes, which are recognized as an essential factor in the successful operation of all highly developed elevated or subway lines where short, smooth stops are imperative in the interests of train frequency and time economy.

CONSULT OUR ENGINEERS

Our engineering experts are always available for analyses of operating conditions and to render such other assistance as may be required to determine the best form of traction brake for any class of service.

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

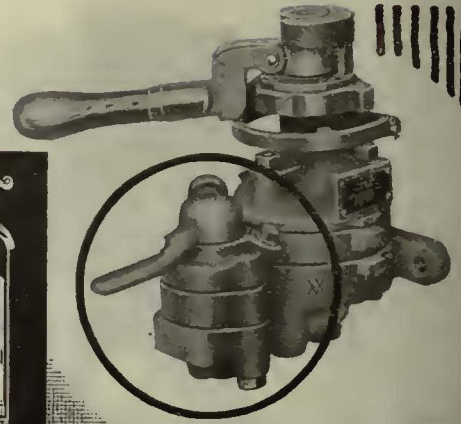
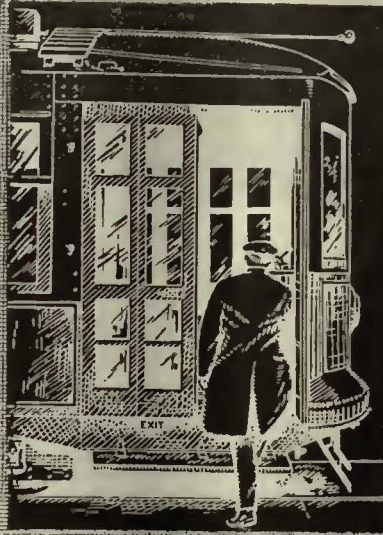
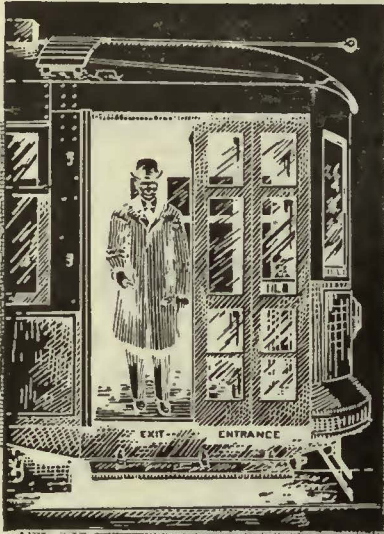
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Washington
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WESTINGHOUSE TRACTION BRAKES



Speed Up Passenger Interchange With the new SELECTOR VALVE

THE use of double passageways on Safety Cars to facilitate passenger interchange is made thoroughly safe and practical by the new Selector Valve.

The Selector Valve, functioning in connection with the standard M-28 Safety Car brake valve, makes it a simple matter to open or close either door independently, or both together, as occasion demands.

The operator is enabled to regulate the entrance or exit of passengers to meet the

highest requirements of speed and safety under all conditions. Thus the many recognized advantages of the double passageway are utilized to the utmost with every assurance of ease and security.

The illustration gives you a picture of efficient passenger interchange as effected with the new Selector Valve.

No time lost loading and unloading passengers. Greater car mileage. Increased revenue.



SAFETY CAR DEVICES CO.

OF ST. LOUIS, MO.

Postal and Telegraphic Address:

WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH



O-B Trolley Catcher
Patented

On the instant when the wheel leaves the wire O-B Catcher stops the rope and holds it.

It is rugged. All parts are interchangeable.

What users think of O-B Trolley Catchers

All the Master Mechanics on a large system in the East gathered to discuss common problems. The question of standardizing on one particular trolley catcher came up. Out of the combined experience of its members, the meeting decided easily on O-B Catchers.

An O-B Salesman called on a Canadian property the other day and interviewed the Master Mechanic about his O-B Catchers. The railway man reported perfect satisfaction—said that he had picked the O-B Catcher after trying several other kinds.

A southwestern property is pleased with some O-B Catchers which have served without a sign of trouble for about two years so far—a great deal longer than this road had been getting from other types. May we tell you some of the reasons why the O-B Catcher is so satisfactory?

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



Insurance plus Marsh & McLennan Service

Representatives

Representatives of Marsh & McLennan act as your confidential insurance advisers. They are men who have the confidence and the standing among insurance companies to plead your case, whenever they are satisfied that your rates are not a true measurement of relative fire hazard.

The service which Marsh & McLennan can render you is consistent with the service your legal advisers render. Do you place your insurance with the same care?

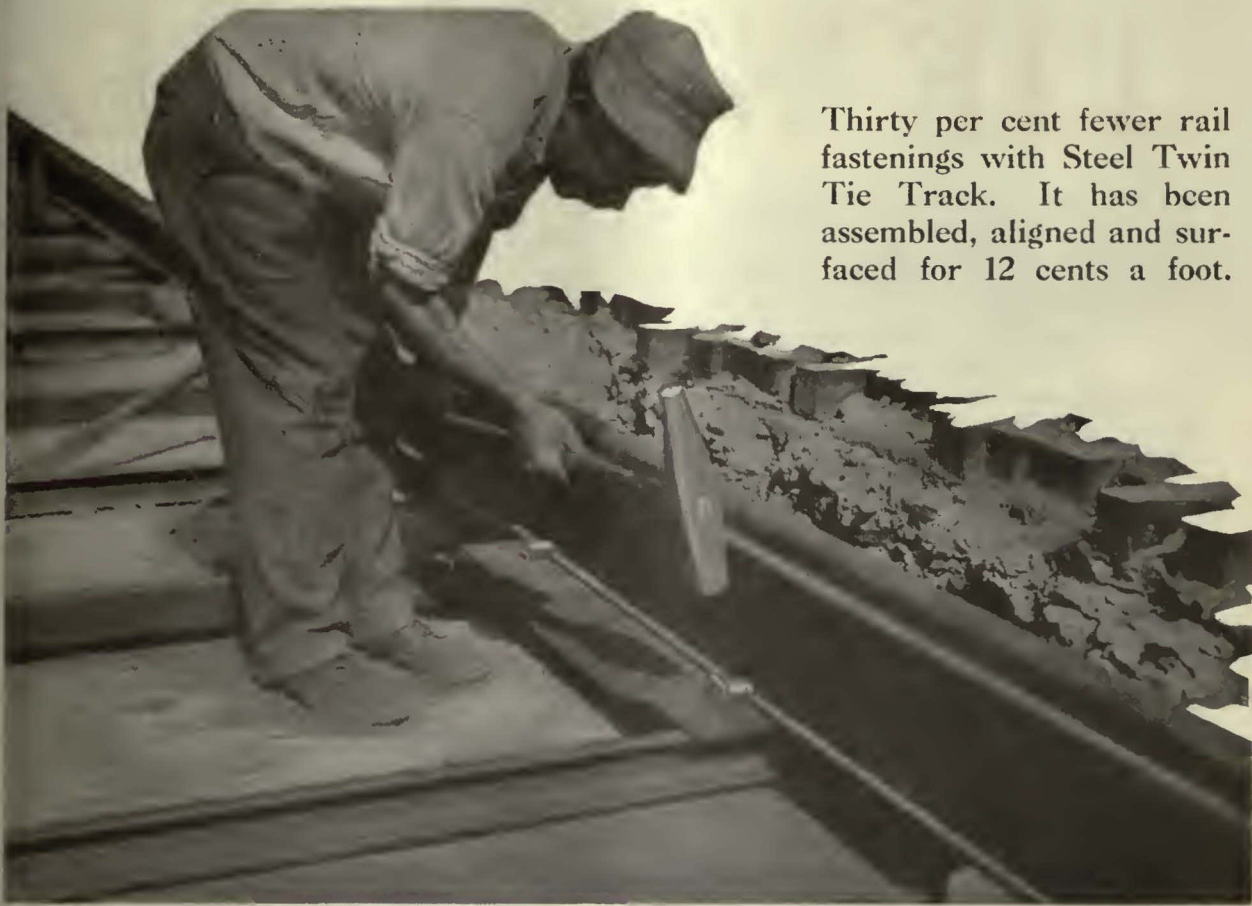
MARSH & MCLENNAN
175 W. Jackson Blvd. Chicago, Ill.

Minneapolis
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Detroit

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Columbus

San Francisco
Seattle
Cleveland

Winnipeg
Montreal
London



Thirty per cent fewer rail fastenings with Steel Twin Tie Track. It has been assembled, aligned and surfaced for 12 cents a foot.

Check Steel Tie construction with these essentials of good paved track—

Bearing—The efficient design of Steel Twin Ties provides 156 square inches of effective bearing per track foot at the lowest cost per unit of bearing—and, where it is most needed, 468 sq. in. of bearing under each joint.

Permanent Materials

—In Steel Twin Tie construction, the tie structure embedded in concrete is

not affected by water, temperature variations or rot.

Economy—

Steel Tie Track minimizes excavation, concrete and track labor. It costs no more than wood ties in rock ballast and its longer life increases the cost per track-foot per year.

For estimating get the 1922 prices at your delivery point.

THE INTERNATIONAL STEEL TIE CO., CLEVELAND

Steel Twin Tie Track

TIE SERVICE



(Recent photograph showing creosoted pine ties supplied by this company in track, New Orleans Street Ry. since 1899)

International Creosoted Ties still in track after twenty-three years' continuous service and good for many years more.

Quick shipments from seasoned ties in stock

CREOSOTED

POLES

PILING

TIES

TIMBERS

INTERNATIONAL CREOSOTING AND CONSTRUCTION CO.

General Office: Galveston, Texas

Plants—Texarkana—Beaumont—Galveston, Texas

LIGHT

Safety Car Lighting Fixtures

Announcing a new Safety Fixture for cars where headroom is restricted

(illustrated at right)

The flexibility of metal fingers provides for expansion and contraction of the reflector, and also cushions the glass against any severe jolt of the car. Notwithstanding this flexible grip, it is impossible for the reflector to fall or rattle in the holder.



The use of Safety Car Lighting Fixtures in your cars will eliminate broken glassware and decrease installation and lamp renewal costs. These fixtures when used in combination with proper reflectors and Mazda lamps reduce the number of lighting units required to properly illuminate the car. Thus a saving in current consumption over bare lamps is also effected. And they enhance the interior attractiveness of your cars, and your passengers are afforded greater eye comfort.

Safety fixtures fit all types of cars, being made in straight pendant form with round or square bases (illustrated); in angle base pendant form and in bracket form. Made in various sizes to use with standard 23, 36, 46, 56, 72 and 94 watt Mazda series lamps.

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA NEW YORK CHICAGO
17th and Cambria Streets 50 Church Street Monadnock Bldg.

Branch Offices: Boston, Scranton, Pittsburgh

Canadian Distributors:

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver

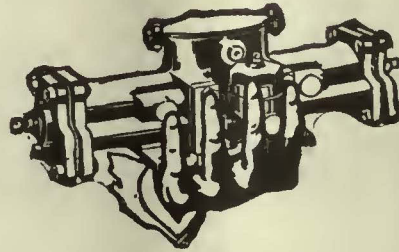
KEYSTONE Car Specialties

- Air Sanders
- Air Valves
- Golden Glow Headlights
- Illuminated Destination Signs
- Steel Gear Cases
- Safety Car Lighting Fixtures
- Motormen's Seats
- Faraday Car Signals
- Trolley Catchers
- Shelby Trolley Poles
- Samson Cordage
- International Fare Registers
- Fare Register Fittings
- Cord Connectors
- Rotary Gongs
- Standard Trolley Harps
- Standard Trolley Wheels
- Automatic Door Signals
- Trailer Connectors

Modernize!



Pneumatize!



That "flying-leap" passenger!

You can't get rid of him.

Nor do you want to!

Because his objects are truly worthy ones—namely—to save a few seconds time for himself and deliver to you an extra fare!

But—you can make your car safe for him—so safe that there will be no possibility of trapping him in doors or steps.

—and at the same time you can do this without putting any burden of watchfulness upon your conductor or in any way distracting his attention from the main issue of getting all the fares—when you equip your cars with the

National Pneumatic "Rushour" Line

Door and Step Control

Door and Step Operating Mechanisms

Motorman's Signal Lights

Safety Interlocking Door Control

Multiple Unit Door Control

In such cars, the entire control of doors and steps and go ahead signals are vested in the mere turn of a lever-handle or the pressing of a button. From the lone "flying-leaper" to the massed formation of

the rush-hour you can eliminate accidents and secure the utmost in revenue, on cars that are modernized — *pneumatized*. Think it over.

*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.



Bates Pole Lines Earn Good Will

Offset agitation for the removal of pole lines from streets by installing Bates Expanded Steel Poles.

Demands by citizens that heavily loaded pole lines be removed from the streets are becoming more frequent. The pole lines are visible evidence of the utility company, and unsightly lines are a shining mark for the indignant citizen and his alderman.

In one large city demands for the removal of wood pole lines have been met by the installation of trim, slightly Bates Steel Poles. These Poles are set for greater spans, cost the utility less, please the citizens, and avoid in this case the expense of underground cables.

This particular utility is installing Bates Poles wherever replacement is needed from time to time—fore-stalling complaint and saving money. Many of these lines carry ornamental lighting and transmission lines as well as trolley spans and feeders. This practice of replacement pole by pole as the occasion requires will soon result in a complete steel line with all its advantages, and at less expense than if wood poles were used.

Ask us for prices on Bates Poles and data on their life and strength.

The Bates Steel Pole Treatise will be sent on request.

Bates **E**xpanded **S**teel **T**russ **C**o.

208 So. La Salle St., Chicago, Ill.

District Offices in all Principal Cities

BATES ONE PIECE EXPANDED STEEL POLES



MORE BUILDING —

AMERICAN COPPER PRODUCTS
CORPORATION
200 BROADWAY NEW YORK



MORE TRAVEL— MORE TROLLEY WIRE

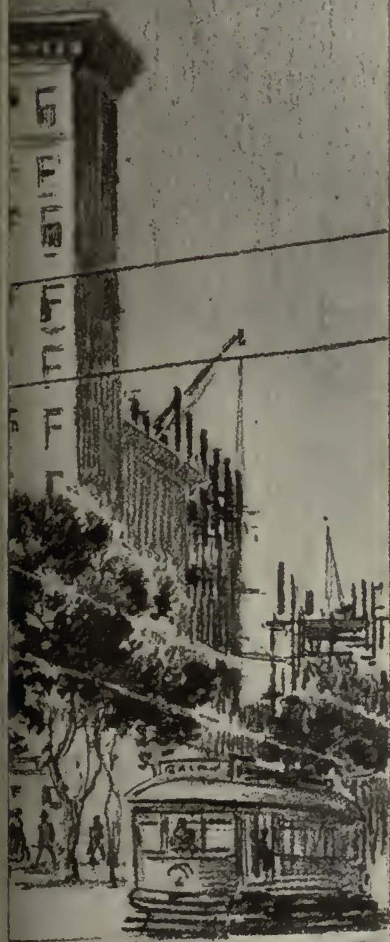
“WHILE professional theorists and agitators are still arguing over the best means for starting a big building movement, builders themselves are rushing into the greatest wave of construction ever witnessed in this country.

“Projects announced and started in the metropolitan district are breaking all records for volume and cost. They are running above \$20,000,000 a week. The rest of the country is reporting a similar condition.”

The above statement, made by a publication of unquestioned authority, would seem to indicate that electric railways are facing tremendous demands for service. More building means more travel and this means a logical increase of equipment on a profitable basis.

Every need for trolley wire—round or shaped—can be supplied at once from our mills at Bayway, N. J., with a specialized understanding of the problems and requirements of public service corporations, and with economy as well as speed in delivery.

If you are in the market for *a strong, tough trolley wire*, uniform in size, of known conductivity, and right as to price, we strongly urge you not to place your order without sending us an inquiry. And this applies to all your wire needs, whether they be for bare or weatherproof.



COPPER PRODUCTS

- | | |
|-------------------------------|--|
| Round Bare Wire | Slow-burning Wire and Strand |
| Bare Strand | Bus Bars |
| Trolley Wire—Round and Shaped | Copper in Rolls |
| Flat and Square Bare Wire | Rolled Rods |
| Tinned Wire and Strand | Drawn Rods—Round, Square and Rectangular |
| Weatherproof Wire and Strand | |

BRASS AND BRONZE PRODUCTS

- | | |
|---------------------------------------|-----------------------------|
| Brass and Bronze Sheets | Brass and Bronze Round Wire |
| Brass and Bronze Flat and Square Wire | |

AMERICAN COPPER PRODUCTS CORPORATION
200 BROADWAY NEW YORK



Speaking about ourselves

Electric Railway Journal
New York

Berlin Street Railway

BERLIN, N. H. April 7th 1922

Electric Railway Journal,
New York, N. Y.

Gentlemen: Yours of the 3 received. In the February 4, 1922 edition of the Electric Railway Journal page 203 is an article on joint supports, and on pages 28 and 29 the joint as built up is shown. These are the articles that I want.

Very truly yours,
Berlin Street Ry'
per *[Signature]* Aast. Mgr.

**Always—
electric railway men read
Electric Railway Journal
text and ads**

ELECTRIC RAILWAY JOURNAL

At each joint there was a decided cup in the end of each rail due to the bending of the rail head. The most serious part of the trouble was the fact that the rails of the special flat head type, having the wire rim bolts to the joint, were not all the same. Some were absolutely tight, some were in addition they were particularly rusted fast, so we took them up and replaced them with new rails. After the track was in position we had it all filled in the copped rails with hard steel by means of the electric welder and ground them in a true surface. This gave us a nice, smooth track free from any ponding at the joints. It was with the light-weight cars which operate over it we should receive many more years of service from the original rails.

Special Joint Supports Prove Highly Satisfactory*

By M. ACKERMAN
General Manager, Cincinnati & Dayton Traction Company, Cincinnati, Ohio.

The accompanying photographs show the condition of some track in Hamilton, Ohio, when the reconstruction started and when the work had been completed. The track shows how the joints were repaired only twelve months before, where the old-time method of placing the rails under the rail and in some cases the frequent repairs made were necessary by this method ran up maintenance charges up very high, as we have seen.

These results, unsatisfactory results made us look around for some other method, even though it might cost a little more, but we wanted something that would give us a more lasting joint booster, because we had had our share of failures. As it generally happens, the joint booster offers a broad bearing surface for the rail ends, and as the concrete under a strain of wear, it was necessary to repair the entire track. We did not realize more than twenty per cent of the original installation.

*An article on "Rebuilding the Hamilton Street Railway" in the Electric Railway Journal, Vol. 25, No. 12, 1922.

We have always believed that the most satisfactory method of joint support is provided by the cushion, which is built into the joint.

The heavy steel plate that is used in the booster block makes it so that the base of the rail is in and so that the angle bars in the rail, holding, overcome the tendency of the rail to warp in the joints. If the rail ends were not held up in most cases, we filled in the rapped portion with new steel and then ground it down to a smooth surface.

Our work of relaying tracks by this method has been going on now for two or three years and in date we have relaid track in Hamilton, where we have miles of single track in Hamilton, about 13 miles of double track in Marietta and where we use Dayton Section 81-872 has boosters under about 75 per cent of the joints. The other 25 per cent are under consideration.

28 ELECTRIC RAILWAY JOURNAL February 4, 1922 February 4, 1922 ELECTRIC RAILWAY JOURNAL 29

The approaching question:

"What shall I do with this track?"



The maintenance on this track by using shims has been enormous and is only short lived. The rails appear to be good, but the joints are battered and low and the constant hammering over them is ruinous to the rolling stock, not to say a word about the lost current. If I could find a cure for this condition at out too great a cost, I believe I could postpone rebuilding this track for six or seven years, and by that time this Company may be in better financial condition.

**Reduced from double page spread
in Electric Railway Journal.
Good ads produce results.**

I have it!

I'll use those Dayton Resilient Joint Boosters. They allow the use of concrete under the Booster, and provide for a shock absorber in the Booster itself, which saves the concrete from breaking up under the hammer blows; moreover, they can be installed without any interruption to traffic. The price of \$4.50 for a "Booster" is a mere nothing because the chief expense of repairing a bad joint is the tearing out of the old paving and replacing it, whereas if I add the Booster to the job I can forget about the repairs for several years. The old saying, "Opportunity only knocks at your door once is true," so I will not let it be said that I passed up an opportunity, but will order the Joint Boosters at once.



DAYTON

**Resilient
JOINT BOOSTER**

**THE DAYTON
MECHANICAL TIE COMPANY**
708 Commercial Building
DAYTON, OHIO



Riding on Oil

How many realize that in all railroad travel, either steam or electric, we are literally riding on a film of oil—a thin spread film composed of tiny globules that act as roller bearings between the sliding surfaces of metal.

The life or durability of oil film is proportionate to the vitality of the tiny globules that build it—their *quality*. And this is dependent upon their origin—the basic crudes which forms them.

Galena Oils possess not only the natural body and stamina peculiar to highest quality in basic constituents, but are still further reinforced and strengthened by Galena process in compounding. This extra strength means longer life—greater mileage. It enables them to resist the strains of weight and speed without breaking down. Their superior “body” protects and preserves the bearings. In other words, they give a lubricating service that has never been equalled by other oils.

*“Galena Quality Is Our Bond
and Your Security!”*



Galena-Signal Oil Company

New York Franklin, Pa. Chicago
and offices in principal cities



Price basis versus performance basis in the selection of lubricants

REASONS for the use of Tulec as a lubricant for electric railway service embrace both the price consideration and the performance consideration.

(By price consideration we do not mean cost per pound, but cost of lubrication per car mile or per month, or some similar equitable reckoning.)

If the lubricant used enables the car or machine to develop a high degree of efficiency with least expense for power; at the same time reducing depreciation to a minimum; reducing labor and maintenance attention;—*and* if this lubricant does all this in the way of performance on a quantity one-third to one-half that formerly required, there you have both cost and performance consideration in its favor.

With Tulec, this true lubrication economy is assured.

Proven records on many electric railways show that Tulec not only reduces cost of lubrication directly, but that it ends repairs and shut-downs from failure of lubricant, and saves time, labor, and overhead expense.

A trial on your property will be arranged if you will write us.

"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 Tulec 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.

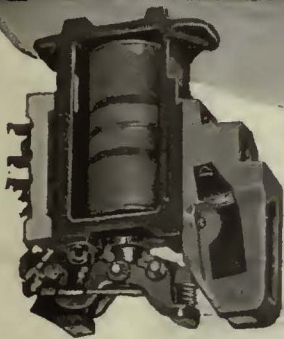
The Universal Lubricating Co.

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



—scientifically and
accurately compounded to
reduce lubricating costs

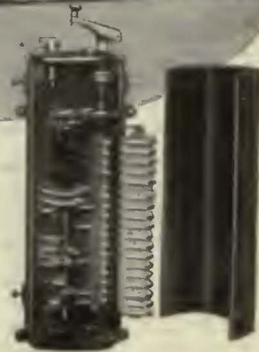
Convention Special G-E Equipped



DB-166 Contactor



GE-69-C Railway Motor



Type C Master Controller

Railway officials who attended the Mid-Winter Convention of the A. E. R. A. at Indianapolis were favorably impressed with the electric train exhibited by the Illinois Traction System.

This train, which represents some of the best developments in electric traction, is hauled by a locomotive equipped with GE-69 motors and G-E type M control.

This and other locomotives similarly equipped have been in service for many years and have operated with a minimum of electrical or mechanical failures.

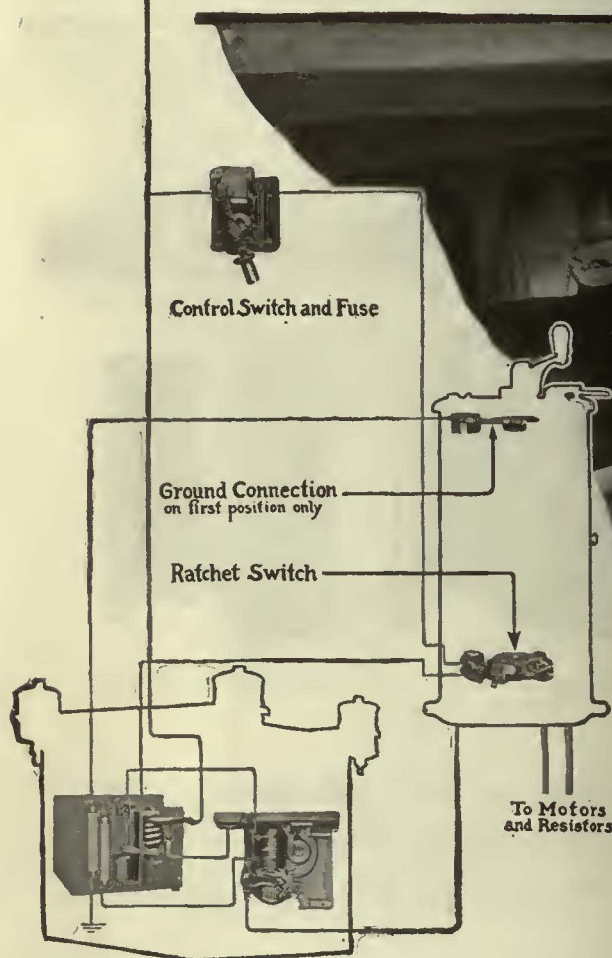


General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

Remote-controlled Line Breakers Protect and Save Your Equipment



Line Breaker under the Car
Consists of Overload Relay and Contactor
with powerful magnetic Blowout

Under the Car Out of the Way

When the motorman "notches up" or "shuts off", a drum controller arcs excessively. It's because the controller is opening and closing the motor circuit, although designed primarily for adjusting speeds. G-E line breakers are designed to break the heavy currents and protect the motors from improper acceleration.

On the first point of the controller, a ratchet switch closes the motor circuit through the line breaker. The least backward motion of the controller

handle opens the ratchet switch and, in turn, the line breaker contacts. Then the circuit can be closed again only by starting from the "off" position.

G-E line breaker equipment replaces the hand-operated breaker and puts the flash and noise under the car. It cuts controller maintenance costs, especially for companies with overloaded conditions.

Let the nearest G-E Sales Office explain further.



General Electric Company

General Office
Schenectady, N.Y. Sales Offices in
all large cities

ELECTRIC RAILWAY JOURNAL

Consolidation of Street Railway Journal and Electric Railway Review

HENRY W. BLAKE and HAROLD V. BOZELL, Editors

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Supreme Court Decides Galveston Rate Case

THE decision of the United States Supreme Court in the Galveston case, rendered April 10, differs in a number of important respects from those in other rate cases. The city was willing to permit an 8 per cent return and the experts on both sides were agreed as to the cost of reproduction of the property on a historical basis and the amount of gross revenue and operating expenses. The main differences between the city and the company arose over various items in development cost, allowances for depreciation, maintenance and taxes, and the future trend of prices. The last-named question entered because the city maintained that prices were coming down and the company would soon be able to earn its 8 per cent, if it was not yet doing so, while the company wanted something more tangible than long-deferred hopes. In upholding the decision of the lower court, the Supreme Court declared it believed the city would probably "give full and fair consideration to a proposed change in rate if application were now made to it." If not, the court intimated that it was prepared to extend relief.

Some of the conclusions reached in its decision by the Supreme Court relating to going value are particularly interesting, especially those relating to the extent to which past losses and brokerage fees should be included in valuation. The consideration of the extent to which taxes may be deducted from income to determine what is a fair return will also attract attention.

Next Thursday Is Electric Railway Day

LAST year a number of electric railway companies celebrated May 4, the thirty-third anniversary of the completion in 1888 of the Richmond electric road, the first large electric railway in the world. At least five companies succeeded in resurrecting old horse cars, which were drawn about the streets of their respective cities to show what progress had been made in street railway transportation during the previous three decades. In three of these cases the car was driven by one of the horse-car drivers of the early days who was still connected with the company. The report of these celebrations in the issue of this paper for May 21, 1921, showed that they were witnessed by large crowds of interested people. Many of these had probably never seen a horse car before, and the comparison between this primitive conveyance and the comfortable and commodious electric car of modern type which accompanied it in several of the processions must have been impressive.

Certain other electric railway companies in the celebrations last year offered prizes for the best essays or historical reviews of the development of the local system. In one city the prize was limited to school children. Many electric railway companies referred to the anniversary in their advertisements in the daily papers.

Most of the larger newspapers carried articles and editorials about the improvements in city transportation which had been effected during the past three decades.

Occasions and events of this kind are undoubtedly helpful to electric railway companies. Too many people take things for granted. They see electric cars running through the streets, but do not realize the long and expensive experiments which led up to the use of the present style of car. Still fewer probably understand that the cost of all of these expensive changes had to be defrayed by the electric railway companies.

For this reason an object lesson of the new and the old in transit is a good thing, and where the actual cars typical of the development are shown, it is more impressive than if the idea has to be conveyed by a printed statement. "Electric Railway Day" can well be celebrated each year, not necessarily in the same way, but in some way, for the benefit of the lesson that it carries.

Cross-Trench Nuisance Can Be Controlled

THE best possible foundation for a structure such as an electric railway track is solidly packed natural soil. Time is an important factor in the compacting process, and every disturbance interferes with the solidity of the soil. An electric railway which has a franchise for a track, even if it does not own the strip on which the track is built, should therefore have something to say regarding excavations through the franchise width of street area. Only thus can proper back-filling and pavement maintenance be assured.

Just how the electric railway's rights in this direction shall be safeguarded is a problem for local solution in each case. But the fundamental principle should be recognized that once the soil under a piece of track has been disturbed the track has a very uncertain support over the disturbed area until the soil is brought back to its original condition. Unless this is done the track must bridge the gap from solid soil to solid soil, with consequent effect on track and pavement. Photographs are reproduced elsewhere in this issue to illustrate the situation which actually develops, and an explanation is given of the way in which the results of these excavations are controlled in Montreal.

In the article referred to, the author outlines in humorous fashion the operations in an attack upon the integrity of a track foundation. The story which he tells will recall to the minds of the readers many experiences of the same nature if not of the same degree. The story enforces the logic of the whole matter, showing how ridiculous it is for a community to expect a railway to keep in condition its track, and oftentimes the inclosed and adjacent paving, and for the community at the same time not to furnish protection against damage to the track foundation. Followed as it is by an account of actual success in securing such protection, the story will do more than cause a smile,

Another Term Needed in Valuation Nomenclature

LAST week mention was made in these columns of an interesting byproduct of recent hearings before the New York Transit Commission, namely, the enrichment of the electric railway vocabulary by the term "rotating standee." The same series of hearings has also disclosed the need for a further addition to the terms used in railway valuation procedure, or at least this need has become apparent through conclusions which have been drawn in public print from some of the testimony presented to the commission by members of its own staff.

It will be remembered that in the act creating the present commission it was instructed to make a valuation of the property, other than franchise or going value, necessarily used in railway service in New York City. Wisely the commission concluded as a preliminary to make estimates on several bases, of which four have been concluded. These were reported in the issue of this paper of Feb. 25, page 333.

The Valuation Bureau of the commission recommended one of these as the correct measure of present fair value and termed this one the "actual or estimated original cost less an amount necessary to restore the property to first-class operating condition." We pointed out then, however, that as defined in the accompanying report this term was a misnomer and it would probably be misinterpreted by the public to mean legitimate investment rather than what the figures actually represent. That this is so is increasingly evident. In valuation nomenclature legitimate investment has supposedly been indicated by "historical cost," a term quite generally used. Briefly, the "historical cost" is the aggregate of the sums actually and legitimately expended in producing the property, and if applied to the physical property it includes the cost of all experimental work necessarily conducted to determine the system finally to be used, the reconstruction costs to produce more modern plant, etc.

The "original cost" valuation of the New York Transit Commission does not aim to give this figure, at least for the street surface lines and for the original elevated railway line. Instead, it represents the expenditure which would be required to reproduce the property in its physical condition as of the date of inventory, but with the cost for the several classes of work and material taken not at the prices of today but at those prevalent in the year corresponding to the construction, as nearly as may be estimated.

In the way in which these figures are used they form a perfectly legitimate basis to show what they intend to convey. But they are not and cannot be the same as "historical cost" or "legitimate investment," any more than the value of any of the great inventions when perfected is represented by the worth of the material used to construct the first successful models and valued at the time the material was bought. One might as well base the present value of the real estate on Manhattan Island at the twenty-four Dutch dollars paid for it by the early settlers on the guileless red men.

In the Galveston Electric Company case, reported this week, the Supreme Court speaks of the estimated cost of reproduction on the historical basis; that is, what the property ought to have cost on the basis of prices prevailing at the time the system and its various units were constructed." This is apparently similar to what the New York Valuation Bureau ascertained; except that we know that the New York figure does not include the development costs of changing from system to sys-

tem as well as those caused by other obsolescence. The Galveston figure may; it is not clear.

Just how extensive the use of such a term would be is another question. It is not difficult to have a concept of the reproduction cost of a property at present prices, because that represents, at least theoretically, the expense of building a similar property at the present time. Nor is it hard to understand what is meant by reproduction cost at 1914 prices, because that would mean that the expense of reproduction is reduced to 1914 unit prices, which some people profess to consider "normal" at the present time. In the same way, the expression "historical cost" or "investment" conveys the definite meaning of the actual expenditure on the property.

But it is impossible to imagine either an electric railway property built today at prices of 1880 or 1890, or one built in 1880 or 1890, which would not have required some expenditures since that time for experimental development. In other words, there is no precedent, either in heaven above or in the earth beneath or in the waters under the earth, for such a manner of construction. It is neither like a property built today without experimental cost but at 1922 prices, nor is it like an old property built at the lower prices of two or three decades ago but with the burden in a new art of having been built at a time when the experience and knowledge of succeeding years were not available.

The facts here related make it clear how important it is that the nomenclature of the valuation business be cleared up—that there be a concise and descriptive expression for the basis of valuation used in New York, lest other mistakes be made in the future by contributors to journals of public opinion.

Maintenance Costs Should Be Kept on a Comparable Basis

ALL electric railway engineers are fond of making cost comparisons, and in fact they are quite necessary if the economies resulting from attention to detail in the various classes of work are to be evaluated. Compilation and comparison of costs furnish a powerful incentive toward increased efficiency, but in order for these to be of value they must include the same items. An example of a variation in practice occurs in the use of the item of carhouse maintenance. Some railways include this item in their rolling stock maintenance costs; others do not. Manifestly this leads to a variation that should be taken into consideration in making comparisons.

The problem of keeping a record of the cost and life of various wearing parts has received considerable attention from equipment engineers. A few roads have reported excellent results from the use of letters or symbols in the accountants' ledgers to designate the several parts of the equipment. The auditor is then in a position to draw off a statement of the quantity used and the cost of any particular part without great trouble. The men responsible for equipment maintenance require such records in order to conduct their work efficiently and the auditing departments are usually ready to co-operate as far as they can. By deciding on a few parts of which individual records are of advantage and then using a system so that these can be conveniently located, accurate cost records can be produced with considerably less work than by keeping individual car records in the maintenance department. If different roads follow the same practice in this particular, their cost figures can readily be compared.

Controlling Excavations Through Right-of-Way

Montreal (Quebec) Tramways Has Worked Successful Plan of Co-operation with City Under Which Railway Sanctions Digging Operations Affecting Its Track and Is Compensated for Expense Connected Therewith—Plan Has Been in Use for Nineteen Months

By R. B. GENEST

Chief Clerk Engineering Department, Montreal Tramways

IN MANY cities and towns of the United States and Canada electric railways suffer from the actions of individuals who seem to delight in wrecking their roadbed by digging holes and excavations in the right-of-way, varying in depth from 1 ft. to 30 ft., of various widths, and of shapes geometrically indescribable.

For many years the Montreal Tramways had difficulty in collecting the cost of repairs made to tracks rendered necessary by openings and cuts of all kinds and dimensions made by the city of Montreal road, sewer and water works departments, by utility companies, by contractors and by private individuals. Many such openings were made within a few hours, and often late at night. While the company's inspectors were surveying lines in one part of the city, a contractor's forces would be penetrating the right-of-way in another part, and the opening would be refilled before the inspectors could reach the location and obtain the necessary information.

Liability for payment was denied in a large percentage of cases by the parties responsible for the excavations in the first instance, and prolonged controversies arose between the city departments and contractors as to the responsibility for the damage.

TRACK SUFFERS FROM EXCAVATING BY IRRESPONSIBLE PERSONS

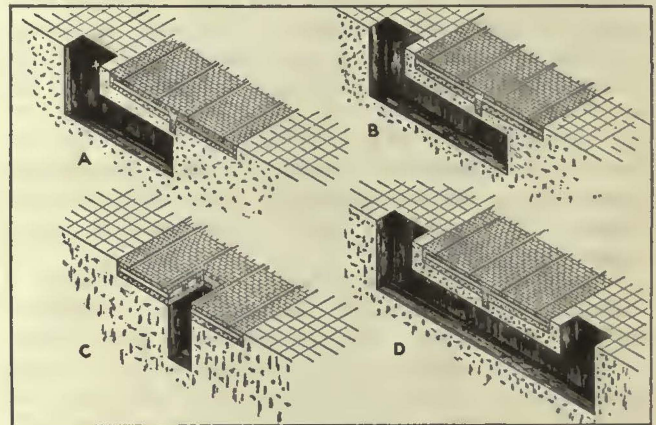
According to the city regulations, a contractor or individual, wishing to make a drain pipe connection to a sewer, applied to the city permit department for written authority to open up the pavement in the roadway. The procedure was somewhat as follows: John Doe & Company, house builders and apartment-house erectors, find that they must reach the city sewer in order properly to drain the building under construction. The sewer is located in the middle of the street, directly beneath the devil strip of the tramways' tracks. A call is sent out for expert representatives of the hole-digging fraternity, who have specialized for many years in the business of track wrecking. The services of Messrs. Hammeri & Bango are obtained. A form of contract is drawn up, in which it is stipulated that for the lump sum mentioned therein, Hammeri & Bango agree to deposit with the city of Montreal funds to cover the cost of disturbing the city paving in the vehicular roadway, and to accept all responsibility therefor. But in so far as the paving area within the boundaries of the tramways' tracks is concerned, no questions are asked.

THE JOB UNDER WAY

The excavation is started at the sidewalk curb. When the contractors reach the brow, or a point 18 in. from the outside rail, which is the boundary between the company's right-of-way and the vehicular roadway, the excavation is sloped at an angle of 45 deg. and a tunnel is commenced. A few cubic feet of concrete slab foundation is knocked off by way of testing its strength. An underground telephone line is encountered, and

unfortunately a pick point penetrates a conduit. A few feet lower down a water main appears. There seems to be a leaky joint, as the substratum is quite heavy with moisture, and a small stream of water is running down the pipe. However, that is not the affair of Hammeri & Bango.

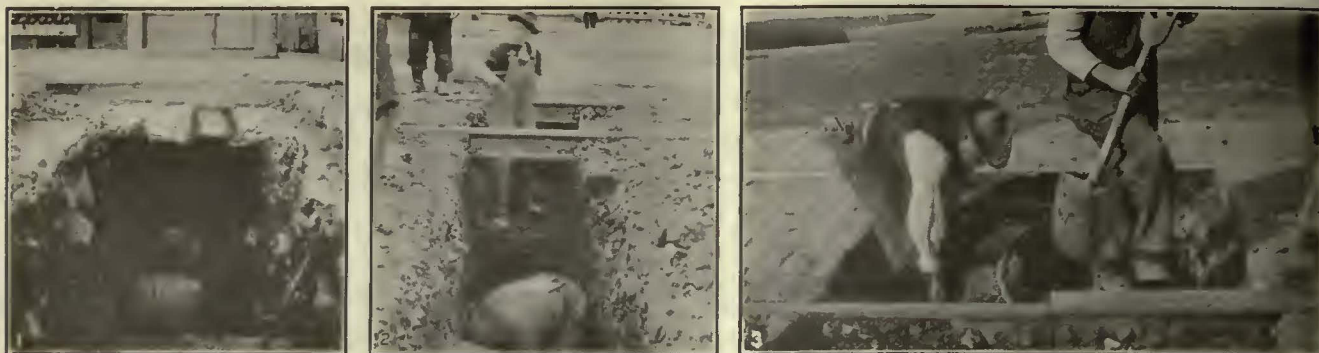
Excavation is now down 17 ft. The sewer (so the excavators were informed) is 20 ft. below the surface. Street cars roll by overhead; an occasional motor truck bumps across the rails. The sides of the excavation show signs of a cave-in. The diggers decide to go through the surface between the rails in one track and



THE FOUR TYPES OF EXCAVATION SPECIFIED IN THE MONTREAL AGREEMENT

in the devil strip. The paving block is pried up, the sand cushion is swept aside, and the concrete ballast is hammered loose with drills and sledges. A tie rod is in the way, but this can be easily bent to one side with a hammer blow and knocked back into position by the same method, damaged a little but still there.

The concrete slab is a little more difficult, but longer and sharper drills are used and the foundation is soon removed. A little more digging and pounding with bars, and the roof of the tunnel falls in; the worst is over. The roadbed is now well broken up, and 7 ft. or 8 ft. of skeleton track is exposed to view, the rails acting as steel stringers and the ties held to the rail by the spikes. A few lengths of 2-in. plank are inserted vertically against the sides of the excavation, blocked here and there with horizontal braces and forming a rough cofferdam. The danger of a cave-in is now eliminated, and the contractors descend into the hole and remove the balance of the loose material, reach the sewer, lay their pipe and make the connection. The excavated material is then loosely back-filled, and the broken-up paving block set on the surface. The job is completed according to tradition. Messrs. Hammeri & Bango hie themselves to the offices of John Doe & Company, collect their money and are ready to tackle the next wrecking job.



TYPICAL CLASS "A" OPENINGS THROUGH RIGHT-OF-WAY IN MONTREAL

No. 1—He left the paving base, anyway. No. 2—Rails suspended in midair. No. 3—Work of demolition begins.

Next morning the telephone company experiences line trouble in the immediate vicinity in which the wreckers were busy. Diagrams indicate the presence of a conduit in exactly the same location where the drain-connecting contractors were working. The loosely back-filled material is removed, the broken conduit is discovered and repaired and a bill is forwarded to the tramways company. A few days later a digging squad from the gas company appears, to lay a sewer service for the new building and make connections to the gas main, located across the street. The same hole is used, but it is necessary to undermine the remaining track by tunneling in order to reach the main. The now well-loosened excavated material is again thrown back into the hole and the surface is lightly tamped. Both tracks and the devil strip have been broken up and undermined.

About ten days later water begins to spout up through the surface here and there, and a small lake forms. A battalion from the city water works department arrives, accompanied by foreman and sub-foreman, and bringing pumps, jacks, block and tackle and truck-loads of sundry material. A citizen who lives in the immediate vicinity regards the operations with disapproval, not knowing whether the workers are employed by the tramways company or the city. The workers seem to be making several holes right between the tracks, and they are also opening up where a hole has already been made. Why, in the name of common sense, the tramways company cannot leave well enough alone is beyond his understanding. It is not a month since the company disturbed the whole district putting down a brand new track and foundation. Inquiry discloses that the city is trying to locate a break in the water main. The break is finally located in the original excavation made by the drain-connecting experts. In

the course of a week or so the pipe is made watertight, all holes are refilled and the track is left to settle and sink unmolested.

In the meantime the tramways' excavation inspector has been carefully viewing all operations, taking notes and measurements, and record of dates, names and addresses of all concerned, and further increasing the value of his information by several photographs.

MAKING GOOD THE DAMAGE

Finally the tramways' division roadmaster decides to repair the damage done to the track, as there appears to be no danger of further hole digging. A survey of the damaged roadway shows that six different excavations are located in a stretch of 60 ft. The conditions found are: Broken-up paving surface, broken and cupped joints, loose bolts and spikes, bent tie rods, sagged and twisted rail, shortened and cut-off ties, and ballast and foundations reduced to mud. A birdseye view of the track taken from the sidewalk shows a series of short vertical curves, resembling in appearance the general contour of a scenic railway.

The soggy mass now comprising the back-filled material is removed. The sides of the excavation are trimmed and the holes are filled with wet sand, packed and hard tamped. A new concrete slab is laid, joints are repaired, track is relined, concrete ballast is filled in, track is surfaced and new granite paving block is reset and grouted. The roadbed is again in operating condition.

A careful record of the cost of rehabilitating the track is made out by a construction timekeeper covering labor and material in detail. The question then arises as to whom the bills should be sent, and, if it is to be divided among the four parties concerned in the wrecking job, what proportion of the bill should



EXAMPLES OF CLASS "B" OPENINGS THROUGH RIGHT-OF-WAY

No. 4—Combination of "A" and "B" opening, concrete slab and ballast being completely knocked away on outer edge, exposing tie. No. 5—A typical case in this class. No. 6—Will this trench be properly back-filled?



SOME DEVIL-STRIP, OR CLASS "C" OPENINGS

No. 7—This one will not disturb the track. No. 8—An operation which will require careful back-filling. No. 9—Close work in this devil strip.

each party pay? Finally the account is forwarded to the tramways' accounting office for distribution and a tremendous amount of correspondence accumulates, involving the engineering, claims, accounting and legal departments, and also the utility companies, the contractors and the city departments.

In 1920 two Belgian roadbed wreckers undertook to dig a hole in a single track, which had to be repaired by the company immediately, as the track showed signs of depression shortly after the excavation was filled in. The cost of repairs in this instance amounted to \$155. The Belgians, however, disappeared and the city authorities denied all responsibility for the bill.

CO-OPERATION REPLACES CHAOS

According to the operating contract between the city of Montreal and the Montreal Tramways, the company is responsible for the maintenance of the paving surface in the track area but, at the same time, the company has no right or authority to prevent any one from breaking up the paving area.

For many years the Montreal Tramways desired to bring about the institution of regulations to overcome these many difficulties. After several conferences with the city authorities and the Montreal Tramways Commission an agreement was finally drawn up. It was put into force on Sept. 13, 1920. Thus the company succeeded in obtaining some protection. The agreement is as follows:

Before the city of Montreal will issue a permit to a corporation or contractor to make openings for the purposes of installing pipes or sewer connections, etc., in the streets on which there are car tracks, and where it is necessary to go under the car tracks to reach utilities, the city of Montreal will require the applicant to show receipt from the Montreal Tramways Company, indicating that such applicant has made a deposit to the company

covering its expense to make any repairs to the track and roadbed, made necessary on account of the operations of the corporation or contractor. The schedule of prices for doing this work and for the various types of openings shown on blueprint of our drawing No. 586 J.B. will be as follows: Type "A," \$60; Type "B," \$100; Type "C," \$100; Type "D," \$155. It being understood that after such deposit is made the Montreal Tramways Company will assume all liability for damage to its property; the applicant, corporation or contractor will, however, temporarily back-fill the opening to make it safe for the passage of the vehicular and pedestrian traffic in the streets. It is further understood that no rebate will be given to the applicant, corporation or contractor, in the event that the cost is less for repairing the damage to such excavations than as stated above, as it is understood that the prices quoted will about even up at the end of the year. The standard form of receipt will be given applicants for permits, which can be exhibited to your permit clerk, at the time of issuing city permit. The company reserves the right to increase or decrease the figures given as conditions may warrant.

This agreement has now been in force approximately one year and seven months, and, outside of a certain amount of difficulty experienced during the first six weeks or two months of its enactment, has proved satisfactory. During the preliminary stages a certain amount of tact was required in dealing with applicants for permits because they were not inclined to look with favor upon such a revolutionary change in the routine. Sporadic attempts were made to evade the regulations but, by exercise of care to detect infringement of the ordinance, the company was able to reduce the number of deposit evaders to a minimum. Instructions were issued to roadmasters, section foremen, and construction timekeepers to notify the head office immediately on discovery that an opening is being made in the company's right-of-way. This information is given to the excavation inspectors, who, between their rounds, report at stated hours to the head office and are, therefore, in constant communication with the construction



MISCELLANEOUS EXCAVATIONS KNOWN AS CLASS "D"

No. 10—This kind of work requires a large deposit. No. 11—The shoring here shows that troubles will result if careful work is not done. No. 12—This man trusts the concreting done by the railway.

forces. Also, the local police have instructions to prevent penetration of the track area by any one unable to show a company permit.

HERE IS HOW THE AGREEMENT WORKS

Now, if a corporation or individual desires to make an excavation or opening through the right-of-way of the Montreal Tramways he applies to the city of Montreal permit department for a written authorization to open the city streets. He must explain satisfactorily the purpose of the opening. The city

request from the engineering department (Form E-54) which is made out in duplicate, a carbon copy retained in the engineering department. The applicant then proceeds to the accounting office, where a deposit is made according to the classification mentioned in Form E-54, and he is given two copies of Form A.1. He is then in possession of the necessary authority to obtain a permit from the city of Montreal. The comptroller immediately forwards two carbon copies of Form A.1. to the engineering department, one of which is retained and attached to the file. The other is forwarded to the

MONTREAL TRAMWAYS COMPANY
ENGINEERING DEPARTMENT

Report of Excavation Repaired

No. 4711 _____ 192

Where Repaired _____
 At or near _____
 Made by _____
 Foreman _____ Hrs. at _____
 Labor " " _____
 Labor " " _____
 Watching " " _____
 Teaming " " _____
 Material _____

Negative & Bonding Repairs _____ 192
 Foreman _____ Hrs. at _____
 Labor " " _____
 Team " " _____
 Material _____

Work Done _____

MONTREAL TRAMWAYS COMPANY
ENGINEERING DEPARTMENT

Report of Excavation

No. 4711 _____ 192

Where Opened _____
 At or near _____
 For what purpose _____
 By whom _____
 Address _____
 Owner of Property _____
 Address _____
 Foreman _____
 Rec'd Notice from _____ Date _____
 Pavement Rem'd _____ Size _____
 Damage to Negative Cable & Bonds _____
 Tunnel under r-of-w-Size _____
 Excavated outside r-of-w and Bored through _____

Temporary Repairs _____ 192
 Foreman _____ Hrs. at _____
 Labor " " _____
 Team " " _____
 Material _____

Work Done _____

Remarks: _____

SECTION LOOKING NORTH
EAST

SECTION LOOKING NORTH
EAST

No. _____

MONTREAL TRAMWAYS COMPANY
COMPTROLLER'S OFFICE

MONTREAL, _____

To The Director of Public Works,
Permit Department,
City Hall, Montreal.

Dear Sir:-

Address _____

has deposited with this Company, \$ _____

to reimburse us for repairs to tracks and paving to a Class _____

_____ excavation which he they propose to

make under our tracks and paving for the purpose of _____

at _____

The applicant agrees to temporarily back fill the excavation to make it safe for the passage of vehicular and pedestrian traffic in the streets.

MONTREAL TRAMWAYS COMPANY.

SIGNED _____ Comptroller.

Applicant.

MONTREAL TRAMWAYS COMPANY
ENGINEERING DEPARTMENT

N^o 217 A STREET OPENING PERMIT REQUEST

Date _____

To The Comptroller.

Dear Sir: _____

Address _____

has made application for permission to excavate under our tracks on _____

for the purpose of _____

This excavation comes under type _____

and you will please request a deposit of _____

Yours truly,

Chief Foreman

FORMS USED IN CONNECTION WITH EXCAVATION UNDER TRACK IN MONTREAL
 At left—Form E-18, which tells the story of the job. Top, right—Form A-1, used in notifying city of pavement opening authorization. Bottom, right—The originating document, E-54.

departments have drawings showing all streets upon which the Montreal Tramways' lines are operated, and they also know the location of the sewers and water mains. If the applicant plans to penetrate the company's right-of-way, the city withholds the permit until the tramways, in writing, sanctions the application, which is done only when a deposit has been made under the classification indicated on a reduction of the drawing No. 586 J. B. reproduced on page 703, and according to the classification as shown in the agreement above mentioned. The applicant obtains the permit

excavation inspector, who then knows that the parties or individuals opening up the street have deposited the necessary sum of money to cover the cost of the opening to be made. Next, the excavation inspector, having in his possession a copy each of Forms E-54 and A.1., proceeds to the location mentioned as soon as convenient and fills in Form E-18, retaining a carbon copy and forwarding the original to the engineering department head office. Copies of all three forms are then clipped together and placed in an envelope or folder bearing the number

indicated on Form E-18 and filed in rotation of numbers. All excavations or street openings are referred to by the number indicated on the inspector's reports.

In addition to other records photographs furnish irrefutable evidence in litigation in connection with the payment of a repair bill for a street opening. On the Montreal Tramways photographs are made of all openings through the right-of-way, the photographer working in co-operation with the excavation inspector. On the back of each photographic print are noted the number of the excavation appearing on the inspector's report, the date, the location, and the inspector's and photographer's signatures. These men, if called into court to give evidence, are then in a position to supply information of value.

Typical photographs are reproduced to show the different types of opening, as indicated in the captions.

SCHEDULE OF CHARGES PROVES EQUITABLE

As a check on the fairness of the amounts stipulated in the agreement, forty-five different excavation records were picked at random from the file cases and compared.



DEPRESSION OCCURRING IN PAVING SURFACE AS A RESULT OF TUNNELING UNDER ROADBED

The difference between the actual cost of repair work and the sum of money deposited by applicants was found to amount to but \$10 on the average.

In some instances it has been necessary to make exceptions from the schedule, for instance, in a case where the same opening might be used by two different city departments, or where a Class "A" opening has been extended to a Class "B" opening, or where the tramways was about to renew its track foundations. It would not then be reasonable to exact the full payment according to the agreement. The exceptions, however, have not caused any great difficulty, and, generally speaking, the operation of this agreement has been a success.

Technologic Papers of Bureau of Standards to Be Indexed

BEGINNING with No. 203, the pages of the Technologic Papers of the United States Bureau of Standards will be consecutively numbered to facilitate binding in volumes. Papers in the series will be paged consecutively until 750 pages are reached. The title page and index (issued separately) will be transmitted with the last technologic paper of each volume to subscribers who receive the complete series.

A descriptive list of all Bureau of Standards publications issued since the establishment of the bureau has been issued. This "Circular No. 24" may be had free on application to the Bureau of Standards, Department of Commerce, Washington, D. C.

New York State Railways Organized for Safety

Superimposed on a Continuous Accident-Reduction Campaign Covering Several Years, a Special Organization Made Effective This Year Is Already Producing Remarkable Results

By A. W. KOEHLER

Director of Safety, New York State Railways, Rochester, N. Y.

BELIEVING that through organized accident prevention the burden imposed upon the company by needless accidents might be considerably lightened, the New York State Railways on Jan. 1, 1922, created an accident prevention department. The efforts of this department are being guided by a program which has been designed to embrace in its ramifications all of those features which have proved successful in the elimination of preventable accidents in industry.

The underlying conviction in this work has been that, to be successful, any movement which has for its purpose the reduction of accidents must be a co-operative one; motorist, pedestrian and trainmen must each subordinate his own immediate convenience and desire to the best interests and safety of the public. In addition to being co-operative, it must be continuous and follow some well-conceived plan as opposed to spasmodic or sporadic campaigns, characterized by hysterical display or propaganda of doubtful value.

Although in operation only a few months, the preventive measures employed by the State Railways already give promise of satisfactory results. Accidents from all recorded sources show a perceptible decrease. It may be fair to assume that this decrease is not due entirely to a favorable combination of events, but has resulted at least in a measure from methods adopted toward that end.

The creation of an accident prevention department by this company does not mark its entry into a new field. R. E. McDougall, formerly claim agent of the company and now general manager of the New York & Harlem Traction Lines, New York City, while in Rochester devoted a considerable portion of his time to safety. He stimulated an interest in accident prevention on the part of employees of the company through friendly competition. A silver loving cup offered to the station having fewest accidents during a given period was spiritedly contested for, and its possession was a matter of pride to the winner.

The results that attended these earlier efforts and the growing conviction on the part of officials of the company that accident prevention might further benefit the company and the community led to the formation of this new department which is devoting its entire energy to the work of safety.

FIGURES SHOWING REDUCTIONS IN ACCIDENTS OF VARIOUS KINDS

A comparison of accident records for the month of February with those of January of this year, as well as with February of last year, shows a reduction that is not confined to any one class of accidents but is evident in every recorded classification. The reduction over February, 1921, is 11.3 per cent, and over January of this year is 24 per cent. Comparing the records of January and February of this year, we have the following classifications and their corresponding reductions: Collisions with motor vehicles, 28 per cent; collisions

other than motor, 20 per cent; collisions with pedestrians, 62½ per cent; collisions with cars, 7.69 per cent; derailments, 35.48 per cent; employees injured, 57.14 per cent; alighting from cars, 7.14 per cent; boarding cars, 27.87 per cent; injured on cars, 8.51 per cent; damage to company's property, 22.76 per cent; miscellaneous, 13.33 per cent.

These results have been secured because eight to nine hundred men are alert and keenly observant of conditions or practices that make for accidents. Each day's reports bring to the accident prevention department a fund of information that makes it possible to deal intelligently with the accident situation.

THE TRAINMEN'S TRAFFIC REPORT

Records of violations of traffic ordinances on the part of motorists are most numerous. Of these the most

FORM 44001	
New York State Railways Safety Department Trainmen's Traffic Report	
Date	March 28-22 10 A. M.
Place	Main and State Sts.
General Description and Remarks <i>Cars passed, standing car, from which persons were alighting, at high rate of speed. Nearly struck woman.</i>	
License No. (if vehicle)	307-707
Reported by	Chas. P. Smith
Motorman No.	1356
Conductor No.	1335
Line	Central Park and Jeffers on
Car No.	457
Car Golog	Outbound
Use Other Side for Additional Information	

A SIMPLE FORM OF REPORT WHICH IS ACCOMPLISHING MUCH IN ROCHESTER

frequent is the passing of a standing street car while the latter is taking on or discharging passengers. Since the advent of the "trainmen's traffic report," a sample of which is reproduced, violations of this sort have shown a marked decrease. "Stunts" by boys, such as stealing rides, hanging onto the sides of cars while riding bicycles, riding on the fender and similar dangerous practices, have also been reported and steps have been taken to discourage such acts of recklessness. In this

work the schools are co-operating to a commendable degree. Motormen and conductors, inspectors, division superintendents and all of the various departments are co-operating to achieve the greatest possible reduction of accidents.

Safety committees have been appointed and are functioning in excellent fashion.

Points of contact are being established with all of the various agencies which might be instrumental in contributing to the success of the efforts as a whole. Of these, favorable mention is due the police department, whose active co-operation is a large factor in eliminating the hazard created by the reckless motorist, who passes at a greater speed than is compatible with safety a car which has stopped to discharge and take on passengers, or who otherwise endangers the lives of street car patrons.

The medium through which the information concerning the violation just mentioned is conveyed to the police is the trainmen's traffic report, already mentioned. Motormen and conductors are supplied with blank forms for these reports and on them notify the accident prevention department of any hazardous conditions or practices observed by them while operating cars over their different routes.

Another feature, the efficacy of which is making itself

manifest, is that of writing a letter to some responsible person in a firm whose truck or wagon driver has violated a traffic ordinance. This letter advises the owner of the particular offense of which his driver has been guilty, the possible consequences are called to his mind and his co-operation to prevent a recurrence is sought. In every instance the reply to such a letter has brought assurance of the desire of the recipient to co-operate with us and his thanks for apprising him of dangerous practices indulged in by his drivers. Information regarding such practices is conveyed to the accident prevention department, also through the medium of the trainmen's traffic report.

Safety messages to the car riding public will be carried each week on cards in the car. These cards will bear the heading "Trolley Flashes" and will convey a different message each week. In addition, from thirty to forty thousand employees of industry will be reached through safety talks at their respective plants and articles published in the house organs of their employers.

The schools too are co-operating actively by providing opportunity for safety talks to the pupils. These talks emphasize the ways in which school children can do their parts in assisting in our accident prevention measures.

From time to time the newspapers will be given articles dealing with the progress of our efforts, so that the subject will be kept constantly before the public.

Through these sources, and such other avenues of approach as may be opened to us, "Safety" will be brought to every man, woman and child in the community, and thus, in due time, marked reductions in accidents are inevitable.

Large Layout of Chrome Nickel Steel Special Trackwork

THE Milwaukee (Wis.) Electric Railway & Light Company is installing its first general layout of special trackwork made of chrome nickel steel, having originated the idea of the use of this metal in connection with steam road crossings in 1920. The full particulars about this type of special trackwork were published in ELECTRIC RAILWAY JOURNAL, Vol. 55, page 799.



NICKEL CHROME STEEL LAYOUT GOING IN AT EAST WATER AND MICHIGAN STREETS, MILWAUKEE

The Philadelphia Rapid Transit Company and one or two other street railway companies have since installed a number of chrome nickel steel layouts. Most of these and the one pictured herewith were manufactured by the Lorain Steel Company.

Notes from Southern Cities

Railways in South Active in Improving Properties Along Modern Lines—Chief Handicaps Are Jitney Competition and the Present Industrial Situation, Brought About Because of the Low Prices Being Obtained for the Principal Agricultural Products of the South

THE Birmingham Railway, Light & Power Company has been in the hands of a receiver since Jan. 23, 1919, but the property has been well maintained under the receiver and considerable reconstruction of cars and tracks has been done. With the revival of the steel industry, on which the city of Birmingham and neighboring communities largely depend for their prosperity, the benefits of this rehabilitation will become apparent. The Birmingham Railway, Light & Power Company is one of the group of American Cities Company properties now being reorganized. It has 154 miles of track and several long interurban extensions.

Birmingham is a city of recent growth, so that the main streets are wide and there is not the same street congestion as in many other cities in the South. From the railway point of view the wide streets have the advantage that they provide ample parking space for automobiles, and the competition from this source is considerable. Since 1915 there has also been some jitney competition, due largely, it is probable, to the unemployment situation in the steel industry. The jitneys number about fifty or sixty and charge various fares ranging from 10 cents to 7 cents, against 8 cents for the trolley, but they do some business, because of their higher speed.

One step being taken by the company to meet this competition of jitney and private automobile is to provide more units by reducing the number of trailers and operating more motor cars. By this means also the average speed is increased. A number of one-man cars have also been put in service. One hundred per cent one-man operation is not contemplated, but the company believes that it can use still more one-man cars to advantage.

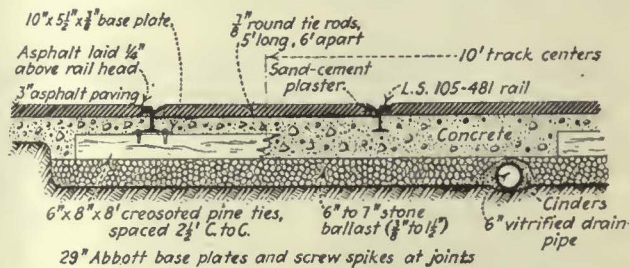
Only one bus line has been started in Birmingham. This was promoted by the owners of a real estate development in the northern part of the city and was continued for about six years. It proved a losing venture, and an arrangement has been made within the last year between the land company and the trolley company by which the latter agreed to extend its tracks into the development and supply the necessary service. The buses were then withdrawn.

As with a few other companies, transfers are punched with the point of origin rather than the line to which the passenger wishes to transfer. The principal advantage claimed for this plan is that it saves the time of both conductor and passenger and avoids any dispute owing to misunderstanding between the two. The company is protected against looping by a provision printed on the back of the transfer that a passenger is not permitted to return on the transfer to a point near that from which he started.

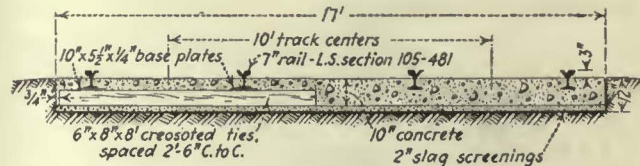
A campaign directed against accident reduction was begun last year through an offer to the employees to divide among them 50 per cent of all the saving in the accident account over the average of the three previous years. Under this plan, during January, 1922, each

man got \$4.07. Shop men share in the division as well as trainmen, as they are held to have as much to do with the safety record as the trainmen. The latter are warned that the claim department requires complete reports of all accidents to assist in keeping down the cost of accidents. The result of this policy has been shown in the quality of the reports rendered of all accidents.

In new track and in track reconstruction in paved streets the company is using a 7-in. 105-lb. girder rail,



STANDARD GIRDER TRACK CONSTRUCTION ON PAVED STREET IN MEMPHIS



SPECIAL SHALLOW CONSTRUCTION IN MEMPHIS USED ON VIADUCT

or a 7-in. 101-lb. T-rail. Under special work the practice is to employ an 8-in. x 10-in. oak tie, but elsewhere to use creosoted pine ties. With a 7-in. T-rail a six-bolt 34-in. angle plate is used, welded top and bottom except at the extreme ends. Some work has been done during the past year in taking out left-handed turns in the downtown streets. Owing to the practice of the company to collect fares pay-enter inbound and pay-leave outbound loop operation in distinction from through operation is favored.

MEMPHIS

The Memphis Street Railway has constructed about 4.2 miles of track during the past year. Creosoted pine ties have been used in all new work. Although these cost \$1.10 each at present as compared with 70 cents for untreated oak ties, the additional life of the creosoted ties is considered to warrant this additional expense. The Lowry process or creosoting is used. In some old track, which had been down thirty years and was recently taken up, certain of the creosoted ties were found in such good condition that they were used over again.

The standard track construction in Memphis in paved streets is shown in the accompanying section. The tie rests on 6 and 7 in. of stone ballast with concrete around the ties and under the rail. The joint is made with an eight-hole joint plate and an Abbott base plate. The former is electrically welded to the rail and the latter is screw-spiked to the tie and also electrically welded

to the base of the rail. No bonds are used except in special work. Screw spikes are used at joints and nail spikes elsewhere. The standard paving is asphalt with no headers or stretchers against the rail.

The principal matter of electric railway interest in Memphis is, of course, the operation of the property under the service-at-cost plan inaugurated in 1921, but this subject will be treated in a separate article.

Through co-operation with the city considerable reduction has been made in street congestion. Part of this was accomplished by rerouting and part by stricter enforcement of traffic ordinances. In consequence it has been possible to increase the scheduled speed of cars to 10.1 m.p.h., which is the basis on which all schedules are figured for the entire system. On Main Street, the principal business street, the scheduled speed has been increased from about 5 m.p.h. to more than 8 m.p.h. Under the new ordinance traffic checks are made frequently to determine the demand for transportation. Motormen and conductors are used for this purpose. Their figures are sent to the office and tabulated and charted.

AUGUSTA

Augusta has been undergoing a discontinuance of service, owing to jitney competition, which has been

practice has been helpful. A force of four inspectors is employed, mostly in the center of the city, to check the passing time of the cars against the scheduled time and the superintendent and assistant superintendent also do considerable checking.

The cash fare in Augusta is 10 cents, with token sold five to 40 cents. On the Augusta-Aiken division, 24 miles, there are eight 8-cent zones.

CHARLESTON

In Charleston there is a variety of fares. The cash fare is 7 cents, with a cash fare of 3 cents for children up to ten years of age. Tickets are sold four for 2 cents. There are two kinds of employees' tickets, one for people employed in the offices of the company, and these tickets are stamped with their names. There is also a form ticket for workmen used around the power plant and repair shop and on construction work. In addition, the company has a form ticket used on the through cars to North Charleston. This route has two zones, and besides the tickets already mentioned a special rate is available on this line of 20 cents for a round trip (instead of 28 cents) if the ticket is used between 5:40 and 8:30 a.m. and 4:20 and 6 p.m. This ticket is sold only in lot.

PLEASE HAVE EXACT FARE READY ON BOARDING CARS

SMILE A WHILE
Life is like a street car—there is always room up to front.
—OUR PARTNER—
GIVE 'EM MORE AIR!
The street car conductor examined the transfer thoughtfully, and said merrily: "This transfer expired an hour ago, lady." The lady digging in her purse after a coin, replied: "No wonder, with not a single ventilator open in the whole car."
—LARS WOOD YOUNG—
A STREET CAR ACCIDENT.
Did you hear about the accident in a street car today? A lady had her eye cut a bit, and a man sat on it.
—E. H. HANCOCK—
BUY CAR TICKETS.
When it gets to a point where we think we can about make ends meet—somebody moves the ends.
—CARELESSNESS—

SAFETY-FIRST
18,000 AUTOMOBILE VICTIMS
Of the 18,000 victims were claimed by the automobile in one year in the United States, and 28 per cent of them were children under 15 years of age. It is claimed that over three-fourths of these accidents were the direct result of carelessness.
To Charleston, the newspapers tell a daily story of motor tragedies, and almost without exception these accidents, with their suffering, sorrow, loss of life or limb, could have been avoided. There is an appalling lack of regard for even ordinary rules of safety upon the part of drivers of automobiles.
An evidence of this is seen every day in the number of automobiles that run into the rear end of standing street cars. A street car stops to let off or take on passengers, and some almost-minded auto driver who is following our car tracks it.
His mind—his eyes were careless practice mobilist who do not of a moment to find the road in an unexpected position cars risks, feel that if casualties in able in view. It is the lack in assume the identity.
W. O. P.
The car ready to serve you mean being ready to trade or not.
It means that the street car run ready to serve you mean being ready to trade or not.
Whether there are passengers on them
In your home, or office, or place of work, you decide in your mind that that of course, is at your own inclination.
The car must come along soon after

changes to the right. The lady who carries her parcels in the right arm and now saves the left hand, she too grab rail will doubtless transfer everything over to the other hand. We'd just the engine by an inch. And make the train bands some. There was a man who fanned this. There isn't any more.
—LARS WOOD YOUNG—
WE WANT YOUR CO-OPERATION.
If we are giving you unsatisfactory service in any one of our utilities—gas—electric light and power—transportation—we want to know it, and we will correct it, if possible. We want the people of Charleston to know that we are their servants; that we are anxious to satisfy their ability

CHARLESTON CONSOLIDATED RAILWAY & LIGHTING CO. No. 6

Cri-Service
GAS — ELECTRIC — RAILWAY
Send immediately for the information and characteristics of papers of the Charleston Consolidated Railway & Light. Co.
WEDNESDAY, MARCH 1, 1922
CHARLESTON, S. C.

Happenings in Cardom
AN APPRECIATION OF SERVICE.
On November 16th, 1921, Motormen Thomas L. Jacques and Christopher Because retired from active duty as Motormen after many years of loyal, devoted service. Mr. Jacques is in his 51st year and Mrs. Because is 49.
They entered the service of this Company July 6th, 1897 and April 8th, 1898 respectively, and at the time of their retirement were third and fourth in order of time in service, first and second being Messrs. Worrell and Fishman, both of whom are still actively employed as motormen.
Though retired from service, the names of Messrs. Jacques and Because will appear regularly on the monthly payroll of this Company. They retain their riding buttons, which automatically entitles them to free transportation, and become life members of the Charleston Relief Association of the Charleston Consolidated Railway & Light. Co.

OUR public and our utilities will have to pull together if either is to prosper.
—Key System News.
"SERVICE FIRST — OUR PASSENGERS."
MORE SEATS THAN PASSENGERS.
The majority of passengers on the street cars ride during the hours of heavy traffic when everyone is anxious to get to or from work at the same time. Naturally this does not afford a fair opportunity for a passenger to judge the service. Similar congested conditions exist in all large cities.
It is very easy for the average passenger to overlook the fact that during the normal period of the day cars operated with only a few passengers riding in them. Investigation shows that every line in the City has an excess of empty seats during the course of the day so that in judgment a street car ferries one should judge it as a whole a motor on the basis of rush hour conditions, which are the

THE wants of thousands of people at all hours of the day and night. It is done rather efficiently in Charleston, don't you think so?
—BUY CAR TICKETS.
There is nothing to take the place of the street car as a means of transportation for all the people at an economic cost.
In other industries something that actually supersedes the industry or "car."
It is the most economical mode of travel yet known for city populations. And, best in rapid transit, it removes production, retail shops, and the man and woman in the earning "manly world" be cut down
For the good of the service and for the welfare of the community, connection with the street railway service should be sent to the Company which we have no knowledge are, in fact, they are brought to our attention. We are desirous at all times of doing everything in our power to add to the comfort, convenience and safety

WATER YOUR STEP.
For the good of the service and for the welfare of the community, connection with the street railway service should be sent to the Company which we have no knowledge are, in fact, they are brought to our attention. We are desirous at all times of doing everything in our power to add to the comfort, convenience and safety

READINESS-TO-SERVE.
By the term above we mean being ready to trade or not.
It means that the street car run ready to serve you mean being ready to trade or not.
Whether there are passengers on them
In your home, or office, or place of work, you decide in your mind that that of course, is at your own inclination.
The car must come along soon after

PAGES FROM "TRI-SERVICE" ISSUED SEMI-MONTHLY BY THE CHARLESTON CONSOLIDATED RAILWAY & LIGHTING COMPANY

described in the news columns of this paper. For some time the Augusta railway, like some other railways in neighboring cities, has suffered from loss of traffic due to both private automobile and jitney. In the Southern States as a rule the country roads are poor, but for a short distance out from interurban centers they are generally in good condition and the absence of snow in winter encourages automobile driving for twelve months in the year. Residents in the Southern States are proverbially hospitable, and many a potential passenger on an electric railway is "given a lift" by a friend or even a stranger who is passing his way in a private automobile. On the other hand, the color line is drawn as strictly by jitanes as on the street cars or steam railroads. The result is that in most cities a jitney has to be either a "white" jitney or a "colored" jitney. This hampers their development to some extent. The company has tried various methods of increasing traffic. One is to post at important boarding points time cards showing when cars pass that place. As a fifteen-minute service is run on many of the lines, this

of six round-trip tickets for \$1.20. Thirty per cent of the business of the company is done for cash and the rest in tickets. Two registers are employed, one for tickets and one for cash. The transfers for January 1922, were 7.36 per cent of the revenue passengers. A present paper is being used for all of the tickets, and one of the problems before the company now is whether to substitute metal tokens for paper and how to collect both cash fare and tickets. Each plan is considered to possess certain advantages. There is considerable jitney competition with the Charleston railway, but at present this comes entirely from individuals. Some time ago a regular bus company was organized to operate twenty cars, each seating ten persons, but this company has gone out of business. The railway company has about thirty-three one-man cars and is converting some others to one-man operation. Like other of the older cities, Charleston suffers because those who laid out its main streets did not realize the demands for street space which the twentieth century would bring: King Street, Charleston's prin

"Chats with the Consolidated"

"The Effect of Automobiles on Street Car Travel"

Has it ever occurred to you that automobiles have contributed largely to the position in which the street railway at present finds itself? Well, it is a fact that they have. Not only have we lost the fares formerly paid by the auto owners and members of their families, but thousands of fares are lost through auto owners "picking up" friends going to and from work in the mornings and afternoons.

How often have you stood on a street corner waiting for a street car, perhaps with several other folks, when just before the street car arrived an auto drove up and the would-be street car riders were invited to ride "as far as I go." Each passenger thus lost reduces our revenue, and has a direct bearing upon the service we render.

We appeal to the auto owners to assist us in rendering a more satisfactory service to the people of Charleston by discontinuing this practice and thereby direct these fares into the proper channel. A prosperous street railway rendering an essential service is of greater value to the community than are the few cents to the individuals who are occasionally "picked up." Please allow those who would patronize the street cars.

Your Co-operation Is Requested and Will Be Appreciated

CHARLESTON CONSOLIDATED RAILWAY & LIGHTING COMPANY

Principal business street, for example, is only about 35 ft. wide from curb to curb. The company is doing what it can to relieve this situation by speeding up cars, cutting out unnecessary stops and in other ways. The headway on most lines is ten minutes in winter and a shorter time in summer.

In Charleston the railway, electric lighting and gas services are all owned by the same company, and publicity is conducted through a regular department serving all three departments. Newspaper space and car folders are used.

A feature of the newspaper space is a series of friendly talks, called "Chats," carried in each of the three papers in Charleston on Tuesday, Thursday and Saturday. This series was begun July, 1921, and the space taken is usually one column wide and 8 in. deep, but this space is varied. Typical "Chats" on the railway system are reproduced on this page. Three prizes, all in car tickets, of \$50, \$30 and \$20 were offered for the first, second and third prizes on May 4, 1921, "Electric Railway Day," for an essay on the advantages of electric railway cars as applied to Charle-

"Chats with the Consolidated"

BACK TO NORMALCY—

Use Your Street Cars More

Saving is at the bottom of it. Our savings must repair the waste of war in addition to performing the usual job of developing our resources.

The man who rides the street car instead of using more expensive transportation is to be congratulated. He is helping the country by adding to the heaps and savings that will bring us back to normalcy.

He is helping himself by increasing his stake in the country through saving. He is helping the community to maintain a service that is vital to it.

The service he buys when he rides a street car is second to none in the country. The price he pays is reasonable. We repeat—he is to be congratulated.

"Patronize Your Street Cars"

CHARLESTON CONSOLIDATED RAILWAY & LIGHTING COMPANY

ton. The paper which received first prize was a well prepared article which gives in detail the advantages to real estate owners, to school children, for social and recreational purposes, etc.

The car folder is entitled "Tri-Service," and the pages of a few recent issues are reproduced. Three departments are carried, named respectively "Smile-a-While," "Safety First" and "Happenings in Cardom."

CHARLESTON-ISLE OF PALMS

The Charleston-Isle of Palms Traction Company's line is right across the bay from Charleston, with which it has connection by ferry owned by the company. The principal business is in summer, when all of the forty-two cars of the property are operated.

The usual method of operation is to send out a motor car with trailer followed by a motor car, as the line does not have loops at its terminals. On the arrival of the two-car train at the end of the line, the following motor car couples up to the trailer, which is uncoupled from the first motor car.

This line has the distinction of having raised fares during the last five years from 30 cents to \$1.30 for the round trip.

Getting a British Franchise

THE procedure of getting authority to build a street railway of any kind in Great Britain is quite complicated. Many of the British tramway properties are municipal, but even a city cannot build a trolley line within its boundaries without getting a special bill through Parliament authorizing it to do so. If the undertaking is a private one, Parliament will not even consider the application unless the local authority, town or county council, approves. In London a somewhat different condition prevails. There the County Council is the tramway authority, but the local borough councils in London are the road authorities, and in most cases they possess power of veto and often exercise it.

Buses are on a different basis. If the local authorities wish to go into the bus business, they must get Parliamentary powers in which the routes are specified. If a private company wants to start a service, all it needs is to get the consent of the local authorities and licenses for the buses. If the proposed bus routes are likely to compete with the municipal tramway routes, the licenses probably will be refused. For interurban service where no such competition question arises, licenses apparently are secured for the asking. In London here also the condition is different. Neither the London County Council nor the metropolitan borough councils seem to have any say about buses. They are licensed by the Metropolitan police authorities, and their routes are regulated by them and by the Ministry of Transport.

One great reason for the great development of buses in London is that tramways are excluded from a considerable part of its area, including the downtown business and financial section known as "The City," and also from the fashionable West End.

After experimenting with double helical gears for the 2,500-hp. electric locomotives for the Gothard section, the Swiss Federal Railways has adopted the Maag spur gearing with case-hardened and ground pinion teeth. The wheel teeth are of unhardened steel. For the State Railways the pinion will be made of case-hardened chrome-steel and the wheel rim of forged steel.

Electric Railway Bridge Built in Eleven Hours

Holyoke Street Railway Faced the Problem of Providing a Temporary Canal Crossing Instantly or Discontinuing Important Service for an Indefinite Period

EARLY in December, 1921, the engineering department of the Holyoke (Mass.) Street Railway, under the direction of George E. Pellissier, assistant general manager, did a remarkably quick piece of temporary bridge construction under circumstances which made this work especially difficult.

This emergency job was necessary on account of a misunderstanding as to temporary diversion of electric railway traffic during the construction of the new

ing, it was necessary to let the water back into the canal beginning soon after midnight. A total of but fifteen hours was available from the time the first work could be done until the job was completed and all materials, tools, etc., had been removed by the company from the canal bed.

The importance of this railway connection can be appreciated from the fact that about 300 cars cross the trestle each day and the entire community of South



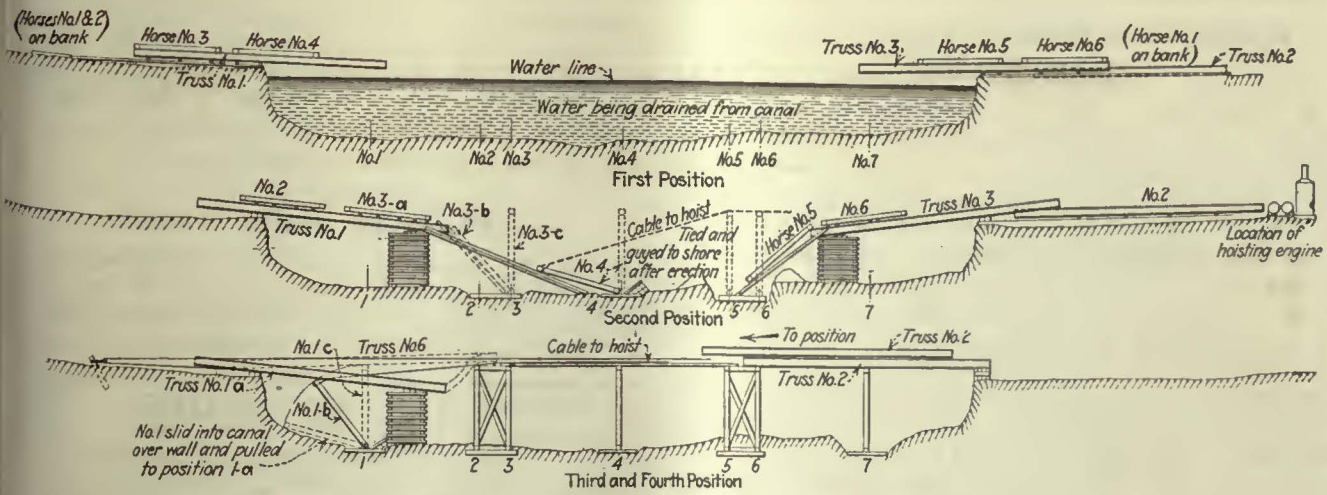
BUILDING A BRIDGE IN ELEVEN HOURS AT HOLYOKE, MASS.

"Valley Bridge" over the second level canal in Holyoke. The railway company was not informed that no provision for this had been made until it was almost too late to draw down the water in the canal to permit the erection of cribwork in its muddy bottom to support horses or bents for a trestle. However, with only five days available to secure the material necessary for the trestle, to fabricate it and to deliver it at the bridge site, and only one day available to erect the structure, the railway undertook the work. In explanation of the shortness of these periods, it should be said that on account of the ice it is impossible to draw the water out of the canals during the winter, and in the present case the water had been drawn out of this canal, presumably for the last time, two weeks prior to the day when the bridge was scheduled to be put in, namely, Sunday, Dec. 11. Fortunately weather conditions early in December were favorable, and it was possible, through the courtesy of the Holyoke Water Power Company, to draw the water out of the canal once more. It required until 11 a.m. Sunday to do this, however, and as the paper mills which draw water from this canal all had to resume operations early Monday morn-

ing, Hadley and Amherst would have been cut off from trolley connection with Holyoke unless the temporary bridge had been built.

The technical details of the construction are more or less standard and can be comprehended from the drawing reproduced. Soundings made before the water was drawn out showed that the canal bottom was soft ooze. Provision was made, therefore, for building cribwork on the bottom and timbers were framed to make up seven supporting horses. The horses were framed near by and slid into place by means of rollers and a donkey engine. The steel I-beams were lifted into place by means of the rigging shown in the accompanying drawing, in the following manner:

These horses were framed on the banks of the canal while the steel beams were being assembled and bolted together in three sections, each 50 ft. long. On two sections of steel work, one on either side of the canal, two complete horses were placed and the steel sections with their horses were mounted on rollers on the banks of the canal. While the water was being drawn out of the canal these steel sections were hauled out over the canal by means of a donkey engine (the only power



STEPS IN PROGRESS OF ERECTING BRIDGE WITH LITTLE MACHINERY AT HOLYOKE

equipment available for the job) until the sections were practically balanced on the edge of the wall.

As soon as the water was out of the canal a crib was made of ties on the bed of the canal under the ends of the projecting steel beams just high enough so that when the steel beams were tipped down they would strike a roll on top of the crib and slide right into place with one end of the beam resting on the bed of the canal. The two horses on these beams were thus deposited practically in their proper position and, being on an incline, very little effort was necessary to pull them into upright position and bolt them together to form the double horses or piers which are shown in the accompanying elevations.

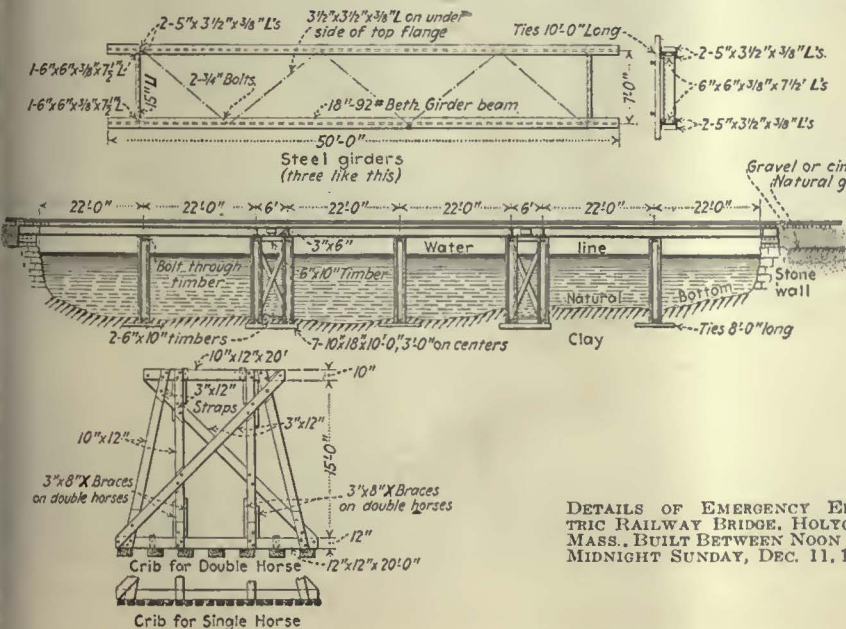
The intermediate horses were then dropped over the wall of the canal and placed under the steel beams resting flat on the bottom but with their bases in their final position. A couple of stakes were driven to keep these bents from sliding and a line from the donkey engine to the top of the bents pulled them into an upright position. As they came up they lifted with them the two steel beams, which of course would then be in their final resting place. One of the sections was then used for a run to roll out the middle section of the trestle, using the donkey engine for motive power.

Thermal Relay for Apparatus Protection

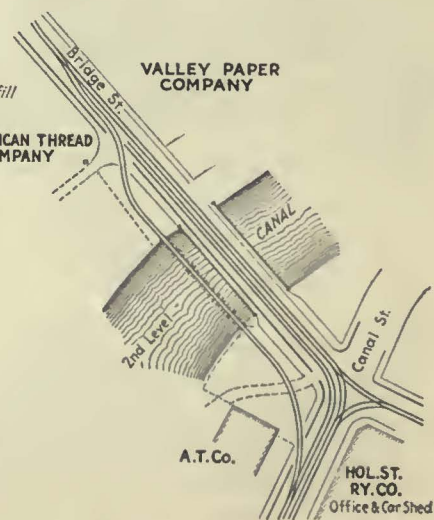
A LINE of thermal relays has been developed by the Westinghouse Electric & Manufacturing Company, which permits control of the circuit in such a way as to open it approximately when a piece of apparatus to be protected has reached a predetermined temperature. This is accomplished by providing in the relay a certain amount of resistance and of thermal capacity so that its temperature rises substantially with that of the apparatus to be protected. By adjustment of the relay the temperature at which it will open the circuit can be predetermined.

The operating mechanism of the relay consists of a number of sheets of thermostatic metal arranged in series or in parallel and with varying resistance, according to the desired current-carrying capacity. A contact is attached to one of the elements and is normally held with an initial tension against a stationary contact. At the proper temperature the bending of the thermostatic metal takes up this initial tension and the contact opens, thus opening the holding coil of a small circuit breaker to open the main circuit.

The relay may be provided with a pointer to indicate its temperature and thus furnish a guide to the temperature of the machine which it protects.



DETAILS OF EMERGENCY ELECTRIC RAILWAY BRIDGE, HOLYOKE, MASS., BUILT BETWEEN NOON AND MIDNIGHT SUNDAY, DEC. 11, 1921



When Preservative Treatment of Wood Is an Economy

ALTHOUGH any set of timbers may be made more resistant to decay by preservative treatment, such treatment may not always be economical, even though the timbers are to be exposed to the most severe fungus attack. If the timbers are to be in service for a short time only, durability is unimportant, and any kind of preservative treatment would obviously be a waste of money. If, on the other hand, the wood is naturally of low durability and is to be used in a permanent location, it is easy for preservative treatment to show great savings. Between these two extremes there are any number of instances in which it is a more difficult problem to determine whether or not preservative treatment will pay. The United States Forest Products Laboratory has compiled some valuable information along this line, which is abstracted below.

If a timber user knows the average life that treated and untreated timbers are giving and the cost of each in place, he can easily compute, with the use of the accompanying table, the relative annual costs of maintaining the two. Assume as an extreme case, for example, that untreated timbers are giving an average life of two years and that their cost in place is \$6 per set. Assuming an interest rate of 7 per cent, the table shows that timbers which need replacement every two years cost annually \$0.553 on every dollar of their cost in place. For the \$6 set, then, the annual maintenance cost would be 6 times \$0.553, or \$3.32. Treated timbers, the user may find, give an average life of fourteen years and cost \$7.50 per set in place. The annual charge on timbers with a fourteen-year life is found in the table to be \$0.116 on each dollar of their cost in place. The annual cost of maintaining the \$7.50 treated set, therefore, would be 7.5 times \$0.116 or \$0.87. Preservative treatment, then, would save this user annually \$2.45 per set.

If a timber user knows the cost of treated and untreated timber and the average life of the untreated timber only, he can estimate how long treated timber would have to last to be as cheap as untreated timber. In the case discussed above, the untreated timber cost \$6 in place; the treated, \$7.50; and the untreated timber was lasting two years. The annual charge on the untreated set was found to be \$3.32, and since the annual charge on the \$7.50 treated set is to equal this, we may set up the equation, $7.5 \times y = \$3.32$; then y (the annual charge on \$1 expenditure) = $\$3.32 \div 7.5$, or \$0.443. Referring again to the table and looking along the 7 per cent interest rate now, we find that an annual charge of \$0.443 on the dollar falls between the two-year and three-year columns and evidently at a

point equivalent to about a 2½-year life. It can readily be seen from this that if treatment adds only three-quarters of a year to the life of the timbers, it would pay for itself, and the user could be sure from the experience of others that it would add much more than this and would therefore be profitable.

Advertising on Berlin Transfers

IN BERLIN, owing to the high cost of railway operation, advertising is being printed on both the front and back of transfer tickets and fare receipts. Some of this advertising is artistic, as shown by the advertise-

<p>Fahrschein und Quittung über 1.50 M. Gültig für die ganze Fahrt unter den im Wagen aushängenden Beförd.-Beding.</p> <p style="font-size: 24pt; text-align: center;">16563</p> <p style="text-align: center;">M 534</p> <p>Berliner Straßenbahn W 9, Leipziger Platz 14</p> <p>Ausweis für diejenige Person und Fahrt, f. die gelöst.</p>	<p>Die billige Kaufgelegenheit</p>  <p>stellt sich ein</p> <p>beim</p> <p>(Wenden)</p>
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<p>Fahrschein und Quittung über 2 M. Gültig für die ganze Fahrt unter den im Wagen aushängenden Beförd.-Beding.</p> <p style="font-size: 24pt; text-align: center;">85014</p> <p style="text-align: center;">V 636</p> <p>Berliner Strassenbahn W 9, Leipziger Platz 14.</p> <p>Ausweis für diejenige Person und Fahrt, f. die gelöst.</p>	 <p>Beim Wandern ist mein Weggenoss' Das Lautenspieler von BEIL & VOSS</p> <p>Wanderer, dem Frühling geht's entgegen Mit hellem Sang auf Weg und Stegen,</p> <p>(Wenden)</p>
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BERLIN TRAMWAY TICKETS CARRY ADVERTISING ON FRONT AND BACK

ment of the dealers in musical instruments on one of the tickets reproduced. In this case a verse of poetry is begun on the front of the ticket, and if the reader wishes to see the rest of it he has to turn to the back of the ticket, which carries the full advertisement of the dealers. The shoe dealer on the front of the transfer says simply that "the greatest bargain sale is at," creating curiosity on the part of the reader to see where the sale is taking place.

The charge for a single fare on the surface lines of Berlin is now 2 marks, and it is stated that the fare will probably be increased to 5 marks in the early future. Before the war a mark was worth 24 cents.

ANNUAL CHARGES ON EACH DOLLAR OF COST OF TIMBERS IN PLACE

Interest Rate Per cent	Life in years before replacement																											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	16	18	20	22	24	26	28	30						
4	1.04	0.530	0.362	0.275	0.225	0.191	0.166	0.148	0.132	0.123	0.114	0.106	0.100	0.094	0.086	0.079	0.073	0.069	0.065	0.062	0.060	0.058						
5	1.05	0.538	0.367	0.282	0.231	0.197	0.173	0.155	0.140	0.129	0.120	0.112	0.106	0.101	0.092	0.085	0.080	0.076	0.072	0.069	0.067	0.065						
6	1.06	0.545	0.374	0.288	0.237	0.203	0.179	0.161	0.148	0.135	0.126	0.119	0.112	0.107	0.098	0.092	0.087	0.083	0.079	0.076	0.074	0.070						
7	1.07	0.553	0.381	0.292	0.243	0.209	0.185	0.167	0.153	0.142	0.133	0.128	0.121	0.116	0.109	0.103	0.097	0.092	0.088	0.086	0.083	0.081						
8	1.08	0.561	0.388	0.302	0.250	0.216	0.192	0.174	0.160	0.149	0.140	0.133	0.127	0.121	0.113	0.107	0.102	0.098	0.095	0.093	0.090	0.089						
9	1.09	0.568	0.395	0.309	0.257	0.223	0.199	0.181	0.167	0.156	0.147	0.140	0.134	0.128	0.120	0.114	0.110	0.106	0.103	0.101	0.099	0.097						
10	1.10	0.576	0.402	0.315	0.263	0.227	0.205	0.187	0.173	0.162	0.153	0.146	0.140	0.135	0.128	0.121	0.117	0.114	0.110	0.109	0.106	0.106						

Based on the formula, $A = \frac{P(1+r)^{nr}}{(1+r)^n - 1}$, in which A = annual charge, P = amount of initial investment, n = number of years in the recurring period (the average life of the timber), r = the rate of interest expressed decimally.

Letters to the Editors

Arc Welding to Rail Webs

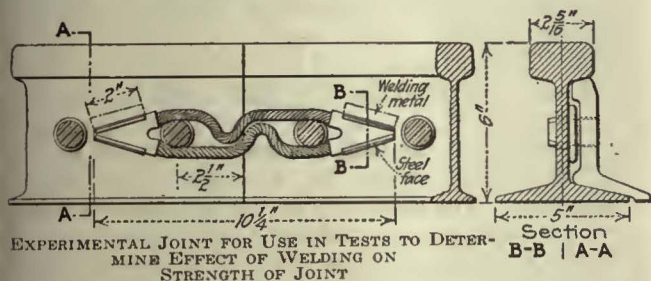
PUBLIC SERVICE RAILWAY

NEWARK, N. J., April 19, 1922.

To the Editors:

In the *Engineering News-Record* of March 30, page 524, appeared an article describing the effect on some 6-in. tee-rails of applying rail bonds to the rail web by means of the electric arc, as determined by a series of tests made by the Pittsburgh Testing Laboratory for the Canadian Engineering Agency, Inc., New York.

The tests were made under the standard drop-test machine specifications of the American Railway Engineering Association, 2,000-lb. weight with 15-ft. fall, some of the rails having bonds applied to their webs and others without the bonds. The bonded rails all



broke on the first blow while the unbonded rails required from three to five blows before fracture occurred. In a second series of tests wherein the height of the drop was reduced to 10 ft., the bonded rails all broke on the first or second blow, whereas the unbonded rails required from four to five blows before failure occurred.

While the article did not state the type of electric arc used, whether carbon or metallic electrode was employed, the results obtained are nothing more than could reasonably have been expected. While no definite conclusions can be drawn as to the results which would have been obtained under actual service conditions, it is quite generally conceded that the web of a rail is not the best place in which to install a welded bond. The metal has quite a thin section at this portion of the rail and is that portion in which a considerable part of the internal stress due to unequal rate of cooling during rolling has developed. The intense heat of the electric arc, especially in the case of the carbon electrode or the resistance type of welders, would naturally affect the web more, because the heat is not conducted away from the weld and distributed through a large mass of metal as would be the case if the weld had been made on the head or base of the rail. Welding of plates to rail webs by such methods as that employed in making the Lorain bar weld has a materially different effect, because the temperature rise at the weld is accomplished much more gradually and the effect is not localized to the same extent as in the case of the arc weld, where the metal is suddenly changed from a solid to a molten state and suddenly solidified again. This sudden change would certainly increase brittleness of the steel at the point of weld and would cause the results the test produced.

HOWARD H. GEORGE,

Engineer of Maintenance of Way.

EDITORS' NOTE—The article in the *Engineering News-Record* to which Mr. George refers was entitled "Steel

Rails Embrittled by Welding Bonds." It describes tests which were made in connection with the development of a theft-proof rail bond for the Mexico City street railway system. The bond was of the form shown in the accompanying illustration, comprising two strands of No. 0 copper cable connected at the end by spear-shaped cast-copper terminals faced along the outer edge with 1/2 in. of steel. The bond was designed to fit under the standard splice bar, passing around the bolt, and was to be attached to the rail web by means of electric arc welding of the steel facing to the rail metal.

Bonds were attached to about half the number of test pieces, in some cases with one of the terminals at mid-length of the specimen, in other cases with the two terminals symmetrically placed with respect to the mid-length of the rail. No more welding material was used than would be considered good practice, the test report states, and the welding process did not heat the rail to a noticeable degree.

In addition to the information which is quoted by Mr. George, the report states that quite abnormal shapes of fracture resulted in the case of the bonded specimens.

It was concluded from these tests that "serious injury is done to a rail by the welding process applied to its web," and the welded bonds therefore were not adopted for use. A form of bond passing under the splice and then attached to the head or base of the rail by welding may be adopted, however, as welding to the more massive parts of the section is not believed to injure the rail.

"The 'Ruthless' Trackless Trolley. It Is Destroying the Roads."

NEW YORK CITY, April 22, 1922.

To the Editors:

The above is a newspaper headline to an article on the effect of the trackless trolley on the cost of highway maintenance in the Borough of Richmond (Staten Island), where the city of New York is operating a trackless trolley system. This system was described in the issue of the *ELECTRIC RAILWAY JOURNAL* for Oct. 15, 1921. It appears that the authorities in charge of the maintenance of the highways have petitioned the Board of Estimate for \$281,600 for repaving two streets whose maintenance has become necessary because of the damage caused by the trackless trolley. The Borough President, in his request for funds for repairs, says: "As the present pavement is being destroyed by the trackless trolley operated by the city," etc. It further appears that 5,600,032 nickels will be needed to pay for the pavement.

The city is finding out that there is some virtue in trolley tracks with pavement maintained by the railways through the aid of the fare payers, thus again proving that the car rider is being taxed for pavement maintenance. Meanwhile, the Richmond authorities are attempting to have the pavement repaired at the expense of the Greater City at large in order to relieve the local taxpayers and property owners fronting on the streets to be repaved. Thus the entire city is asked to subsidize a supposedly cheap form of transportation which is not so cheap when road damage is considered, especially where the trackless trolley fare does not amortize maintenance costs.

This should serve as a warning to those railway companies which may be considering the trackless trolley

or even the motor bus to beware of any new entangling alliances with franchises which may require pavement maintenance. It also indicates the timeliness of the American Association's recently expressed desire for information on the cost of construction and maintenance of the public highways.

The writer considers that the situation found in Richmond Borough practically confirms some of the statements made in his letter to you dated Jan. 31, 1921, which appeared in the issue of the JOURNAL for Feb. 5, 1921. It was there noted that it will be necessary to build good roads for trackless trolleys, and that good roads cost about as much as good tracks. The experiment in Richmond Borough seems to prove also that it costs a lot of money to maintain roads for bus operation. What would happen to the streets in New York if their operation were to be multiplied many hundred-fold as desired by the Hylan bus or bus transit policy?

"ENGINEER."

*Psychological Tests Must Be Based on Facts**

NEW YORK, N. Y., April 20, 1922.

To the Editors:

The steps being taken by the American Electric Railway Transportation & Traffic Association, through its committee on personnel and training, to apply scientific methods in the selection and development of trainmen have been of great interest to me. It is especially gratifying to see the clear conception, on the part of the committee, of the value of utilizing in the solution of this important problem the accumulated scientific knowledge in the field of selection. The benefits to be derived from improving the personnel of platform men have been set forth in the reports of the committee and in the article by Dr. John Leeming in the March 11 issue of the ELECTRIC RAILWAY JOURNAL. Certainly no one will fail to see the practical results and actual savings in dollars and cents to be obtained through increased good will, the cutting down of operating costs and the reduction of accident claims, made possible by the adoption of sound principles of dealing with human relations. On the one item of the reduction of accident claims alone a large annual saving can be made.

The committee has made definite recommendations that psychological tests be used in the employment procedure and expects, I understand, to suggest concrete tests for use of the membership. It seems especially fitting at this juncture in the program, before definite tests or methods are tried out or adopted, for the JOURNAL through its columns to discuss the procedure which should be followed in order to avoid unnecessary pitfalls and obtain sound and permanent results.

While the use of tests is closely interwoven with the employment procedure and cannot be separated from it, my remarks will largely be confined to the requirements in the preparation and adoption of a testing program. To those who have been directly interested in the development and application of psychological tests to industry, it has been proved over and over again that getting the right start and adhering to a definite technique is of paramount importance. Probably the best thing I can do at this time is to point out just what a psychological test is, and second, to indicate the steps necessary in their preparation and application.

*The author of this letter has been engaged for years in the subject of practical psychology as applied to the personnel in different branches of industry.

What is a psychological test? To one it means a so-called character analysis; to another it means a series of information questions, similar to the "famous" Edison questionnaire; and to yet another it is simply a sort of examination or interview. This general misconception, coupled with the widespread exploitation on the part of the charlatan, is a matter of deep concern to the true psychologist. The long-headed business man, who would not think of turning over a technical piece of engineering to any but a trained engineer, or of turning over his books for an audit by any but a trained accountant, will in many cases, when it comes to applying tests, listen to almost any scheme put up to him. There seem to be two reasons for this attitude: First, each one of us is vitally interested in the human problem involved; second, the tests themselves seem to be quite simple, which causes a tendency to feel that they are easily prepared.

Just what a test is must be clearly understood. A psychological test is not an exercise, nor a problem *per se*, but a standardized task or series of tasks used as an instrument or tool to measure a particular trait or ability. The performance of the task is simply a means of taking a "sampling" of the ability, and is not a complete measure of it. In this manner, an opportunity for expression of the trait is given, and on the basis of this "sampling" it is possible to predict or estimate the total ability. The reliability of the test depends largely upon the task selected making a fair sampling. The principle is the same as that involved in testing steel, in testing chemicals, or in any kind of scientific test. In each case an analysis is made and what is to be tested for determined. Then standards are set up and samplings taken, and on the basis of what the samplings show an estimate of the whole is made.

Obviously, then, psychological tests for use in selecting men for definite types of work cannot be prepared by simply taking tests which have been used for an entirely different purpose or a different type of job. This error is probably the most common one made by the uninitiated. It is possible to get together a good collection of tests; but a test in itself means nothing. It is the interpretation which gives results, and in order to get the proper interpretation a definite procedure and technique must be followed in the preparation. The results of a good test may be entirely vitiated by preconceived ideas which lead to erroneous conclusions. One of the most common mistakes made is the assumption that the most intelligent man will be the best for a particular type of work. It has been conclusively proved that there is a range of intelligence which is best for each type of work; that there is an upper limit as well as a lower limit which should be adhered to if all the factors entering into efficiency and contentment are to be recognized. This principle is closely related to the problem of training and promotion, and in practice affects the policies and organization of each company. If opportunities for promotion are present, a higher type of ability may be secured and the range made wider than if the selection is made with the intention of keeping the man on the one job.

Experience has shown that the steps to be followed in preparing tests are: (1) A careful analysis of the job for which the tests are to be used, to determine the essential human qualities involved in efficient performance. (2) The preparation of tests for these qualities, tests which are simple and easily administered. (3) The standardization of the tests through tryout on men of

known ability. (4) Revision of the tests in light of the findings, and setting up of standards for use in the selection of new men.

Applying this procedure to the problem before the association, what does it mean? In the first place, there are no tests in existence, other than some mechanical devices such as are described in Dr. Gradenwitz's article in the JOURNAL of Jan. 28, which are directly applicable in the selection of motormen and conductors. It will be necessary, therefore, that a series of tests for this purpose be prepared. The first thing to do will be to make a careful and complete job analysis. Sitting in an armchair and guessing at the qualities involved will not be sufficient, even though one feels that he is familiar with the job. Until a systematic study is made of the duties of trainmen, there is very little basis upon which to proceed. At best, there will of necessity be a great many changes before the exact qualities will be found. When the qualities have been determined, practical tests may be devised. As a result of experience in the army and in industry during the last few years, great progress has been made in simplifying tests and methods of giving them. This experience should be drawn on by the association, for success largely depends upon the practicability of the tests themselves. In carrying out the third step, that of standardization of the tests, a representative group of at least five hundred men of known ability should be selected, preferably from a number of different companies, and the tests given to them, the results being checked against their efficiency on the job. A test is not ready for use until it has undergone such a tryout. Even then, only tentative standards will have been set. Before adequate standards can be determined, a great many revisions of the tests will in all probability have to be made, based on experiences in different companies as indicated by careful records. Standardization will be greatly facilitated in the program of the association by the comparisons which can readily be made, because the almost identical nature

of the work in the different companies will permit the same tests to be used and standard procedure to be followed. Unless provision is made in the program of the association for keeping records of the results obtained in the various companies, adequate standardization will never be possible.

In my estimation, and I want to emphasize this in conclusion, it is better not to start the use of tests at all than to "get off on the wrong foot" by attempting to do in a hurry what requires time and patience as well as expert counsel to do. Testing is not something mysterious; but the utilization of the knowledge already obtained in the field is essential if results are to be permanent and satisfactory. N. L. HOOPINGARNER.

Single and Double-Door Safety Cars

HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO

TORONTO, ONT., March 15, 1922.

To the Editors:

We have followed the various communications that have appeared in your journal on the above subject with very great interest, and after careful study have reached the same conclusions as expressed by Mr. Flowers in his letter of March 6, appearing in your issue of March 11.

About three months ago we placed an order with a local car company for twenty-five cars of the safety type and specified our own design rather than the standard, as we are absolutely convinced that satisfactory service cannot be given with the narrow aisles and single doors provided on the so-called standard car. The double doors on our car will be separately operated, and we have also deviated from the old standard by increasing the motor capacity to two 40-hp. motors.

We are thoroughly convinced that the wide aisles and separate entrances must be provided before a satisfactory car of this type can be produced.

FREDERICK A. GABY,
Chief Engineer.

One of the Busiest Traffic Streets in the World



THIS VIEW SHOWS THE FOUR LINES OF CARS ON LOWER MARKET STREET, SAN FRANCISCO. THE SPECTATOR IS LOOKING SOUTHWEST ON MARKET STREET FROM FRONT STREET

Lower Court Is Upheld in Galveston Fare Case

United States Supreme Court Indicates Galveston Company May Reappeal to City for Relief from Five-Cent Fare Order Under Changed Economic Status if Court's Prophecy Has Proved Wrong

Action of the City Commission of Galveston, Tex., in fixing 5 cents as the fare to be charged there has been upheld by the United States Supreme Court. This marks an end to fare litigation that has been waged for several years. The opinion, delivered by Justice Brandeis, sustained the action of the United States District Court at Houston in dismissing without prejudice the application for an injunction on the part of the Galveston Electric Company.

The Opinion of the Court

THE street railway system of Galveston was started as a horse-car line in 1881. It was electrified about 1890 and after the hurricane of 1900 was largely rebuilt. Upon sale on foreclosure the railway passed in 1901 to a new company, and in 1905 it was purchased by the Galveston Electric Company, which supplies to the inhabitants of that city also electric light and power. At no time has the full fare on the railway been more than 5 cents—except during the period of eight months, from Oct. 1, 1918, to June 5, 1919, when 6 cents was charged. This higher fare was authorized by ordinance of the municipal Board of Commissioners, which possesses regulatory powers, and on June 5, 1919, the same board reduced the maximum fare to 5 cents. The latter ordinance was passed after a hearing and a finding by the board that with the reduced rate the company would continue to earn a fair return. Under the 1919 ordinance the company operated for eleven months. Then it brought this suit, in the federal court for southern Texas, to enjoin its enforcement. The company contends that the fare prescribed is confiscatory in violation of the Fourteenth Amendment; the city that it is sufficient to yield a return of 8 per cent on the value of the property used in the public service.

A temporary injunction having been denied, the court appointed a master to take the evidence and make advisory findings. There was substantially no dispute concerning the facts past or present. It was assumed, in view of then prevailing money rates, that 8 per cent was a fair return upon money invested in the business. The experts agreed on what they called the estimated undepreciated cost of production on the historical basis; that is, what the property ought to have cost on the basis of prices prevailing at the time the system and its various units were constructed. They agreed also on the amount of gross revenue, and on the expenditures made in operation and for taxes, except as hereinafter stated. The differences between the parties resulted, mainly, either from differences in prophecy as to the future trend of prices or from differences in legal opinion as to the elements to be con-

sidered in determining whether a fair return would be earned. These differences affected both the base value and the amount to be deemed net revenues. The master, who heard the case in October, 1920, and filed his report in November, made findings on which he advised that the fare was confiscatory. The District Judge, who heard the case in January, 1921, found a much smaller base value and much larger net revenues, stated that he did not deem it necessary to determine whether the ordinance "will produce exactly 8 per cent or a little more or a little short of it," declared that he was "not satisfied that the ordinance produces a return so plainly inadequate as to justify this court in interfering with the action of the municipality in the exercise of its rate-making function" and in March, 1921, entered a decree dismissing the bill without prejudice. In April he denied a petition for rehearing, 272 Fed. 147. The case comes here on appeal under Sec. 238 of the Judicial Code.

The undepreciated reproduction cost on the historical basis¹—which seems to be substantially equivalent to what is often termed the prudent investment²—was agreed to be \$1,715,825. The parties failed to agree in their estimates of the depreciation accrued up to 1921. The master estimated that, based on the 1913 price level, it was \$390,000, and this estimate the court accepted. Thus measured, the value of the property, less depreciation, was \$1,325,825. The court found that the net earnings under the 5-cent fare for the year ended June 30, 1920, had been \$90,159 and for the year ended Dec. 31, 1920, \$109,286, and estimated that for the year ended June 30, 1921, it would be at least \$111,285. The return so found for the year ended June 30, 1920, is 6.8 per cent of \$1,325,825; for the calendar year 1920, 8.2 per cent and for the year ended

June 30, 1921, 8.4 per cent. The master made calculations only for the year ended June 30, 1920, and, mainly³ because he allowed an amount for maintenance and depreciation equal to nearly 18 per cent of the prudent investment for the depreciable property (less accrued depreciation), found the net earnings to be only \$50,249.60. This sum is 3.8 per cent on the prudent investment value, less depreciation. But neither the District Judge nor the master reached his conclusion as to net return by a calculation as simple as that indicated above.

DETERMINATION OF VALUE

First—As the base value of the property, master and court took—instead of the prudent investment value—the estimated cost of reproduction at a later time, less depreciation; and in estimating reproduction cost both refused to use as a basis the prices actually prevailing at the time of the hearings. These had risen to 110 per cent above those of 1913. The basis for calculating reproduction cost adopted by all was prophecy as to the future general price level of commodities, labor and money. This predicted level, which they assumed would be stable for an indefinite period, they called the new plateau of prices. As to the height of this prophesied plateau there was naturally wide divergence of opinion. The company's expert prophesied that the level would be 60 to 70 per cent above 1913 prices; the master that an increase of 33½ per cent would prove fair, and the court accepted the master's prophecy of 33½ per cent.⁴ Thus both master and court assumed a reproduction cost, after deducting accrued depreciation, of about \$1,625,000. On this sum the net earnings found by the court yielded—after deducting a 4 per cent depreciation annuity on property subject to depreciation, a maintenance charge, and a charge for taxes, other than the federal income tax—a net return of 5½ per cent for the fiscal year ended June 30, 1920; of 6.7 per cent for the calendar year 1920, and the promise of more for the fiscal year ended June

¹He allowed also on account of federal income taxes a sum of \$3,008, which the court disallowed.

²From the agreed valuation of \$1,715,825, the court deducted \$425,117 for property not subject to this appreciation—land, already given its market value, and capital acquired recently (all acquisitions before Jan. 1, 1915, being assumed to have been at the 1913 price level, all since that date at the new level). The balance was appreciated ½; the \$425,117 was added again; and accrued depreciation, likewise appreciated ½, was subtracted. The court thus obtained a base value of \$1,626,061. The master's figure was slightly smaller (but for his inclusion of development cost and brokerage) for he excepted more property from this 33½ per cent appreciation.

³That is "the estimated undepreciated cost of reproduction of railway property of the company on the historical basis, exclusive of franchise value, going concern value, bond discount and brokerage fee," but with land and right of way which cost about \$15,000 estimated at their present value of \$58,836. It was also agreed, for the purpose of dividing joint items, that one-fifth of the property of the company was devoted to its light and power business.

⁴See Richberg, 31 Yale Law Journal, 263, 266, 279; Hale, 30 Yale Law Journal, 710, 720; Henderson, 33 Harvard Law Review, 902 and 1031; Friday, 36 Quarterly Journal of Economics, 197, 211.

30, 1921. But to fix base value the master added, and the court disallowed, items aggregating nearly \$600,000, which must now be considered.

The most important of these items is \$520,000 for "development cost." The item is called by the master also "going concern value or value of plant in successful operation." He could not have meant by this to cover the cost of establishing the system as a physically going concern, for the cost of converting the inert railway plant into an operating system is covered in the agreed historical value by items aggregating \$202,000. These included, besides engineering, supervision, interest, taxes, law expenses, injuries and damages during construction, the sum of \$73,281 for the expenses of organization and business management. The going concern value for which the master makes allowance is the cost of developing the operating railway system into a financially successful concern. The only evidence offered, or relied upon, to support his finding, is a capitalization of the net balance of alleged past deficits in accordance with what was said to be the Wisconsin Rule.³ The experts calculated this sum in various ways. One estimate placed the development cost at \$2,000,000; a more moderate estimate by the company's expert was \$575,300, and the city's expert made a calculation by which he estimated this so-called cost at \$212,452.

INTERPRETATION OF "DEVELOPMENT COST"

If the rule were that a prescribed rate is to be held confiscatory in case net earnings are not sufficient to yield 8 per cent on the amount prudently invested in the business, there might be propriety in counting as part of the investment such amount, if any, as was necessarily expended at the start in overcoming initial difficulties incident to operation and in securing patronage. But no evidence of any such expenditure was introduced; and the claim of the company does not proceed upon that basis. What was presented by the witnesses are studies, on various theories, of what past deficiencies in net income would aggregate, if 4 per cent were allowed as a depreciation annually on the value of the property used. These calculations covered, on one basis, the period of thirty-nine years since the original horse-car line was built; on another, the period of fifteen years since the appellant purchased the property as a going concern. If net deficits so estimated were made a factor in the rate base, recognition of 8 per cent as a fair return on the continuing investment would imply substantially a guarantee by the community that the investor will net on his investment

ultimately a return of 8 per cent yearly, with interest compounded on deferred payments; provided only that the traffic will in course of time bear a rate high enough to produce that amount.⁴

The fact that a utility may reach financial success only in time or not at all is a reason for allowing a liberal return on the money invested in the enterprise, but it does not make past losses an element to be considered in deciding what the base value is and whether the rate is confiscatory. A company which has failed to secure from year to year sufficient earnings to keep the investment unimpaired and to pay a fair return, whether its failure was the result of imprudence in engaging in the enterprise, or of errors in management, or of omission to exact proper prices for its output, cannot erect, out of past deficits a legal basis for holding confiscatory for the future rates which would, on the basis of present reproduction value, otherwise be compensatory. *Knoxville vs. Knoxville Water Company*, 212 U. S. 1, 14.

Nor is there evidence in the record to justify the master's finding that a business brought to successful operation "should have a going concern value at least equal to one-third of its physical properties." Past losses obviously do not tend to prove present values. The fact that a sometime losing business becomes profitable eventually through growth of the community or more efficient management, tends to prove merely that the adventure was not wholly misconceived. It is doubtless true, as the master indicated, that a prospective purchaser of the Galveston system would be willing to pay more for it with a record of annual losses overcome than he would if the losses had continued. But would not the property be, at least, as valuable if the past had presented a record of continuous successes? And shall the base value be deemed less in law if there was no development cost, because success was instant and continuous? Or, if the success had been so great that, besides paying an annual return at the rate of 8 per cent, a large surplus had been accumulated, could the city insist that the base value be reduced by the amount of the surplus? Compare *Newton vs. Consolidated Gas Company*, decided March 6, 1922.

In determining the value of a business as between buyer and seller, the good will and earning power due to effective organization are often more important elements than tangible property. Where the public acquires the business, compensation must be made for these, at least under some circumstances. *Omaha vs. Omaha Water Company*, 218 U. S.

³On the other hand, if what is to be considered in determining the net deficit is not the result of operations from the beginning of the enterprise, but the result of operations since the present owner acquired it—in other words, the return on its investment—we are left without the data necessary to determine the fact. For the record does not disclose what the present company paid when it purchased the property in 1905 as a going concern. For aught that appears, appellant has received full 8 per cent annually on that amount and later additions to capital.

180, 202, 203; *National Waterworks Company vs. Kansas City*, 62 Fed. 853, 865. And they, like past losses, should be considered in determining whether a rate charged by a public utility is reasonable. Compare *Venner vs. Urbana Waterworks*, 174 Fed. 348,352. But in determining whether a rate is confiscatory, good will and franchise value were excluded from the base value in *Cedar Rapids Gas Company vs. Cedar Rapids*, 223 U. S. 655, 669, and *Des Moines Gas Company vs. Des Moines*, 238 U. S. 153, 169; and the expressions in *Denver vs. Denver Union Water Company*, 246 U. S. 178, 184, 191, and in *Lincoln Gas Company, vs. Lincoln*, 250 U. S. 256, 267, are not to be taken as modifying in any respect the rule there declared. Going concern value and development cost, in the sense in which the master used these terms, are not to be included in the base value for the purpose of determining whether a rate is confiscatory.

HYPOTHETICAL BROKERAGE FEES DISALLOWED

The other item included by the master in determining base value, but disallowed by the court, is \$67,078 for brokerage fees. There is no evidence that any sum was in fact paid as brokerage, and there was included, as above shown, the sum of \$73,281 for organization and business management in calculating the historical reproduction cost. The finding of the master rests upon testimony that bankers customarily get, in some form, compensation equal to 4 per cent on the money procured by them for such enterprises.⁵ But compensation for bankers' services is often paid in the lessened price at which they take the company's securities, and is thus represented in the higher rate of interest or dividend paid on the money actually received by the company as capital. The reason given by the master for including the allowance for an assumed brokerage fee is that a brokerage fee is "a normal incident of large industrial investments and has not been amortized," since "the record shows that the plant has been operated at a loss." If base value were to be fixed by the money expended, brokerage fees actually paid might with propriety be included, as are taxes paid pending construction. But as the base value considered is the present value, that value must be measured by money; and the customary cost of obtaining the money is immaterial. We cannot say that the court erred in refusing to include in base value an allowance for hypothetical broker's fees.

The appellants insisted also that the base value should be raised by assuming that the future plateau of prices would be 60 to 70 per cent above the historical reproduction value instead of 33½ per cent as the master and the court assumed. The appellees insisted, on the other hand, that an item of \$142,281 for

⁵The record cost of the property was originally used as the base for this calculation. But the figure \$67,078 was tacitly agreed by both parties to be the amount, if any, that should be allowed for brokerage.

⁴Hill vs. Antigo Water Company, 3 Wis. R. R. Com. Reports, 623, 705-723. But see *Cunningham vs. Chippewa Falls Water Company*, 5 Wis. R. R. Com. Reports, 302, 315; *Appleton vs. Appleton Water Works Company*, 5 Wis. R. R. Com. Reports, 215, 277; *In re Purchase Racine Water Works Plant*, 19 Wis. R. R. Com. Reports, 83, 140.

grade raising included by master and court in the historical cost should be eliminated. We cannot say there was error in over-ruling these contentions.

DEPRECIATION, MAINTENANCE, TAXES

Second—Concerning deductions to be made from gross revenue in order to determine net earnings, the court differed from the master in regard both to the yearly charge for maintenance and to the depreciation annuity. It appeared that in the fifteen years since appellant acquired the system in 1905, the average annual expenditure for maintenance had been \$42,771; that during the war the property had been admittedly undermaintained; that the expenditure was \$64,108 in the calendar year 1919; \$80,322 in the fiscal year ended June 30, 1920, and \$90,861.28 in the calendar year 1920. The court estimated the proper charge for current maintenance at \$70,000, and allowed, in addition, a depreciation annuity of \$45,245 (that is, 4 per cent on property subject to depreciation) to provide a fund out of which annual replacements and renewals could be made. Thus the court allowed for the year's depreciation and maintenance \$115,245, which is nearly 14 per cent of the historical reproduction value, and about 10 per cent of the assumed reproduction cost, of the depreciable part of the system. The master allowed \$147,146.40 for maintenance and depreciation during the year ended June 30, 1920. This larger figure was arrived at, partly by charging as cost of maintenance the full \$80,322 expended during that year, and partly by including as depreciable property expenditures for overhead items which the court excluded. The proper annual charge for maintenance is the amount normally required for that purpose during the period; it is not necessarily the amount actually expended within the year. Many items included in the overhead cost of original construction may properly be excluded in calculating the amount of the depreciation annuity. We cannot say that the court erred in limiting the year's maintenance and depreciation allowances to \$115,245.

The company asked to have allowed as a further charge \$29,500 a year on account of what it called deferred maintenance. The contention is that during the war and two years following, the company had deferred maintenance, pursuant to a policy established at the express request of the Government to the end that material and labor might be released for war purposes; that to make good this deferred maintenance would cost \$197,000, and that in order to amortize this amount an annual allowance from earnings of \$29,500 should be made for five years. This is an attempt, in another form, to capitalize alleged past losses, and the request was properly refused.

Third—The remaining item as to which the master and the court differed relates to the income tax. The company assigns as error that the master allowed, but the court disallowed, as a part of the operating expenses for the year ended June 30, 1920, the sum

of \$16,254 paid by the company during that year for federal income taxes. The tax referred to is presumably that imposed by the act of Feb. 24, 1919, c. 18, Secs. 230-238, 40 Stat. 1057, 1075-1080, which for any year after 1918 is 10 per cent of the net income. In calculating whether the 5-cent fare will yield a proper return, it is necessary to deduct from gross revenue the expenses and charges, and all taxes which would be payable if a fair return were earned are appropriate deductions. There is no difference in this respect between state and federal taxes or between income taxes and others. But the fact that it is the federal corporate income tax for which deduction is made must be taken into consideration in determining what rate of return shall be deemed fair. For under Section 216 the stockholder does not include in the income on which the normal federal tax is payable dividends received from the corporation. This tax exemption is therefore, in effect, part of the return on the investment⁸.

1922 EARNINGS MAY BE 8 PER CENT

It is thus clear that both in the year ended June 30, 1920, and in the calendar year 1920 the net earnings of the system were less than 8 per cent of its value, whether the value be estimated on the basis of prudent investment or on the basis of the reproduction cost actually adopted. When the court rendered its decision the ordinance had been tested for more than a year and a half—a period ample in ordinary times to test the current effect of the rate prescribed and to indicate its probable effect in the near future. The times here involved were, however, in a high degree abnormal. It did not follow that, because the system had earned less than 8 per cent in 1919 and in 1920, it would earn less than 8 per cent in 1921. A rate ordinance invalid when adopted may later become valid, just as an ordinance valid when made may become invalid by change in conditions. *Municipal Gas Company vs. Commission*, 225 N. Y. 89, 96. Compare *Willcox vs. Consolidated Gas Company*, 212 U. S. 19; *Newton vs. Consolidated Gas Company*, decided March 6, 1922.

The District Judge was obliged to form an opinion as to the probable net earnings in the future. All relevant facts, except as stated, and all appli-

⁸It is difficult to see how, on the facts presented, so large a sum as \$16,254 could have been paid on account of the year's operation. Indeed the court, in disallowing the item of federal income tax, deducted not \$16,254, but \$8,008. Even this seems too large, for the net earnings, without deduction of the \$16,254 attributed to income tax, for the year ended June 30, 1920, as found by the master, were \$66,503.60. From this, interest paid or accrued on indebtedness is to be deducted before computing the net income on which the tax is payable. A large part of the capital of utility companies is ordinarily represented by interest-bearing bonds and notes, and there is evidence that such indebtedness of the appellant was "in the neighborhood of \$1,400,000." The interest on this debt chargeable to the railway system would be at least \$50,000. There is further an exemption from tax of \$2,000 of the net income. So a 10 per cent tax on the balance would amount to less than \$1,500.

In the record and briefs elsewhere the income tax is reckoned at between \$8,000 and \$10,000, which is a proper figure if there be an 8 per cent return on \$1,626,061.

cable arguments were fully and clearly presented by the parties and were carefully considered by the court. Although the District Judge treated the master's report as advisory merely, he passed upon the numerous exceptions taken to the master's findings in order to indicate his view on the precise points raised. He allowed some exceptions and disallowed others. Upon petition for rehearing further careful consideration was given to the case. Views expressed in the first opinion on some matters were modified; but these changes did not call for any change in the decree. The District Judge had before him some evidence not before the master; for the company's expert was recalled and testified both to the result of operations of later months in which there was a large increase in travel and to the heavy decline in prices which occurred after October. Concerning actual facts there was substantially no controversy. On the elements to be considered in determining whether the rate would be confiscatory no error was made which could substantially affect the result. His determination whether the prescribed rate would be confiscatory was necessarily based largely on a prophecy, for normal conditions had not been restored. He found that gross revenues were steadily increasing; and that they were larger under the 5-cent fare than they had been during the preceding year when the 6-cent rate was in effect. He was convinced that operating costs would decrease largely during the year. His two opinions show that every element upon which his prophecy should be based received careful consideration. We cannot say that the evidence compelled a conviction that the rate would prove inadequate. Compare *San Diego Land & Town Company vs. National City*, 174 U. S. 739, 754. *San Diego Land & Town Company vs. Jasper*, 189 U. S. 439; *Knoxville vs. Knoxville Water Company*, 212 U. S. 1, 17.

The occasion for the suit was solely the extraordinary rise in prices incident to the war. There was no suggestion that action of the board evidenced hostility to the utility, or that the board was arbitrary or hasty. It had been theretofore considerate of the company's rights and needs. When prices rose rapidly in 1918, it raised the fare limit to 6 cents, although the franchise ordinance prescribed the 5-cent fare. And this was before our decision in *San Antonio vs. San Antonio Public Service Company*, 255 U. S. 547. Its reduction of the fare by ordinance of June 5, 1919, was made after hearing, and was doubtless due to the conviction, shared by many, that, with the cessation of hostilities and the negotiation of the peace treaty, prices and operating cost would fall abruptly. This prophecy, if such there was, proved false. But nearly three years have elapsed since the board adopted the ordinance; and more than a year since entry of the decree below. We know judicially that the period has, in general, been one of continuous price recession, and that the current rates of

return on capital are much lower than they then were'. But we cannot know to what extent the important changes occurring have affected either gross revenues or the net return. There is no reason to believe that the board would not give full and fair consideration to a proposed change in rate if application were now made to it. And the District Judge stated in his opinion (272 Fed. 147) that the decree to be entered would be vacated or amended in case it should later appear that the regulating board declined such adjustment of rates as the actual experience of the utility might show it entitled to; and the decree was thereupon entered without prejudice.

The District Judge refused a temporary injunction and did not exact a bond. Hence the only relief we can grant is such as operates *in futuro*. Compare Duplex Printing Press Company vs. Deering, 254 U. S. 443, 464. An injunction should not issue now, unless conditions are such that the prescribed rate is confiscatory. As by the reservation in the decree appellant may secure protection against the ordinance if under existing conditions the 5-cent rate appears to be inadequate, the decree should be affirmed. Compare Lincoln Gas & Electric Company vs. Lincoln, 250 U. S. 256, 268; 257 U. S.

Action by Galveston Company

In anticipation of a decision that would not restore the 6-cent fare but would authorize the company to seek relief through application to the constituted authorities, the Galveston Electric Company has made application to the City Commission for authority to increase its fares to 6 cents. In this connection the company petitioned the City Commission to order an audit of its books to the end that the real conditions in regard to profits or losses of the company might be determined. The City Commission granted this petition and at a meeting just two days before the Supreme Court decided the fare case directed that the books of the Galveston Electric Company be audited.

In discussing the petition for an audit, City Attorney Frank S. Anderson told the commission that without an audit of the traction company's books which would show whether the figures presented by the company were correct, it would be impossible to determine if the profits under a 5-cent fare were inadequate.

On being advised of the decision by the Supreme Court, R. G. Carroll, general manager of the Galveston Electric Company, said:

When the district federal court rendered its decision it found that the return, as reflected by the records, was undoubtedly less than the law regards as fair.

The court, however, felt that the future earnings of the company would be sufficient to permit the company to earn a fair return, and issued its Injunction as follows:

"The injunction prayed for will be denied upon a decree so drawn as to permit the complainant to again apply as it may be

advised, should the actual experience of the future prove the prophecy false."

Unfortunately, the earnings of the company have declined, rather than increased, so that the present moment finds the company in a strained financial position and not earning a return that the law regards as fair.

In view of the above conditions, the company has presented its condition to the city commission of Galveston for further consideration.

William E. Tucker, Boston, Mass., who represented Stone & Webster in the trial of the case just decided, expressed the opinion that the most significant thing about the court's decision is the "indirect reaffirmation by the Supreme Court of the United States of the now well-established principle that in Texas a 5-cent fare provision written into a franchise is not a contract between a city and a railway system, but is in fact no more than the exercise of

the rate-making power of the city, and as such is subject to the provision against confiscation contained in the Fourteenth Amendment to the Constitution."

Mr. Tucker explains that the new appeal of the company for relief is based on the ground that under the present operative conditions a fair return on its property is not being earned. He says that while the Supreme Court held that the District Court did not err in its early conclusion, the prophecy of the court in that case with respect to the probable future earnings of the company was wrong, and that the right adheres to the company under the existing circumstances to seek relief either from the City Commission or the District Court.

All-Electric Power Signaling on London Metropolitan Railway

Progressive British Road Has Adopted Signal Improvements as These Became Available, and Is Still Experimenting with a View to Utilizing Latest Inventions.

SOME interesting particulars of the all-electric automatic power signaling on the Metropolitan Railway (London) have just been given to the Institution of Civil Engineers by William Willecox, M. A. M. Inst. C. E. In 1905, when electric service was inaugurated on the Metropolitan Railway, the signaling was mechanically controlled by the Spagnoletti lock and block. The number of trains between Praed Street junction and Aldgate, a distance of about 5 miles, was then 621 per day on both roads, and the number of signal sections was forty-nine. As the number of trains was increased, it was found necessary to introduce automatic signaling controlled by track circuits. The system chosen was all-electric, the work was undertaken in 1908 and this section was completed in the following year. Two power frames were installed, one at Praed Street and one at Aldgate, to handle the traffic at these places; but the existing mechanical boxes were retained at the intervening stations for shunting purposes, with the addition of the safeguards provided by track control. The number of trains in 1913 at Praed Street was 863, and from Baker Street to Aldgate 983, with ninety-one signal sections.

There are about twenty hours daily of continuous passenger traffic, but from 7.30 to 10 a. m. and from 4.30 to 7.30 p. m., the traffic is so dense as to necessitate forty trains each to and from the city per hour. The automatic signaling dealt with these satisfactorily. Similar signaling was therefore installed between Baker Street and Neasden in 1911, the number of signaling sections being increased from twenty-four to fifty-one.

At this date there was only one through line at Baker Street handled by two signal boxes, one at the north end of the station and one at the Circle

end. This through line was track-circuited, and full protection was afforded to train movements, allowing forty-eight through passenger trains to be run to and from the city. All the current used in these installations was continuous.

In 1913 the new Baker Street station was completed, and automatic signaling was installed between the Circle lines and the north end of the station. For this purpose a small signal box was constructed on a retaining wall so as to be out of the way, and in it a power frame of thirty-six levers (6 spare) was erected. This power frame handles more than 1,500 trains a day, and the signalman has no view of the trains except those within station limits immediately in front of his box. Through the station all signals and points are controlled by direct current, but the track circuits are alternating current.

In 1913, also, two new fast lines were constructed alongside the old or local lines from Finchley Road to Wembley Park, a distance of 5 miles. Through the junction at Finchley Road and on to Wembley Park alternating current track circuits were installed, but the signals are worked by direct current as far as Neasden power house. From this point to Harrow-on-the-Hill alternating current is used for the signals as well as for the tracks, and from the same point alternating current is used for both tracks and signals on the local lines to the junction north of Wembley Park station where the fast and local lines converge. From Baker Street to Harrow-on-the-Hill, before automatic signaling, there were thirty-nine signaling sections. Now there are sixty-nine and on the through fast lines there are twenty sections.

In 1919 the signaling from Praed Street station to South Kensington, which was an automatic bar-and-treadle system controlled by direct current, was

*See Federal Reserve Bulletin, January, 1922, pages 5, 79, 113; February, 1922, pages, 156-157.

track circuited with alternating current, but the signals continue to be controlled by direct current.

Current for the supply of power to operate the power frame at Praed Street junction and at Baker Street is obtained from two 130-volt, 5-kw. motor-generators through suitable cables. These supply power for the operation of the points, the signal lamps and train stops, the electro-magnets for back-locks and for the constant indication of power-worked points at Praed Street junction, and also for working the power frame at Baker Street, the total required for both boxes being 2.08 kw.

POWER CONSUMPTION IS SMALL

For operating the track circuits, automatic and semi-automatic signals and train stops, between Praed Street, Bishop's Road and Edgware Road stations, and also between Edgware Road, Great Portland Street and Marlborough Road, and for four large illuminated train indicators at Baker Street, power is obtained from one 15-kw. and two 12-kw., 70-volt motor-generators in Baker Street substation, and the maximum power taken is 14-kw. The mechanical locking in the power frames is ordinary miniature tappet-locking controlled by levers in the ordinary way, the electric locking frame being behind the levers. Illuminated continuous diagrams are placed behind the frames lighted by 75-volt 5-cp. lamps.

All signals at junctions are electrically back-locked, an important safety device which in the further development of electric signaling has enabled point-locking bars to be dispensed with. At all running-stop signals there are train stops which are not connected to the signals mechanically, but electrically, and are controlled by the track circuits in the same manner as the signals, coming to clear and going to danger with the signal. They are also controlled by the track circuit independently of the signal, so that, if a signal failed to go to danger, the arm of the train stop would still go to the danger position.

All electric signals are either automatic or semi-automatic, the former controlled through the track circuits by the passage of the trains themselves, the latter controlled from a signal box when this is in use, but becoming automatic when not so controlled. Inside tunnels the signals are lamp signals, outside they are upper-quadrant semaphores worked by electric motors. Signals are held normally in the clear position by electric power, going to danger by gravity.

All signals are lighted electrically, and station masters light the signals half-way to the next station on either side, by means of a switch at their station. A hundred yards behind each stop signal in the open, fog repeater signals have been erected, the lights of which are placed at the level of the driver's eyes and as near as possible to the running line. By this means an indication is given to the driver

whether the stop signal ahead is at clear or at danger, and if it is at danger he can slow up and avoid being tripped suddenly. The signalmen have fog repeater switches in the signal box by means of which they can light the fog repeater lamps when necessary.

Between junctions it is possible to have a number of trains, *e. g.*, between Finchley Road and Baker Street it is possible to have ten trains. For this reason Mackenzie Holland and Westinghouse train describers were installed, by which the signalman at Finchley Road is enabled to indicate to the Baker Street signalman whether the train terminates there, or is a through train to the city. All points where there are power frames are worked by the Mackenzie Holland and Westinghouse all-electric point machines. These machines are enclosed in a water-tight cast-iron case divided into three compartments. At one end is the motor, in the center are the gear wheels and motor switches, and in the other end is the worm drum that operates the points and the bolt that licks them both ways. Both point blades as well as the bolt lock are individually detected through an electric detector fixed in the 4-ft. way before the signalman can get his signal for a train to pass over that route. These point machines, says Mr. Wilcox, are most successful.

The track relays at Baker Street are of the single element vane type, the shunt by a train averaging 0.9 ohm. The relays used on the direct current system are of the three-coil polarized type, the shunt of which by a train averages 0.15 ohm. The most recent type of relay used is a two-element vane relay, the shunt of which by a train averages 3.4 ohms. The maintenance cost of this type of signaling is not excessive.

AUTOMATIC SIGNALING CUTS COSTS

Before automatic signaling was installed there was 645 levers in use, whereas at present only 311 levers are employed, while the number of signalmen was reduced from eighty-six to twenty-seven and one-half. This meant in 1908 a saving of £127 (about \$615 at then rate of exchange) per week on signalmen's wages, which at the present rate would be around £325 (about \$1,483 at current rate of exchange). During 1920 the whole cost of maintenance—wages and materials—of the signaling of the electrified lines amounted to £123 per route-mile.

Charts have been kept from the beginning of automatic signaling in order to ascertain the number of delays to trains as compared with delays to trains with ordinary signaling, and the comparison works out very favorably for automatic signaling.

Tests have also been made with a three-position light signal as used on the Pennsylvania Railroad. The cost of maintenance is about the same as with two position semaphores, but the light signal appears to possess advantages in some respects, *e. g.*, in the

entire absence of mechanical parts, and in the power of penetration of the light rays both in sunshine and in fog.

Power Test Codes to Be Discussed at Public Hearing

ON MAY 9, during the spring meeting of the American Society of Mechanical Engineers at Atlanta, Ga., a public hearing will be held for the discussion of the three additional power test codes which have reached this stage in their development during the past year. Last May at Chicago this committee, of which Fred R. Low, editor of *Power*, is chairman, presented codes on general instructions, steam engines and evaporating apparatus. It now presents codes on definitions and values, displacement compressors and blowers and hydraulic power plants, all three of which have appeared in *Mechanical Engineering*.

Although these codes have passed through six successive revisions in reaching their present form, the committee will welcome a full and frank discussion by the members of the society and others interested in these three subjects. Persons not planning to attend the spring meeting are invited to prepare written discussions.

Reprints of all three codes revised to date have been prepared by the committee and may be obtained by addressing C. B. LePage, secretary to the committee, at the society's headquarters, 29 West Thirty-ninth Street, New York, N. Y.

In 1918 the power test codes committee of the A.S.M.E. was reorganized to revise and enlarge the power test codes of the society, published in 1915. The committee is a large one, consisting of a main committee of twenty-five, under the chairmanship of Mr. Low, and nineteen individual committees of specialists who are drafting codes for the different classes of apparatus comprised in power-plant equipment.

Automotive Engineers Travel in Rail Car

WHAT was heralded as the first trip in history in which a scientific body has traveled any distance on a standard railroad in a motor rail car was made April 21 by New York members of the Society of Automotive Engineers, who traveled to New Haven to hear Prof. E. H. Lockwood of Sheffield Scientific School discuss power losses in motor-vehicle chassis. Some sixty-odd members traveled in the two Mack A.C. rail cars now in operation on the New York, New Haven & Hartford Railroad. Through the courtesy of the New Haven these cars were taken off their regular lines for the trip.

The average operating speed between the Harlem terminal and New Haven was 27 m.p.h., the speed varying according to traffic conditions. For instance, the average speed in the 16.5-mile stretch between New Rochelle and Stamford was only 20.2 m.p.h., whereas in the next stretch, Stamford to South

Norwalk, one of the cars made 36.4 m.p.h. The maximum speed was about 42 m.p.h., but at the higher speeds there was considerable vibration.

The two rail cars were placed in revenue service on Jan. 30, 1922, one covering an 11-mile route from New Haven to Derby and a 44.8-mile route to New Hartford. The second car runs from Litchfield to Waterbury, a distance of 36.4 miles. So far the two have covered about 23,000 miles in the service of the New York, New Haven & Hartford Railroad. Each car has seats for thirty-six passengers, with a 9 x 6-ft. baggage compartment located at the rear.

Industrial Engineers' Convention

THE Society of Industrial Engineers held its spring convention at Hotel Statler, Detroit, Mich., April 26 to 28. Of interest to electric railway men especially were the papers and discussions on conservation of material, plants and equipment, and labor and the workman.

Chamber of Commerce of the United States

AT THE tenth annual meeting of the Chamber of Commerce of the United States, to be held in Washington May 16 to 18, "European Conditions and Their Effect on American Business" will be the main topic. This announcement was made by the Chamber on April 24, when it made public a tentative program for the meeting. Because of the interest of business men throughout the country in the general subject it is predicted that the convention will be one of the largest ever held by the Chamber.

As in previous years the work of the convention will be done largely in group sessions. Groups representing the major divisions of business will take up the questions before the meeting in their relation to the particular interests or industries comprised within the group.

International Chamber of Commerce to Meet

THE American section of the International Chamber of Commerce has just announced that the next general meeting of the International Chamber will be held in Rome, Italy, the week of March 19, 1923. Before this meeting the International Chamber committees will be able to consider the results of the Genoa Conference in so far as they affect industry and commerce. Based on the views of these committees, constructive plans will be made as to such further steps as should be taken to restore the trade of the world.

The next meeting of the executive committee of the International Chamber will be held in Paris on May 26, and will be followed by a meeting of the board of directors on July 10. At that time plans will be made for the general meeting.

International Railway Congress

THE ninth congress of the International Railway Association is in session in Rome, Italy; the period covered by the congress being April 18 to 30. Abstracts of the reports to the congress on heavy electric traction in a number of important countries have appeared in the following recent issues of this paper: Dec. 3, 1921, page 988; Jan. 28, 1922, page 147; Feb. 25, 1922, page 322.

Canadian Association Convention Plans

THE program for the annual convention of the Canadian Electric Railway Association is complete except for a few details. It will be held at Quebec, June 1 to 3. An abstract of the program follows:

JUNE 1

- 9:00 a.m. Registration.
- Address of welcome.
- Business session, including address of president and reports of committees.
- Inspection of exhibits.
- 1:00 p.m. Get-together luncheon.
- 2:30 p.m. Paper by member.
- 2:45 p.m. Sightseeing around Quebec by trolley (ladies).
- 4:00 p.m. Paper by associate member.
- 5:00 p.m. Inspection of exhibits.
- 7:30 p.m. Association banquet.
- 10:00 p.m. Dancing.

JUNE 2

- 9:00 a.m. Inspection of exhibits.
- 10:00 a.m. Paper by member.
- 11:30 a.m. Trip to Quebec Bridge by boat.
- Informal buffet luncheon on board.
- 2:30 p.m. Paper by associate member.
- 4:00 p.m. Unfinished business.
- Election of officers.
- 4:30 p.m. Inspection of exhibits.
- 9:00 p.m. Annual reception and ball, Chateau Frontenac.

JUNE 3

- Inspection of exhibits, and trips to Montmorency Falls and to Saguenay River.

A. E. S. C. Activities

NINETEEN standards have now been approved by the American Engineering Standards Committee, of which four have been approved as "American Standard," fourteen as "Tentative American Standard" and one as "Recommended American Practice."

This number includes the specifications and tests for portland cement, for which the A.S.T.M. is sponsor, which have been advanced to the full status "American Standard." In the list also as "Tentative American Standard" are the specifications for drain tiles of the same society.

The A.S.T.M. has submitted to the standards committee its specifications for purity of raw linseed oil from North American seed and for purity of boiler linseed oil from North Ameri-

can seed, as well as its standard methods for chemical analysis of lead, tin, antimony and copper. Approval as "Tentative American Standard" is asked for these specifications.

French Street Railway Association

AN EXTENDED account of the meeting Oct. 20-23, 1921, of the Street Railway & Automobile Association of France (Union des Voies Ferrées d'Intérêt Local de France et des Transports Publics Automobiles de France) appears in *L'Industrie des Tramways*. The papers presented included reports on track construction, car design, power generation and distribution, trackless trolleys, the financial condition of interurban lines, the reorganization of the Paris tramway and bus system, airplane lines, the engineering status of the bus and railway electrification.

American Association News

Camden Section Boasts 283 Active Members

AT THE April 20 meeting of the Public Service Camden Section President C. V. Wallace announced that the section is now the largest, having 283 active members.

The principal speaker at this meeting was former Judge John B. Kates. His principal point was the dependence of one man on another in the present social order. He pointed out that it is utterly impossible for any one to stand alone, whether he occupies the smallest job or one of the greatest responsibility. An employee is practically a nonentity when isolated. The electric railway employee has a definite niche to fill, and if he does his duty effectively, pleasing the people who depend upon him, he will be rewarded in proportion to the extent to which he discharges his obligations. This reward may be represented in ways other than the pay envelope.

H. T. Stevenson, assistant to the president of the Public Service Railway, spoke on salesmanship. He explained that while an officer of the company may see not over ten men a day, a trainman often comes in contact with 500 or more. In the long run public opinion is molded by the platform men. He told of an experience of a Public Service conductor who made a warm friend for the company of a newspaper editor by the simple act of offering him a fare when the editor had left his money at home. Afterward, by way of appreciation, the editor sent the conductor a gift.

At the close of the meeting the entertainment committee announced that the next meeting would be "radio night."

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Home Rule Fight Staged

Campaign Started in Alabama to Have
Regulatory Powers Returned
to Cities

Preparations have been started for a fight at the next session of the Legislature to regain for the municipalities of Alabama the right to regulate the rates and service of their local utilities.

William L. Harrison, Commissioner of Public Utilities of the city of Birmingham, has taken the lead. On April 18 the City Commission adopted resolutions calling upon the Legislature to restore to the city its control over the rates and service of the Birmingham Railway, Light & Power Company, the Southern Bell Telephone Company and the Birmingham Water Works Company.

Steps for the formation of the state-wide organization have already been taken. Letters are being sent out to every Mayor of cities or towns of Alabama which have public utilities of any kind. With these letters are being sent copies of the resolutions adopted by the Birmingham City Commission and the Mayors are being asked to have their Boards of Aldermen or the City Councils adopt similar resolutions. It is planned to call a meeting of representatives of all of the municipalities later.

Similar resolutions to those adopted in Birmingham have been presented to the City Commissions of Montgomery and Mobile. Commissioner Harrison and W. J. Wynn, City Attorney, made a trip to the two cities, where conferences were held with the commissions and assurances were given that Birmingham, Montgomery, and Mobile would act in concert and take the lead in the proposed fight to be waged before the Legislature at its coming session.

At the last session of the Alabama Legislature the public utility act was amended and all power to control or regulate either rates or service of local utilities was taken from the municipalities of the State and was vested in the Alabama Public Service Commission. This body was authorized to fix rates for all local utilities of the State and to prescribe the service regulations. It was also authorized to set aside contracts which had been made by the municipalities with the utilities.

The repeal of this amendment and the return of the right to regulate rates and service to the municipalities will be sought at the hands of the next Legislature, according to the plans now being worked out.

Commissioner Harrison stated that it is not the purpose of the city of Birmingham to open a fight on its utilities or on the Alabama Public Service Com-

mission, but to regain some of the authority it has lost.

The city of Birmingham is now prosecuting a suit against the Birmingham Railway, Light & Power Company seeking to cancel its franchise because of increase in fare from 5 cents, as provided in its franchise, to 8 cents. The increase was granted by the Public Service Commission some time ago. The city is attacking the validity of the public utilities act on several grounds.

Democratic primary elections are to be held early in August and the general elections will be held in November. The meeting of the Legislature will take place some time later. Candidates running in the primary are in many instances making an issue of the Public Service Commission. Many have announced themselves in favor of curtailing its powers.

Asks Removal of One-Man Car Restrictions

The Jacksonville (Fla.) Traction Company, a Stone & Webster subsidiary, and now in receivership, has requested the city to eliminate the section of the ordinance regulating electric railway traffic which requires that a car crew shall consist of a conductor and a motorman. The company proposes to utilize one-man cars. Peter O. Knight, Stone & Webster counsel for the southeast, vice-president of the Tampa Electric Company, and General Manager T. J. Hanlon, Jr., have stated that the one-man car has been the major means of maintaining a nickel fare in Tampa.

Asks Winnipeg to Postpone Option

A. W. McLimont, vice-president of the Winnipeg (Man.), Electric Railway, has asked the City Council to postpone its option to purchase the railway from 1927 until 1937. In his letter to the Council Mr. McLimont stated that this would enable the company to float a satisfactory security and to care for the payment of all outstanding taxes, paving charges and damages caused by electrolysis; to complete the work of removing span wire poles, put wires underground and to make certain other recommended changes. The company, Mr. McLimont stated in this letter, will agree to extend its Talbot Avenue line from the present terminal to Panet Road and to make extensions on the Notre Dame and Academy Road lines, Notre Dame Avenue West Line, McGregor Street and Sargent Avenue lines, to enlarge the St. James subway for double tracking and to install bus service where necessary.

Detroit Preparing the Way

Forces Being Lined Up for Municipality
to Take Over All Detroit
Traction Lines

Initial steps are being taken in Detroit preparatory to the taking over of the Detroit United Railway city lines by the municipal street railway organization. The purchase agreement was ratified on April 17 and a bond issue voted to finance the initial payment and the purchase of supplies and miscellaneous equipment not included in the purchase plan but necessary for efficient operation by the city. An appraisal has been begun and an inventory is being made, including construction materials such as rails, ties, cement and miscellaneous materials.

It is the endeavor of the city officials to complete the inventory before May 15, the date set for the transfer. Officials of the municipal organization plan on taking over the lines with as little interruption of service as possible. Every effort will be put forth to insure efficient operation from the very beginning and to improve the service.

It has been announced by the municipal officials that as many of the present Detroit United Railway employees will be retained as can be used by the city and that preference will be given to employees who are inclined to work along the lines followed by employees of the present municipal lines and in accordance with the ideals of the officials of these lines. The first and most important aim will be to give courteous and efficient service.

It is planned to have a large number of uniformed municipal ownership employees stationed in the congested downtown districts at the most important points to aid in directing traffic.

An increase in the efficiency of the present Detroit United Railway employees has already been noticed since the city voted to take over the Detroit United Railway lines. No further developments have been reached in regard to the wage cut proposed by the Detroit United Railway earlier in the month, and it now appears unlikely that the wage question will be settled before the transfer is made and the lines are being operated by the city. The present plan is not to reduce wages.

Figures as to operating revenue of the Detroit United Railway for the first three months of the year have been submitted to the city by the company. This is the first report of this nature received by the city and the figures will be used as a basis in making up the budget for the entire municipal system combined with the present Detroit United Railway system for the coming year.

Elevated Lease Reported Negotiated

At a conference at the Mayor's office on April 27 attended by Mayor Moore, Thomas E. Mitten, president of the Philadelphia Rapid Transit Company, and Richard Weglein, president of the City Council, an agreement is said to have been reached by which the Philadelphia Rapid Transit Company will operate the Frankford elevated line for the city. The rental terms which the company will share are 1 per cent in 1923; 2 per cent in 1924; 3 per cent in 1925; 4 per cent in 1926; 5 per cent in 1927. The operation of the road will begin Nov. 5 of this year.

Mayor Moore announced after the Frankford "L" conference that the lease agreement would terminate at the end of five years unless the city gives notice that it wishes the lease continued.

In a statement the Mayor said President Mitten asked for co-operation of the administration and councilmanic forces of the city government in transit matters, and while assured of such co-operation it was pointed out that the city would reserve its rights under the 1907 agreement, the valuation proceedings and others of a legal nature.

It was also stated that the matter of extensions was discussed and it was announced that now that the Frankford "L" lease was out of the way, efforts would be made to extend the Philadelphia Rapid Transit System into sections of the city not now provided with service.

Commission Reiterates Its Rate Deflation Policy

In a summary of its decisions issued on April 24 by the Public Service Commission of New York, it is shown that gas, electric light, telephone and electric railway rates throughout the State have been materially reduced since the commission was appointed to office last April by Governor Miller. Furthermore, the policy of the commission, as expressed in the reduction orders, indicates that the commission intends to continue the rate reducing process as the costs of labor and materials decline.

In this connection the statement of the commission refers to an opinion rendered last fall by Chairman William A. Prendergast refusing an increase in fares in Utica, and concurred in by Commissioners Pooley, Van Voorhis, Semple and Blakeslee. In that decision, reviewed at length in the *ELECTRIC RAILWAY JOURNAL* at the time, the attitude of the commission regarding all public utility rates was set forth as follows:

Public utilities, just as other departments of business, must expect to cope with periods of depression and short earnings. Just as at other times they enjoy periods of prosperity and full dividends. If the public is expected to make up every deficiency in order to give a utility a good round rate of earning power, then the public is entitled to the benefit of the surplus over the agreed upon earning-rate in times of prosperity.

It must be borne in mind that we are not

dealing with the conditions of 1920, nor with the previous abnormal years, but with the present period, which is one of profound economic readjustment. It is with this pregnant fact before us that a decision in this and similar cases must be made.

The commission, up to date, has put into effect about forty orders calling for reduction in rates or suspending proposed increased rates asked for by public utilities. In only seven cases have increases been permitted, and these of a very slight nature to gas and electric light companies in up-state communities where the cost of service is larger than in crowded sections because of the scattered population.

All of the reductions so far ordered are temporary and were made by the commission before the investigations into the various companies were completed. A further revision of these temporary rates will be made at the conclusion of the various hearings.

Learn About Dallas.—A special Dallas edition of "Partners," the official paper of the Dallas (Tex.) Railway, was issued under date of April 5, 1922. It contains some interesting facts and all possible information on the city of Dallas, compiled by the Dallas Chamber of Commerce. With its historical résumé and fine views this copy of "Partners" is something to keep for future use and reference. The pamphlet says that the effective sale of transportation must be based on knowledge of the city. If the Dallas trainmen assimilate one-half of the story they will certainly be living up to their reputation, namely, the best informed group of men in Dallas when it comes to giving information about Dallas.

Suits to Demand Electrification

Suit will be instituted by the municipal authorities of Buffalo, N. Y., against the seventeen railroad lines entering the city to force the companies to file plans for the electrification of their lines. Last November the City Council adopted an ordinance calling for electrification of the railroads by Jan. 1, 1923, and the filing of such plans with the city by Jan. 1, 1922. The failure of the lines to file the plans will prompt the suits. The railroads against which suits are threatened by the City Council are the New York Central, Pennsylvania, Delaware, Lackawanna & Western, and ten others.

Maurice C. Spratt, attorney for the New York Central, says the railroads have no intention of complying with the resolution of the Council, first because of the excessive cost and second because the city has no legal authority to compel the roads to expend such a large sum of money. Railroad engineers have estimated that it would cost the seventeen railroads entering Buffalo about \$116,000,000 to comply with the ordinance. The Erie Railroad's share alone would exceed \$22,000,000, a sum it could not possibly raise, Erie officials say.

Hearing Held on Bacharach Bill

Another hearing was held in Washington before the House judiciary committee on April 25 to consider the Bacharach bill, which would limit the jurisdiction of federal courts as to injunctions in matters pertaining to state public utility orders. The hearing was held before the whole committee, the time being given to the advocates of the measure. Another hearing will be held May 23. Mayor Hylan of New York, Ledyard P. Hale, counsel for the New York State Public Service Commission; John P. O'Brien, Corporation Counsel of New York, and John E. Benton, representing the National Association of Railway & Utilities Commissioners, were among those who appeared before the committee. Among those who listened to the testimony in opposition to the bill were E. A. Harriman, member of the legislative committee of the American Bar Association, and Senator Charles S. Thomas of the Bar Association of Colorado.

The witnesses in behalf of the bill voiced the complaint that state commissions are interfered with by the federal courts. They claimed that as exact justice can be had from the state administrative bodies and the state courts as from the federal courts. The indicated answer to this contention is that, while it is doubtless true in local matters, investors who are not residents of the state naturally look to the federal courts for protection.

Mayor Thompson of Chicago is to be heard on May 23, when the hearings on the measure will probably be concluded. The committee has given a great deal of time to the bill and has had a full explanation of its object. It was evident at the hearing that the opposition to the bill is very strong, especially in states where money is wanted for the extension of railroads and the development of natural resources. It was announced at the hearing that the committee had received telegrams from a number of state commissions opposing the bill on the ground that it would have a tendency, if enacted into law, to exclude capital from public utility enterprises.

Kinsella Mayor of Hartford

Richard J. Kinsella was elected Mayor of Hartford, Conn., April 4, after a campaign in which reduction of car fares was an important issue. Reduction of fares on the lines in Hartford of the Connecticut Company, isolation of the Hartford Division from the state system and curtailment of suburban trolley service during non-rush hours, which he announced as part of his traction plank for the campaign, met with disapproval among business men and taxpayers. They declared that this plan would increase unemployment, inconvenience the public and turn away shoppers from the city. Mr. Kinsella was elected Mayor four years ago, but was defeated at the next election.

Right to Permit an Abandonment a Commission Function

The Montana Public Service Commission was granted final authority over the electric railways of the State in a decision delivered recently by Associate Justice Holloway in the Supreme Court. Judge Holloway reversed action of the Lewis and Clark County District Court in refusing the city of Helena an injunction against the Helena Light & Railway Company.

The railway had announced its intention of abandoning the Kenwood branch on the west side of the city. The city asked an injunction on the ground that the company was violating its franchise. The lower court refused to enjoin the company. The city appealed.

In its decision the higher court held that the Public Service Commission had the power to decide whether the railway had the right to abandon any of its lines on account of heavy losses sustained by insufficient business. Until the state body has acted, it was held, the company must discharge its obligation under its franchise.

Seattle Must Say Yes or No

The question facing residents of Seattle, Wash., at the election on May 2 is this: Shall they accept the proposal to support the municipal street railway by taxation, or shall they refuse it? If they accept it, fares will be reduced from the present 8½ cents to approximately 3 cents. If they refuse it, fares will stay where they are.

Advocates of the proposal for taxation maintenance say that the increased taxation will be more than offset by the reduction of fares. Opponents insist that increased taxes will drive away business. It has been estimated that the new plan would involve an increase in taxes varying in amount from \$5,500,000 to \$6,000,000, or between 20 and 22 mills. The total tax rate would approximate 85 mills. The proposal was brought to vote by an initiative petition. The plan was reviewed in the *ELECTRIC RAILWAY JOURNAL* for March 25, page 534.

Mayor Wants a New Deal

Mayor Hosey of Fort Wayne, Ind., has indicated that the Indiana Service Corporation, Fort Wayne, Ind., will be asked to enter into a new agreement with the city similar to the one surrendered when the company's operation passed completely under the supervision of the State Public Service Commission.

Two petitions of franchises to improve the city lines have been presented to the Board of Works by the company, one for the proposed double tracking of Pontiac Street and the other for the double tracking of South Wayne Avenue. Neither petition has been acted upon, although they have been on file several weeks. Mayor Hosey indicated that permission to carry on the

work will not be granted until the company enters into a new agreement or franchise with the city.

In an effort to settle the Pontiac Street double-tracking proposition, which has been opposed by the residents of Pontiac Street, the railway called a mass meeting of the citizens in that section of the city at the neighborhood school, where it presented its side of the case. The company holds that the Pontiac line carries more traffic than any other line in the city, that new tracks are absolutely necessary and that the amount of traffic on the line will be greatly increased when the International Harvester Company's plant in the eastern end of the city is completed. The meeting was advertised in the local papers and the purpose of the meeting frankly stated in these advertisements.

Publicity Activities Approved by Commission

During various cases before the California State Railroad Commission in recent months in which public utilities have sought increases in rates, several contestants against the commission granting an increase have objected to the expenses for publicity contained in the operating expense exhibits offered to the commission by the utility companies. The contention has been advanced that utilities are not entitled to charge to their operating expenses the cost of advertising and expect the public to pay for it in the manner of increased rates.

To set the public right on this particular issue President Harley W. Brundige of the California State Railroad Commission has given his unqualified approval to the reasonable use of newspaper space by power and other public utilities of the State to promote and extend their business.

Franklin Hichborn of San Francisco questioned the commission as to the right of public utilities to charge advertising to operative account, especially in territory where competition is not a factor. Mr. Brundige has answered this gentleman by letter and has described newspaper advertising by public utilities as the most effective and cheapest form of salesmanship.

The protest to the commission followed the insertion of an advertisement by the Pacific Gas & Electric Company of San Francisco in a Santa Clara County publication, a region where the corporation holds a monopoly.

That utilities in certain fields do not have serious competition does not affect the proper use of advertising, Mr. Brundige contended, and he further pointed out that modern advertising seeks to create new business rather than to take business away from a competitor.

Mr. Brundige held that when advertising is reasonably and wisely used, measured by results obtained, and is not of the political propaganda type, it is a legitimate operating expense.

Reviews Boston Elevated Situation

James F. Jackson, chairman of the board of trustees of the Boston (Mass.) Elevated Railway, in a letter to Walter R. Mein, president of the United Improvement Association, recently stated that the present 10-cent fare could not be lowered until towns upon which the deficit of 1919 was assessed were paid back the money loaned by them. This amounts to \$4,980,151.

Mr. Jackson's letter is a reply to the questions and suggestions presented at a conference between the Boston Elevated Railway and the United Improvement Association on Jan. 30.

To replace the worn-out equipment of the railway with new and modern material and to bring the service to an efficient point would cost about \$6,000,000, according to Mr. Jackson. In three years the annual reserve for depreciation would care for the expenditures which normally should be cared for by current revenue.

The reserve for depreciation, said Mr. Jackson in his letter, is not being set aside as a capital asset. It is, instead, the fund which is being used by the trustees to replace deteriorated equipment. With it were purchased the majority of the 300 new center-entrance cars and eighty one-man cars, sixty-five elevated cars and forty Cambridge subway cars.

The 5-cent fare areas established between each of the long-distance trunk lines is, according to Mr. Jackson, part of the company's theory of developing a local service at a low fare which is "consistent with the flat fare that distributes population from congested centers to outlying districts and that can be made lower as relief from burdens and lessening costs permit."

Transportation Department for City in Prospect

The abolishment of the Department of Public Utilities, and the creation of a Transportation Department, making the Seattle (Wash.) Municipal Railway a separate branch of the city government, is proposed in an ordinance passed by the City Council, which will be submitted to the voters at the May 2 election as a charter amendment. Councilman Oliver T. Erickson, author of the amendment, claimed that the State under recent legislation has taken over most of the work performed by this branch of the city government. The Council was in favor, as a unit, for the charter amendment constituting the city's railway and bus system a separate and distinct department of the city government, and its executive head a member of the board of public works. As approved, the amendment creates the Department of Transportation, with a superintendent of transportation at its head, this official to be appointed for a three-year term by the Mayor, subject to confirmation by a majority vote of the Council.

Financial and Corporate

Interborough Asks \$400,000,000

This Value Is Placed on Rapid Transit Lines as Company's Price for Entering Transit Plan

James L. Quackenbush, counsel for the Interborough Rapid Transit Company, New York, N. Y., served notice on the Transit Commission on April 21 that it could not hope to take over the Interborough at the figure of \$174,221,056 recommended by the commission's valuation bureau. He put in a company value of \$399,873,697 and indicated that somewhere between these two figures there might be a chance of getting together on a price to be paid for turning the property over to the city for operation in connection with the proposed city-wide traction reorganization plan.

The statement was made at the opening of the valuation hearing which was begun on April 21 before the commission. Interborough figures were taken up first and there was a sharp clash between Clarence J. Shearn, special counsel to the Transit Commission, and the Interborough counsel. Mr. Quackenbush threatened to walk out of the hearing unless he was allowed to present the I. R. T. case as he saw fit and without what he termed "ungentlemanly interruptions." Chairman McAneny poured oil on the troubled waters and the matter was smoothed over.

Mr. Quackenbush wanted the commis-

sion to adopt a plan of arbitration to consider the figures of the chief engineer of the Transit Commission upon which the valuations were based. He claimed that the Transit Commission had this right under the dual subway contract. William A. De Ford objected and said that the Transit Commission should not be bound by any such arbitration.

It was decided that it might be feasible to go over the engineer's figures, which were the base figures upon which the valuations were built, in an arbitration with the city, the Transit Commission and the company represented. The commission, however, insisted upon the company bringing out its arguments against the Transit Bureau values at the opening hearing, and this proceeding was followed. The first witness was the Interborough Rapid Transit Company auditor, Edward F. J. Gaynor, who testified on the company figures.

Mr. Quackenbush said that, whereas the commission's valuation bureau had arrived at its figures by taking the cost to produce the property and deducting from it the cost of depreciation or the sum necessary to put it in first-class order, the company held that since the case was not a rate case, but one in which the commission sought to take the property away from the company, it must use a different method of fixing value. A rate fixed on the basis followed by the valuation bureau, Mr. Quackenbush held, could be changed if found unsatisfactory, but in this case

there was no chance for correction. His company, he contended, should be allowed a price equal to the value of the property as of today, with the company allowed all the advantages of increase in values due to advance in market costs.

He said that as the commission had presented the "minimum value" it was the duty of the company to show the maximum. "That does not mean," he said, "that some lower figure might not ultimately be accepted. Somewhere between may be the figure that may be arrived at between the parties, as frequently is the case in all negotiations."

Mr. Quackenbush declared that nothing he said must be taken as an ultimatum that the company would not eventually reach an agreement with the commission. He declared, however, that "the method adopted by the valuation bureau in reporting the lowest possible value could not be adopted by the commission with any hope of success."

"However," he said, "I cannot imagine that the commission can hope or expect that the thousands upon thousands of security holders who have purchased notes and bonds to the extent of \$200,000,000 will consent to accept anything less than the face value of those securities."

In discussing the conferences in 1919 he declared that the inquiry into the affairs of the I. R. T. begun by Mayor Hylan had "blanketed at that time any chance of bringing about a reorganization of the traction companies."

The values for the I. R. T. property, according to the auditor's charges, and on the basis of prices of March, 1922, are shown in the accompanying table.

Short Abandonment Approved

Approval of the application of the Public Service Railway, Newark, N. J., to abandon its tracks and service on Main Street, Metuchen, between Benner's Corner and Amboy Avenue, has been received by the company from the Board of Public Utility Commissioners. At the same time the board dismissed the application of the Borough of Metuchen for discontinuance of a transfer charge on this same line.

The annual revenue for the line for 1921 was \$1,807 and the cost of operation was \$21,020. When the Public Service Railway took over the lines of the Brunswick Traction Company and the Raritan Traction Company, consolidating them into the Middlesex line, operating between New Brunswick and Perth Amboy, the shuttle service was started to carry out the franchise requirement. The distance was less than a mile.

It is probable that the company will ask the commission for permission to abandon its extension on Burnet Street, New Brunswick, N. J. The company is anxious to abandon the line because it is being operated at a loss and because of the cost it would have to bear when the street is repaved.

RECAPITULATION OF BOOK COST OF INTERBOROUGH RAPID TRANSIT COMPANY PROPERTY DEVOTED TO THE PUBLIC SERVICE TOGETHER WITH VALUE OF SUCH PROPERTY FOUND BY REVISING BOOK COST TO CONFORM TO PRICES PREVAILING IN MARCH, 1922

Title	Auditor's Charges	Charges Revised to March, 1922, Prices	
Contracts 1 and 2	\$51,832,542(a)	\$91,392,741	
Contract 3 and additions	108,079,433	174,113,997	
Belmont Tunnel (less \$3,000,000)	9,068,329	5,895,174(b)	
Working Capital:			
Supplies	1,769,647(d)	1,769,647	
Cash	1,788,206(e)	1,788,206	
Totals			\$274,959,765
Manhattan third tracking	\$22,033,751	\$29,146,933	
Elevated extensions	13,818,096	18,101,536	
Manhattan power plant improvements	6,035,645	9,023,048	
Additions to company lines	341,350(c)	341,350	
Working Capital:			
Supplies	94,381(f)	94,381	
Cash	80,684(g)	80,684	
Totals		\$42,403,907	\$56,787,932
Grand totals or value of property for rate case		214,942,064	331,747,697
Add value of lease		68,126,000	68,126,000
Value for purpose of sale or exchange		\$283,068,064	\$399,873,697

(a) Does not include amounts paid in stock or cash to acquire Subway Construction Company assets and McDonald's one-quarter interest in subway lease.

(b) These figures represent auditor's charges with revised interest and taxes based upon a reasonable construction period. Cost of Belmont Tunnel (except the \$3,000,000 allowance) not brought up to 1922 prices.

(c) Not revised to 1922 prices.

(d) This represents 60 per cent of total operating supplies carried for entire subway and Manhattan system.

(e) This sum represents one month's operating expenses and is a fair and reasonable allowance for cash working capital.

(f) Supplies on account of elevated extensions.

(g) One month's operating expenses of elevated extensions as cash working capital.

The figures for contracts 1 and 2 Belmont Tunnel are based upon auditor's records of Dec. 31, 1921, and as to contract 3 and certificates they are based upon auditor's records of Jan. 31, 1922.

The figures for operating supplies are based upon the book cost of the supplies in hand Feb. 28, 1922, and the cash part of working capital upon operating expenses for the month of January, 1922.

TABLE I—COMBINED INCOME STATEMENT OF 180 URBAN AND INTERURBAN RAILWAYS FOR 1921 COMPARED WITH 1920

	1921	1920	Increase	Per Cent Increase
Railway operating revenue	\$437,493,853	\$434,888,834	\$2,605,019	0.6
Railway operating expenses	329,178,121	340,972,180	11,794,059	3.5
Net operating revenue	\$108,315,732	\$93,916,654	14,399,078	15.5
Net revenue auxiliary operations	16,787,600	15,002,354	1,785,246	12.0
Taxes	30,024,892	27,483,316	2,541,576	9.2
Operating income	\$95,078,440	\$81,435,692	13,642,748	16.7
Non-operating income	9,787,092	9,050,219	736,873	8.1
Gross income	\$104,865,532	\$90,485,911	14,379,621	15.9
Income deductions	82,842,810	82,776,650	66,160	0.08
Net income	\$22,022,722	\$7,709,261	14,313,461	186.0
Operating ratio (per cent)	75.2	78.4	3.2	4.1
Ratio: Net income to operating revenue (per cent)	5.0	1.77	3.33	188.0

Note—Italics denote decrease.

TABLE II—COMBINED INCOME STATEMENT OF 103 URBAN RAILWAYS FOR 1921 COMPARED WITH 1920

	1921	1920	Increase	Per Cent Increase
Railway operating revenue	\$360,001,980	\$353,621,533	\$6,380,447	1.8
Railway operating expenses	268,067,041	277,092,799	9,025,758	3.3
Net operating revenue	\$91,934,939	\$76,528,734	15,406,205	20.2
Net revenue auxiliary operations	12,123,253	10,816,576	1,306,677	12.2
Taxes	25,524,058	23,303,911	2,220,147	9.5
Operating income	\$78,534,134	\$64,041,399	14,492,735	22.7
Non-operating income	8,480,341	7,442,505	1,037,836	14.0
Gross income	\$87,014,475	\$71,483,904	15,530,571	21.7
Income deductions	65,094,550	65,244,583	160,033	0.2
Net income	\$21,919,925	\$6,239,321	15,680,604	252.0
Operating ratio (per cent)	74.4	78.2	3.8	4.9
Ratio: Net income to operating revenue (per cent)	6.1	1.0	5.1	51.0

Note—Italics denote decrease.

TABLE III—COMBINED INCOME STATEMENT OF 77 INTERURBAN RAILWAYS FOR YEAR 1921 COMPARED WITH 1920

	1921	1920	Increase	Per Cent Increase
Railway operating revenue	\$77,491,873	\$81,267,301	\$3,775,428	4.65
Railway operating expenses	61,111,080	63,879,381	2,768,301	3.33
Net operating revenue	\$16,380,793	\$17,387,920	1,007,127	5.80
Net revenue auxiliary operations	4,664,347	4,185,778	478,569	11.43
Taxes	4,500,834	4,179,405	321,429	7.68
Operating income	\$16,544,306	\$17,394,293	849,987	4.88
Non-operating income	1,306,751	1,607,714	300,963	18.72
Gross income	\$17,851,057	\$19,002,007	1,150,950	6.06
Income deductions	17,748,260	17,532,067	216,193	12.33
Net income	\$102,797	\$1,469,940	1,367,143	93.01
Operating ratio (per cent)	78.86	78.60	0.26	0.33
Ratio: Net income to operating revenue (per cent)	0.13	1.81	1.68	92.8

Note—Italics denote decrease.

TABLE IV—COMBINED EXPENSE STATEMENT OF 180 URBAN AND INTERURBAN RAILWAYS FOR 1921 COMPARED WITH 1920

	1921	1920	Increase	Per Cent Increase
Way and structure	\$46,890,514	\$43,750,874	\$3,139,640	7.2
Equipment	41,259,495	44,080,195	2,820,700	6.4
Power	47,874,219	51,881,539	4,007,320	7.7
Conducting transportation	143,153,943	150,057,496	6,903,553	4.8
Traffic	947,415	1,189,383	241,968	20.3
General and miscellaneous	42,645,116	43,950,163	1,305,008	3.0
Transportation for investment credit	94,723	89,221	5,502	6.2
Total operating expenses	\$329,178,121*	\$340,972,180†	\$11,794,059*	3.5

Note—Italics denote decrease.
* Includes \$6,502,142 miscellaneous expenses.
† Includes \$6,151,751 miscellaneous expenses.

TABLE V—COMBINED INCOME STATEMENT ON A CAR-MILE BASIS (IN CENTS) OF 103 URBAN, 77 INTERURBAN AND THE COMBINED TOTAL OF 180 URBAN AND INTERURBAN RAILWAYS FOR 1921 COMPARED WITH 1920

	103 Urban Rys.			77 Interurban Rys.			180 Urban and Interurban Rys.		
	1921	1920	Per Cent Increase	1921	1920	Per Cent Increase	1921	1920	Per Cent Increase
Railway operating revenue	46.5	44.7	4.0	47.5	49.5	4.0	46.7	45.5	2.6
Railway operating expenses	34.6	34.9	0.9	37.5	39.0	3.9	35.1	35.7	1.7
Net operating revenue	11.9	9.8	21.5	10.0	10.5	4.8	11.6	9.8	18.9
Net revenue auxiliary operations	1.6	1.4	14.3	2.9	2.6	11.5	1.7	1.6	6.3
Taxes	3.3	2.9	13.8	2.8	2.6	7.7	3.2	2.9	10.3
Operating income	10.2	8.3	22.9	10.1	10.5	3.8	10.1	8.5	18.8
Non-operating income	1.1	0.9	22.2	0.8	0.9	11.1	1.0	0.9	11.1
Gross income	11.3	9.2	22.8	10.9	11.4	4.4	11.1	9.5	16.9
Income deductions	8.4	8.3	1.2	10.8	10.7	0.9	8.8	8.7	1.2
Net income	2.9	0.9	222.0	0.1	0.7	85.8	2.3	0.8	187.6

Note—Italics denote decrease.

TABLE VI—COMBINED EXPENSE STATEMENT OF 103 URBAN RAILWAYS FOR 1921 COMPARED WITH 1920

	1921	1920	Increase	Per Cent Increase
Way and structures	\$35,899,696	\$33,565,078	\$2,334,618	6.9
Equipment	32,579,011	34,877,432	2,298,421	6.6
Power	38,168,508	41,174,482	3,005,974	7.3
Conducting transportation	120,672,081	126,412,887	5,740,806	4.6
Traffic	444,168	716,407	272,239	88.0
General and miscellaneous	33,928,155	34,332,713	404,558	1.2
Transportation for investment—credit	42,634	27,667	14,967	54.2
Total operating expenses	\$268,067,041*	\$277,092,799†	\$9,025,758	3.3

Note—Italics denote decrease.
* Includes \$6,418,056 miscellaneous expenses.
† Includes \$6,041,467 miscellaneous expenses.

TABLE VII—COMBINED EXPENSE STATEMENT OF 77 INTERURBAN RAILWAYS FOR 1921 COMPARED WITH 1920

	1921	1920	Increase	Per Cent Increase
Way and structures	\$10,990,818	\$10,185,796	\$805,022	7.32
Equipment	8,680,484	9,202,763	522,279	5.67
Power	9,705,711	10,707,057	1,001,346	9.35
Conducting transportation	22,481,862	23,644,609	1,162,747	4.92
Traffic	503,247	472,976	30,271	6.02
General and miscellaneous	8,716,961	9,617,450	900,489	9.36
Transportation for investment—credit	52,089	61,554	9,465	15.37
Total operating expenses	\$61,111,080*	\$63,879,381†	\$2,768,301	4.39

Note—Italics denote decrease.
* Includes \$84,086 miscellaneous expenses.
† Includes \$110,284 miscellaneous expenses.

TABLE VIII—COMBINED EXPENSE STATEMENT ON A CAR-MILE BASIS (IN CENTS) OF 103 URBAN, 77 INTERURBAN AND A COMBINED TOTAL OF 180 URBAN AND INTERURBAN RAILWAYS FOR 1921 COMPARED WITH 1920

	103 Urban Rys.			77 Interurban Rys.			180 Urban and Interurban Rys.		
	1921	1920	Per Cent Increase	1921	1920	Per Cent Increase	1921	1920	Per Cent Increase
Way and structures	4.6	4.2	9.5	6.7	6.2	8.1	5.0	4.6	8.7
Equipment	4.2	4.4	4.6	5.3	5.6	5.4	4.4	4.6	4.4
Power	4.9	5.2	6.8	5.9	6.5	9.2	5.1	5.4	5.6
Conducting transportation	15.6	15.9	2.9	13.9	14.5	4.2	15.3	15.7	2.6
Traffic	0.06	0.09	33.3	0.3	0.3	...	0.1	0.1	...
General and miscellaneous	4.4	4.3	2.3	5.4	5.9	8.6	4.6	4.6	...
Transportation for investment—credit	0.006	0.004	50.0	0.03	0.04	25.0	0.01	0.009	11.1
Total operating expenses	*34.6c.	†34.9c.	0.9	(a)37.5c.	(b)39.0c.	3.9	(c)35.1c.	(d)35.7c.	1.7

Note—Italics denote decrease.
* Includes 0.8 cent miscellaneous expense. † Includes 0.8 cent miscellaneous expenses. (a) Includes 0.05 cent miscellaneous expenses. (b) Includes 0.07 cent miscellaneous expenses. (c) Includes 0.07 cent miscellaneous expenses. (d) Includes 0.06 cent miscellaneous expenses.

Conditions Improved

Survey for 1921 Shows Greatest Improvement on City Lines—Better Business Conditions Will Help Interurbans.

The financial condition of city electric lines is steadily improving, but this improvement has not yet reached the interurban lines. This is the outstanding fact revealed in the review of conditions in the industry based on official revised operating returns from 180 companies representing more than 50 per cent of the total industry in the United States for the year 1921 and subsequent supplemental reports.

Of these lines 103 are city lines and seventy-seven interurban. Their total operating revenue for 1921 was \$437,493,853, as compared with \$650,149,806 for the entire industry as

ation sees it, however, the figures are merely indicative of the great underlying strength of the industry, the real necessity for the service which it rendered and its ability to withstand serious industrial disturbances.

Traffic on these 180 properties fell from 7,606,190,270 in 1920 to 7,144,332,920 in 1921, a decrease of 6.1 per cent. The total operating expenses of these 180 companies decreased from \$340,972,180 in 1920 to \$327,178,121 in 1921, a drop of 3.5 per cent. The operating ratio dropped from 78.4 per cent in 1920 to 75.2 per cent in 1921.

The net operating revenue as a result of increased revenues and lowered operating expenses increased from \$93,916,654 to \$108,315,732, or 15.5 per cent. Net revenues from auxiliary resources increased \$1,785,246. The surplus created by this increase was

the cost of labor and materials. The cost of conducting transportation of these 180 companies, the principal item in which is wages of trainmen, was \$6,903,353, or 4.6 per cent less than in 1920. The companies ran 18,653,967 fewer car-miles than in 1920. Power costs showed the largest decrease of all the items making up operating expenses.

One-fourth of all passengers riding used transfers, a slight increase over the number using transfers for 1920.

The figures in detail on which the foregoing statements are based are contained in the accompanying tables.

District Merger Agitated Again

The Public Utilities Commission of the District of Columbia is looking into its organic act to determine if it can authorize a merger of the Washington

TABLE IX—COMBINED STATEMENT OF TRAFFIC STATISTICS FOR 103 URBAN, 78 INTERURBAN AND THE COMBINED TOTAL OF 181 URBAN AND INTERURBAN RAILWAYS FOR 1921 COMPARED WITH 1920

	103 Urban Electric Railways			77 Interurban Electric Railways			180 Interurban and Urban Electric Rys.		
	1921	1920	Per Cent Increase	1921	1920	Per Cent Increase	1921	1920	Per Cent Increase
Car-miles (revenue).....	773,852,686	791,817,382	2.3	163,077,867	163,767,138	0.4	936,930,553	955,584,520	2.0
Car-hours (revenue) (a).....	79,988,260	82,166,716	2.7	10,349,271	10,589,509	2.3	90,337,531	92,756,225	2.6
Total passengers.....	6,467,009,091	6,860,771,966	5.8	677,323,829	745,418,304	9.1	7,144,332,920	7,606,190,270	6.1
Revenue passengers.....	5,075,480,639	5,437,465,186	6.7	597,445,113	661,064,968	9.6	5,672,925,752	6,098,530,154	7.0
Transfer passengers.....	1,336,302,729	1,386,635,325	3.6	67,672,399	71,943,167	5.9	1,403,975,128	1,458,578,492	3.8
Miles of single track.....	12,300.0	12,296.3	0.03	6,972.6	6,960.4	0.2	19,272.6	19,256.7	0.08
Cars operated (b).....	18,142	18,715	3.1	1,787	1,803	0.9	19,929	20,518	2.9
Passenger revenue.....	349,685,974	342,180,810	2.2	63,355,620	66,836,868	5.2	413,041,595	409,017,678	0.9

Note—Italics denote decrease

(a) Car-hours were reported by only ninety-eight city companies and sixty interurban companies.

(b) Cars operated (average maximum number in service daily) were reported by only ninety city companies and fifty-five interurban companies.

reported by the United States Census for 1917.

The actual volume of business shows a slight decrease over 1920, but improved operating conditions have helped finances. The outstanding feature of the combined reports as made public by the information bureau of the American Electric Railway Association is the increase in net income after the payment of all expenses and charges. In 1921 this amounted to \$22,022,722, as compared with \$7,709,261 in 1920. In the face of the unusual business depression in 1921 with unemployment at the maximum, this net income figure is considered remarkable. As the associ-

cut down slightly by an increase of \$2,541,576 in taxes.

The net income of \$22,022,722 earned in 1921 amounted to 5 per cent of the total operating revenue, whereas in 1920 it amounted to only 1.8 per cent.

As for the interurban field, a hopeful sign is the decrease in the operating expenses of these companies, which is relatively greater than that of the city companies.

Expenditures for maintenance of way and structures of 180 companies, both city and interurban, were 7 per cent greater in 1921 than in 1920, while expenditures in other departments show substantial decreases, due probably to

Railway & Electric Company and the Capital Traction Company in Washington. The merger question has been agitated for some time on the ground that it is the only solution for the existing traction difficulties—one company requiring a higher rate of fare than the other, although the commission has prescribed a uniform fare, which yields a greater return to one company than the other. Merger legislation has been proposed in Congress, but no action has been taken owing to conflicting views. The commission has requested the Corporation Counsel of the District for an opinion as to whether its organic act empowers it to merge the two lines.

TABLE X—SOME SIGNIFICANT RATIOS DERIVED FROM THE FIGURES SHOWN IN TABLES I TO IX.

	103 Urban Electric Railways			77 Interurban Electric Rys.			180 Urban & Interurban Elec. Rys.		
	1921	1920	Per Cent Inc.	1921	1920	Per Cent Inc.	1921	1920	Per Cent Inc.
Railway operating revenue:									
Per mile of single track.....	\$29,269	\$28,759	1.8	\$11,114	\$11,676	4.8	\$22,700	\$22,584	.7
Passenger revenue:									
Per revenue passenger.....	6.9c.	6.3c.	9.5	10.6c.	10.1c.	5.0	7.3c.	6.7c.	9.0
Per total passengers.....	5.4	5.0	8.0	9.4	9.0	4.5	5.8	5.4	7.4
Per mile of single track.....	\$28,430	\$27,828	2.2	\$9,086	\$9,602	5.4	\$21,432	\$21,240	1.0
Per car-mile.....	45.2c.	43.2c.	4.6	39.0	40.7c.	4.2	43.6c.	42.8c.	1.9
Per car operated daily.....	\$17,522(a)	\$16,548(a)	5.9	\$22,530(b)	\$24,539(b)	8.2	\$17,971(c)	\$17,250(c)	4.2
Per car-hour.....	\$4.14(d)	\$3.94(d)	5.1	\$4.45(e)	\$4.72(e)	5.7	\$4.18(f)	\$4.03(f)	3.7
Revenue passengers:									
Per mile of single track.....	412,641	442,203	6.7	85,684	94,975	9.8	294,352	316,697	7.0
Per car-mile.....	6.6	6.9	4.4	3.7	4.0	17.5	6.1	6.4	4.7
Per car operated daily.....	252,509(a)	260,034(a)	2.9	226,989(b)	258,932(b)	12.3	250,221(c)	259,938(c)	3.7
Per car-hour.....	59.6(d)	62.0(d)	3.9	45.1(e)	50.2(e)	0.2	58.0(f)	60.6(f)	4.3
Per mile of single track.....	525,773	557,954	6.8	97,141	107,094	9.3	370,699	394,989	6.2
Per car-mile.....	8.3	8.6	3.5	4.1	4.5	8.9	7.6	8.0	5.0
Ratio:									
Transfer passengers to revenue passengers.....	26.4%	25.6%	3.2	11.3%	10.9%	3.7	24.70	24.00	2.9
Car-miles:									
Per mile of single track.....	62,914	64,394	2.3	23,388	23,528	0.6	48,615	49,623	2.0
Per car operated daily.....	38,550(a)	38,071(a)	1.3	56,856(b)	57,211(b)	0.6	40,191(c)	39,753(c)	1.1
Per car-hour.....	9.2(d)	9.1(d)	1.1	11.0(e)	1.8(e)	0.02	9.4(f)	9.3(f)	1.1
Car-hours:									
Per car operated daily.....	4,204(g)	\$4,182(g)	0.5	4,933(h)	5,004(h)	1.4	4,268(h)	4,252(i)	4.0

Note—Italics denote decrease. (a) Ninety companies. (b) Fifty-five companies. (c) One hundred and forty-five companies. (d) Ninety-eight companies. (e) Sixty companies. (f) One hundred and fifty-eight companies. (g) Eighty-eight companies. (h) Fifty-five companies. (i) One hundred and forty-three companies.

Receivers for Queens Lines

Justice Stephen Callaghan, in the Supreme Court at Long Island City on April 28, handed down a decision appointing S. W. Huff, president of the Third Avenue Railway, and Robert C. Lee, an insurance broker, as receivers for the New York & Queens County Railway. The appointment was made on the application of the Guaranty Trust Company, New York, N. Y., as trustee under the first mortgage of the Steinway Railway of Long Island City, dated 1892. In its application for a receiver the Guaranty Trust Company declared that the company defaulted on Jan. 1 in the payment of \$45,000 interest due on the mortgage of \$1,500,000.

New York Bankers Acquire Power Company Control

A. E. Fitkin & Company, New York, N. Y., have acquired control of the Tide Water Power Company, Wilmington, N. C., a city of 35,000 population, it was announced on April 27. The properties taken over in the deal include an electric light and power plant, a gas plant and electric railway systems serving the North Carolina city and interurban territory. The interurban line runs 12 miles to Wrightsville Beach on the ocean, where the company has an amusement pier, a casino and a large auditorium for convention purposes.

Discuss Purchase of Market Street Railway by City of San Francisco

The question of the best methods of procedure in the acquisition of the Market Street Railway by the city of San Francisco has been the subject of recent conferences between city and company officials. The city has been represented by George Lull, city attorney, and the company by William Von Phul, president, and William N. Abbott, chief counsel.

The plan of purchase now being discussed is based upon the method provided for in charter amendment No. 30 passed by the voters on Nov. 2, 1920. A \$14,000,000 bond issue would have to be passed to pay off the company's indebtedness that falls due in 1924 and the remainder of the purchase price would be paid out of the earnings of the system on the pay-as-you-go basis, the city to contract to pay a guaranteed amount each year.

The \$14,000,000 bond issue would require a two-thirds vote. The bonds could be made to cover a period of years ample for the city to redeem them. It would also be necessary to amend the city charter to allow the city to operate the San Mateo branch of the company which goes outside city limits.

The price has not been decided, but it is expected to be in the neighborhood of \$40,000,000. This is the value of the property as estimated by M. M. O'Shaughnessy, city engineer. If that were to be the agreed price the city would pay \$14,000,000 in bonds in

1924 and the remaining \$26,000,000 out of earnings of the utility. Mr. Lull states that this would be the most advantageous method of procedure for the city and would be well within the city's limit of bonded indebtedness.

Joliet & Eastern Traction Stops Service

The Joliet & Eastern Traction Company, Joliet, Ill., operating a 23-mile interurban line between Joliet and Chicago Heights, discontinued service on April 15. Permission to cease operation and junk the property was given by the Illinois Commerce Commission when it was shown that the road was no longer financially able to continue business. The petition for discontinuance was filed with the commission by Receiver Eckmann several months ago. The road will be dismantled in the near future.

The action on the part of the railway was brought about by the coincident necessity for the expenditure of a considerable sum of money for changes in its property that in no way would benefit the railway or increase the value of its service. The largest expenditure impending was at Matteson, where the railway would have been obliged to remove its overhead construction to allow the elevation of the tracks of the Illinois Central Railroad. Other obligations, such as paving charges, track changes, etc., caused by city improvement, have come also at this time. The railway exhausted its reserve some time ago and has been operated at a loss, though every means of increasing the revenue has been tried. Besides its passenger service, the railway was giving a freight and package service and carrying the mails.

The underlying reason for discontinuing operation, however, as stated by E. H. Stearns, secretary of the company, was the increased use of private automobiles. Their popularity and number have rapidly been increasing and the completion soon of a cement highway paralleling the railway's right-of-way will make electric interurban service still more impracticable. The railway has also had to operate in competition with the Michigan Central Railroad and the Elgin, Joliet & Eastern Railroad between Joliet and Chicago Heights.

The company's property consists of 25 miles of single track, five motor passenger cars, three motor freight cars and two other cars. The company purchased energy from the Public Service Company of Northern Illinois. The repair shops were located at Frankfort.

The company was incorporated in Illinois in 1914. It represents the reorganized portion of the Joliet & Southern Traction Company, operating between Joliet and Chicago Heights. The property was appraised by the Illinois Commission, which authorized stock to be issued to the amount of \$269,000 and additional \$31,000 for cash received. There is outstanding \$300,000 capital stock, but no bonds.

Resumes Partial Payment

The Third Avenue Railway, New York, N. Y., resumed partial payment of interest on the adjustment 5 per cent bonds this month, with the payment of 1½ per cent. There still remains 22½ per cent interest on these bonds in arrears, which must be paid before there can be any return to the stockholders. However, the critical stage of the affairs of the company is past. These facts were contained in a letter to a stockholder who suggested that a protective committee of fifteen be organized. S. W. Huff, the president, stated that since the company is not in the hands of receivers the directors are in fact the stockholders' committee. The company also has protested against the valuations placed on the properties of the Transit Commission in a letter by Mr. Huff to the commission. Mr. Huff makes the statement that the cost to reproduce the property even with allowances for depreciation would be more than twice the amount recommended by the engineers for the commission.

Toledo \$87,000 Ahead for March, 1922, Over Similar Month in 1921

As a result of March operations of the Community Traction Company, Toledo, Ohio, there has been added to the fare stabilizing fund \$13,549, an increase over the credit for February of \$8,619. Gross revenue for the month amounted to \$307,827 as compared with gross revenue for February of \$281,196, the increase in this instance being entirely due to the greater number of days in March.

The ratio of operating expense to gross income of 69.405 per cent was a slight decrease from the operating ratio for the month of February.

During the month there were operated 639,656 car miles as compared with 574,221 for the previous month. Revenue passengers per car mile of 7.76 represents a decrease of 0.15 passenger per car mile as compared with February.

During the month there were carried 4,965,140 revenue passengers while for the same month last year there were carried 5,710,010, a decrease of 744,879. By reason of operating economies and despite the decrease in riding it was possible to show a surplus of more than \$13,000 for March this year as compared with a deficit of \$73,755 for the same month last year.

Ordinance requirements as to credits to the various funds and reserves have been complied with, and, in addition, interest earned on bonds retired amounting to \$745 for the month has been added to the sinking fund.

Seeks Termination of Receivership

The Binghamton (N. Y.) Railway has announced its intention of applying for the sale of the property and the discharge of the receiver.

Traffic and Transportation

Fares Discussed in Dallas

City Contends Company Has Not Lived Up to the Terms of Temporary Fare Increase

Hearings are now being conducted in Dallas, Tex., before the City Commission on a proposal to order the Dallas Railway to restore the 5-cent fare as provided in the franchise granted in 1917. The hearing was opened by the city when it was disclosed that the Dallas Railway had used \$500,000 of its earnings under the 6-cent fare over and above the 7 per cent authorized return under its franchise, in payment of past-due dividends.

The company claimed that the franchise guaranteed a return of 7 per cent on its investment, and that all unpaid dividends should be paid out of excess earnings before any of such earnings were used in improvements, betterments or for any other purpose.

The city in turn claimed that the 6-cent fare was granted in 1920 under the express provision that the earnings thus made possible would be used in street paving and other improvements ordered by the city and claimed by the company to be impossible because of inadequate returns.

At the opening of the hearing, Attorney J. A. Worsham, representing the railway, filed a lengthy statement setting forth the position of the company. To the statement was appended a table showing receipts and disbursements for 1921.

The statement, as read by Mr. Worsham, attacked the fairness of the 1917 franchise given the company by the city on the grounds that its provisions do not afford a sufficient maintenance and depreciation fund. The statement stressed the point that under the 6-cent fare a maintenance fund of only \$9,000 is on hand, when the company claims a sum of \$1,000,000 should be afforded. Mr. Worsham said:

It has been proved that the authorized return of 7 per cent that the company receives under the terms of the franchise now in force is inadequate, and that 8 per cent would be a fairer rate. The company can barely subsist on the present schedule, and the reduction of the fare to 5 cents will lead to bankruptcy for the company and total loss to its stockholders.

The property value stated in the franchise is \$9,333,000, while the actual property value is closer to \$13,000,000. The whole thing is simply a matter of calculation. The amount of return necessary to operate this business successfully is a formula that can be deduced from a consideration of the property value involved, the receipts, the disbursements and the depreciation that must be allowed for.

The question of fare is not contractual. We maintain that instead of a 7 per cent return, 8 per cent would be fairer, and that at least 4 per cent should be allowed for depreciation of property and 2 per cent for depreciation of buildings.

Interesting testimony regarding the condition of the Dallas Railway's properties was given by Richard Meriwether, vice-president and general

manager. Mr. Meriwether said that when the Dallas Railway was first requested in the fall of 1920 to assist the city in the paving of certain streets on which it had tracks, it was unable to do so because it had no funds and no credit. It will be able to help now to the extent of \$101,000, Mr. Meriwether said, because it will be able to borrow this sum from its stockholders.

In summing up the situation confronting the company Mr. Meriwether said:

The company is in an embarrassing financial position now, and unless relieved within the next two years, in some manner, the situation will become gravely embarrassing. There is \$60,000 due on Lamar Street improvements now, for example, and only \$9,000 available, unless we are permitted to borrow from the stockholders.

The 18 per cent reserve that has been set aside under the terms of the 1917 franchise is not enough to care for the actual repairs to rolling stock and tracks.

Two of the leading lines in the city, the Ervay line and the Bryan line out Live Oak, are in bad condition. They must be repaired. They each make about \$21,000 a month. The Bryan line situation could be taken care of by routing the cars across Cantegral and down Swiss, but there is no way to meet the Ervay Street emergency. These are two of the heaviest traveled routes in the city.

All the officers have discussed the fact that the property is wearing out and that there are no funds available to replace it. The stockholders know that the company is skating on very thin ice. The rate payer of the past hasn't been made to do his part. A collapse of the company will not only be a calamity to the stockholders but to the public as well.

The money disbursed to the stockholders belonged to them under the terms of the franchise. The fund that it was applied on is still \$558,000 in arrears.

Some of the double-truck cars in the city now have been in service for eighteen or twenty years. The company owns 138 double-truck cars and sixty-eight single-truck. It leases fifty big double-truck cars from the old Northern Texas Traction Company. These latter cost probably \$6,500 apiece. The others about \$5,000. The life of the average car is twenty years, and about 25 per cent of those now in operation here should be replaced.

Right to Examine Books Established

Through an order by Judge H. D. Dickinson of the district court on April 21, the city attorney will have only one day to examine the books of the Twin City Rapid Transit Company, Minneapolis, in case they are produced, before the hearing on an alternative writ of mandamus petition. The proceedings have been established to disclose the relationship between the Minneapolis Street Railway and the Twin City Company. The judge on April 21 continued the time for the company to answer a motion to show why the books should not be produced to April 24. The other hearing had been set for April 25, the day following. The city wants to inspect these books and records to prepare its case for the mandamus suit hearing. The company alleges these books have nothing to do with the Minneapolis Street Railway case. The extension of time was given on request of counsel for the railway.

Commutation Rate Fixed

New Jersey Board Authorizes Monthly Ticket Based on Modification of Muscatine Plan

As an experiment in evolving a satisfactory plan of providing necessary revenues, the Board of Public Utility Commissioners of New Jersey has granted permission to the New Jersey Central Traction Company to establish a base rate of 10 cents in each of its seven fare zones with a form of commutation ticket under which lower rates may be obtained by more frequent riders. The new plan is to be put into operation within four weeks and is to receive a six months trial.

The plan authorized by the board is that riders desiring to do so may purchase a commutation ticket, paying \$1 for each zone in which they desire transportation. The commutation ticket so issued is to be good for one calendar month and is to entitle the holder to transportation for not more than 100 rides a month at the rate of 5 cents per ride. Any passenger traveling beyond the zone covered by his commutation ticket will be required to pay the base rate of 10 cents. Under the plan a person holding a commutation ticket for one zone, for which he pays the monthly flat rate of \$1, will pay a total of \$6 if he takes 100 rides a month, or a 6-cent fare.

The commutation rate would increase in proportion to the diminishing number of rides, so that a person riding only twenty times a month would pay the base rate of 10 cents. The commutation plan suggested by the company as a substitute for a flat increase in fare contemplated the purchase of commutation tickets for \$1.50 in each zone. This plan would have resulted in a minimum fare of 6½ cents, instead of 6, and the base rate of 10 cents would be reached by the passenger riding thirty times a month instead of twenty times, as under the \$1 rate fixed by the commission.

In behalf of the objecting municipalities it was contended that the proposal to charge \$1.50 a zone was too high and would discourage the purpose of the entire plan. In this estimate the board assumed that 22 per cent of the total cash fares would become commutation fares. It also assumed that holders of commutation tickets would ride more frequently, causing an increase of 20 per cent among such riders. Of the remaining 78 per cent not holding commutation tickets the commission assumed that 10 per cent would cease riding due to increase in fare. The net result of this computation would give the company a total annual revenue of \$389,752, instead of a revenue of \$311,694 for the past year.

The company asked for a rate yielding a total revenue of \$400,000 a year. The commission believed, however, that the rate established may reasonably be expected to provide the full amount which the company deems necessary for its continued successful operation.

Weekly Pass Suggested for Use in Fort Smith

By a vote of two to one the City Council of Fort Smith, Ark., has ordered the Fort Smith Light & Traction Company to attend a hearing on rates to be held on May 13. The company's proposal for a three months tryout of the weekly pass plan was disregarded by the commissioners.

At the hearing on rates a return to a 6-cent fare was proposed, but the order was changed to a formal notice to the company to appear in a hearing on rates, when the city attorney told the commission that it could not change the rate without a three days notice and a formal hearing.

D. C. Green, manager of the company, and Judge Joseph M. Hill, its attorney, indicated that the company will contest through the courts any change in its schedule which results in a reduction in revenue.

Mayor Fagan Bourland voted against the motion to bring about a reduction in fare, stating that if the company was making money he would be the first one to vote for a reduction. He called attention to the fact that figures had been presented and sworn to by the company's auditor showing that the company is not making a fair return on its investment.

The hearing was occasioned by a petition for a return to the 5-cent fare.

Manager Green proposed to issue a weekly pass for \$1.25.

Steady and continuous reduction in revenue was shown by figures presented by Mr. Green and sworn to by the company's auditor.

Railway Criticised for Not "Selling" Its Rides

Walter Jackson argues for the retention of the 5-cent radial fare and the use of the weekly pass in Bridgeport in three articles written for the Bridgeport *Post* at the solicitation of the editor of that paper and contributed to the issues of April 21, 22 and 24. He considers the present fare plan, with ameliorations here and there, to be excellent for traffic stimulation, but thinks that it lacks the advantages of the pass in this respect and that the Connecticut Company has been lax in advertising the existing service.

Praise for Ed Walker

The Terre Haute *Tribune* said some mighty nice things about the local traction line, in charge of E. M. Walker, in a recent issue. The occasion for this comment was the announcement by the Terre Haute Traction & Light Company of its decision to install the weekly pass. A considerable part of the editorial was devoted to telling about the pass itself and how it would benefit the public. Some of the more complimentary things in the editorial are contained in the following extract:

While many traction lines are asking for increased rates, the Terre Haute lines, which, by the way, have never advanced

the fare over 5 cents, are striking out for more business at the 5-cent fare or less. In other words, the traction company desires a more general use of the cars.

It is interesting to know that the local traction lines are in a position to offer this mutually advantageous proposition. Many such concerns are going the other way, demanding higher rates and resorting to other such extremities to keep out of receivership. It is certain the public here will not only meet the idea half way, but will be appreciative of this unusual manifestation of mutual interest by a public utility.

Injunction Against Jitneys Made Permanent

Kansas City, Mo., ordinances regulating jitneys on the streets of the city have again been upheld by the local courts. On April 17 Judge Nelson E. Johnson of the Circuit Court made permanent a temporary injunction issued by him on Nov. 10, 1921, restraining operators from violating the two jitney ordinances and from conducting business as jitneys on the streets contrary to the provisions of the ordinances. The order is especially significant on the point of violating "by mere subterfuge, shift or device, including, among others, the subterfuge of accepting as a 'gift,' 'gratuity' or otherwise compensation for carrying persons in their cars."

Jitney operators have been running since Nov. 10 without ostensibly charging for their service. The court makes it very clear that the intent is to regulate the "jitney business" and that the operation of jitneys is obviously a business transacted on the public streets. The decision is made against the jitneys on the basis of the right of the city to regulate the use of its streets.

City and Company Argue Abandonment

The City Council of Carlisle, Pa., answered the threat of the Valley Railways, Lemoine, Pa., to discontinue its service within the city of Carlisle, by telling the company it must do one of two things: discontinue service on all lines in Carlisle and as far east as Boiling Springs, or continue the present service unchanged.

The Council says that the charter of the Cumberland Valley Electric Passenger Railway, which the Valley Railways is operating, calls for service from Boiling Springs to Carlisle and in Carlisle. The charter also states that the company must pay for paving required between the company's tracks. Recent bills of the Council call for paving which would cost the company \$11,000. This amount the company said it could not pay, and would withdraw its service to the borough limits. The franchise, however, requires the company to restore the streets to their original condition after tearing up the tracks and poles and taking down the wires. This, according to the Council, would cost the company \$44,000.

It would abandon the Cave Hill line, which gives a local service, from the interurban line within the Carlisle city limits, according to its present plans. The interurban operates from Fort Washington to Carlisle.

Fare Injunction Case Being Argued

Application of the Chicago Surface Lines for an injunction against the 6-cent fare order was argued in the United States District Court on April 24 before Judges Evans, Page and Geiger. The hearing was to be concluded later in the week, as the effective date of the order was set originally as May 1.

This is the order entered by the Illinois Commerce Commission on April 8 which proposed to limit the return of the surface lines to 5 per cent and to cut out certain operating expenses so as to make the charging of a 6-cent fare possible.

The companies' attorneys insisted that such a rate would be confiscatory. They also attacked the conclusions of the commission that the lower rate would attract 50,000,000 additional passengers and that no allowance had been made for the expense of this extra burden. Counsel for the city argued that the new rate should be tried and if it resulted in a loss the companies could be compensated.

Mayor Thompson of Chicago has announced that he and members of his cabinet will visit New York City in the near future as guests of Mayor Hylan in the study of local transportation facilities and how they are handled on a 5-cent fare.

300 New Cars Needed, According to Commission Expert

Need for 311 more steel cars on the Brooklyn Rapid Transit Company's subway and elevated lines was expressed on April 24 by Walter T. Edgerton, assistant supervising inspector for the New York Transit Commission at the commission's hearing into the adequacy of the service now being furnished by the company. These are needed, Mr. Edgerton said, in addition to the 900 cars which the company says it will have in service within thirty days, and the total should not include cars that are laid up for repairs but the number that are actually in daily use on the tracks.

Mr. Edgerton also pointed out variances in the service of the Brooklyn Rapid Transit. He said that on some days there might be a fair service in handling the rush hour crowds to Manhattan in the morning, while the service in the evening would be entirely inadequate.

Mayor Hylan also took occasion to step into Brooklyn Rapid Transit matters on April 24 when he wrote to John P. O'Brien, Corporation Counsel, suggesting an investigation into the expenses incurred by the receiver of the company. His suggestion follows the suit instituted a few days ago by Lindley M. Garrison, the receiver, against the city for \$30,000,000 damages for failure by the city to carry out its part of the contract under which the rapid transit lines are operated under lease from the city.

Personal Mention

More Honors for E. A. Robert

Popular and Efficient Leader of Many Montreal Utility Companies Is Elected President of Quebec Railway, Light, Heat & Power Company

The most talked of man in Montreal these days is E. A. Robert, president of the Montreal Tramways, who was recently elected president of the Quebec Railway, Light, Heat & Power Company. His prominence in the business and financial world comes from the fact that he has developed the Montreal Tramways into an organization unique on this continent. While most public utility companies have during the past ten years found themselves in rather straitened financial circumstances, from a combination of causes, and while in many cities a state of public opinion has grown up which is inimical to the success of such enterprises, Mr. Robert has not only emerged from the war period with his company in splendid financial shape, but public opinion within the sphere of the company's operations is such that residents of Montreal openly boast of the service provided.

When the war broke out the company was face to face with the greatest problem in its history—the problem of obtaining a new franchise. For some years agitators had been at work in Montreal, as in many cities in the United States, trying to stir the public up to blocking the legitimate demands of the company and to favoring the municipalization of the system. But these agitators found two obstacles in their way: First, the inherent distrust of the people of Quebec Province to public ownership, with all its attendant inefficiency and heavy taxation; secondly, the fact that the Montreal Tramways system had, under the Robert régime, been run with such splendid operating efficiency and such regard for the comfort of its patrons that the public felt it would be nothing short of disastrous to take the system out of its hands and turn it over to inexperienced operators.

Before the comprehensive plan could be adopted that had been worked out for keeping the facilities of the company abreast of the growth of the city, it was necessary that the company should be assured as to the terms under which it could operate in the future, and until a new franchise was made this matter would remain in doubt. Therefore only such routes were decided upon for construction as were imperative. The main effort of the company was directed to improving the operating capacity of the existing lines, and this was done by a progressive rearrangement of running schedules and by enlarging the capacity of the cars themselves, but the changes were made only after a comprehensive study had been made by officials of the company of practices in cities elsewhere.

About seven years ago Montreal civic officials were approached regarding the granting of a new franchise to the company. There was some opposition to the granting of a new one until the expiration of the old one in 1922. After considerable controversy, without any result, it was decided to refer the matter to the Quebec Legislature, which body, after being assured of the



E. A. ROBERT

support of both, business and labor organizations in Montreal, appointed a special commission to draw up the terms on which to base a new franchise. The commission took the best part of a year to study the whole situation, with the help of the leading authorities on the subject, and after preparing the terms of the contract it was submitted to the Provincial Government. The proposals were adopted, with some minor amendments. The franchise is recognized as a model one in every respect, as it provides ample protection both for the city and the company. This franchise was adopted in 1918 and is working out to the thorough satisfaction of all concerned.

Every year for a long time past experts from all over the country have come to Montreal to inspect the system, and it is the general verdict that for comfort and efficiency the Montreal Tramways is in the first rank. The cars are clean, roomy, airy, splendidly lighted and comfortably heated in cold weather. In winter snowstorms, for which Montreal is noted, they run on schedule just as in summer, for the snowfighting equipment of the company is the last word in efficiency.

While Mr. Robert has made a success of the Montreal Tramways he has not confined his activities to this phase of business life. He first attracted public attention some sixteen years ago, when he undertook to enter the power field in Montreal by developing the water power of the Beauharnois Canal and distributing it in the vicinity of Montreal. His efforts at first were not taken very seriously, as there were powerful corporations occupying the field he proposed to enter. However, he soon demonstrated that he meant business, and from time to time in the face of strenuous opposition he moved from one success to another until to-day he heads a group of power companies that is rapidly becoming a factor not only in the city of Montreal but throughout many portions of the province. With the acquisition recently of the huge Carillon power, some 40 miles from Montreal, from which can be developed 250,000 hp., Mr. Robert becomes an outstanding figure in the hydro-electric power situation in Canada, especially as he proposes immediately to proceed with the consolidation of all the power plants under his presidency and the development of the Carillon plant.

About ten years ago Mr. Robert interested himself with the tramway and power situation in Halifax, N. S., and in 1917 formed the Nova Scotia Tramways & Power Company, Ltd., operating the tramway, light, power and gas services in Halifax and the adjoining city of Dartmouth. He resigned from the presidency of this company in 1919 in order to devote his entire time and attention to the more important tramway and power situation in Montreal and throughout the province of Quebec.

As another evidence of public appreciation of his ability and enterprise, he was during the past month offered the presidency of the Quebec Railway, Light, Heat & Power Company, which operates the street railway, light, power and gas systems in Quebec City and district. The invitation not only came from the executive and shareholders but from the citizens as expressed publicly by the Mayor. Mr. Robert's acceptance of the position means that the same aggressive policy he has displayed in Montreal in railway and power development will be applied to utilities in the city of Quebec.

Mr. Robert was born fifty-seven years ago at Beauharnois, Que., a village about 30 miles from Montreal, and has always been identified with the financial and industrial life of Montreal. He is a member of the leading clubs in Montreal and Quebec and sat for two parliaments in the Provincial Legislature.

Mr. Robert is president of the Montreal Tramways & Power Company, Montreal Tramways Company, Canadian Light & Power Company, Montreal Public Service Corporation, Beauharnois Light, Heat & Power Company, Imnerial Trust Company and Quebec Railway, Light & Power Company.

Commission on Interstate Traffic Appointed

Governor Edwards of New Jersey has appointed the members of the State Transit Commission, authorized by an act of the last Legislature introduced by Senator Smith, Passaic, for the purpose of bettering traffic conditions between the counties of Bergen, Essex, Middlesex, Morris, Passaic and Union in New Jersey and New York City. The members appointed are Walter M. Dear, Jersey City; Capt. Harry Hatcher, Hoboken; Herbert S. Swan, Glen Ridge; Spaulding Frazer, Newark; Archibald Cox, Plainfield; Bertran H. Saunders, Paterson, and Daniel A. Garber, Ridgewood.

The bill was introduced as a supplement to the Port Authority plan. It was the opinion that the traffic should be considered in co-operation with that development. The measure provided that the Governor should appoint seven commissioners for the purpose of making an investigation and then report a scheme whereby the conditions of travel in the area affected by the Port Authority would be bettered.

Pacific Electric Makes Changes

The title of T. J. Day, general freight agent of the Pacific Electric Railway, Los Angeles, Cal., has been changed to freight traffic manager, and the title of O. A. Smith, general passenger agent, changed to passenger traffic manager.

T. F. Sullivan Is Boston's Transit Chief

The Transit Department of Boston, Mass., has a new chairman in the person of Thomas F. Sullivan. Mayor Curley, in appointing Mr. Sullivan to succeed Edmund Billings, who resigned, said that he was "obliged to acknowledge merit." That recommendation from a political opponent places Mr. Sullivan ace high, for a prophet is usually not without honor save in the ranks of the opposing party.

Mr. Sullivan has held the responsible position of Commissioner of Public Works until recently. He laid out the first comprehensive plan of rebuilding radial highways from Boston to all outlying suburbs. More than that, he reduced the engineering and inspection forces in the city departments under his charge and established a system of promotion on merit, which eliminated political consideration entirely.

Long service with the Boston Elevated Railway has given Mr. Sullivan a concrete and valuable background for his work as chairman of the transit board. From 1899 to 1918 he was associated with different departments of the railway, serving first as clerk and timekeeper, later as chief clerk and assistant superintendent of tracks. From 1912 until he left the company's service to become Commissioner of Public Works he was roadmaster. He assumed his latest position on April 1.

Louis K. Rourke, formerly Commis-

sioner of Public Works, and Francis E. Slattery, with Mr. Sullivan, make up the personnel of the transit commission.

Mr. Sullivan served in the Santiago campaign during the Spanish-American War and commanded the Tenth Regiment, Massachusetts State Guard, during the European War.

Four Philadelphia Changes

Four appointments have been announced by the Philadelphia Rapid Transit Company, effective April 15. F. W. Johnson becomes assistant to the president. He will continue as editor of "Service Talks." R. T. Senter is appointed assistant to the president on special assignment, E. J. McIlraith superintendent of Rolling Stock and Buildings Department and J. H. M. Andrews superintendent of the Way Department.

K. Y. Abe, chief engineer of the Tokyo Underground Railroad of Japan, is in the United States studying examples of tunnel construction. His company is planning the construction of a 10-mile tunnel under Tokyo's main street. The construction of the Japanese tube will be through sandy soil. Mr. Abe stated that the construction would cost \$20,000,000 and would require five years to complete.

H. Flynn, auditor of the Georgia Railway & Power Company, Atlanta, has been appointed assistant comptroller. F. A. Brine has been advanced to the post of auditor. Mr. Flynn has been with the company for more than twenty years. Mr. Brine entered the company in 1901. George S. Jones, Jr., has been made commercial engineer and will have charge of the sale of electric power.

T. C. Berkeley of the English Electric Company is now in the United States and Canada studying rolling stock and fare practices. Mr. Berkeley arrived October last from England and has been engaged since then as specialist for the Toronto Transportation Commission in addition to having charge of the installation of Dick-Kerr electrical equipment on the Toronto system for his firm. He is also engaged in electrical work for the Ontario Hydro-Electric Commission. His headquarters are at 319 Transportation Building, Montreal.

W. J. Baldwin, assistant general manager of the New Orleans Railway & Light Company, has taken up his new work as director of public information for the Alabama Power Company, Birmingham. Mr. Baldwin has had newspaper experience as reporter for various papers in Georgia cities, and for some time owned and published a weekly paper at Hurstboro, Ala. The New Orleans *Daily States* said, upon Mr. Baldwin's departure, that "during Mr. Baldwin's connection with the railway company here, he displayed marked executive ability. His sound judgment contributed largely toward unraveling some of the perplexities which sprang up from time to time in the operation of the properties at New Orleans."

Obituary

William Howard Watson, for many years treasurer of the old Buffalo Street Railway, Buffalo, N. Y., died recently. He was 73 years old. He also had been treasurer of the Bell Telephone Company.

Leslie Richards, superintendent of the Bloomington & Normal Railway & Light Company, Bloomington, Ill., died recently. Mr. Richards was a car operator for eleven years before he became superintendent.

Robert Brisbane, senior construction superintendent for the J. G. White Engineering Corporation, died in New York, N. Y., recently. He was in charge of the construction of the station of the Radio Corporation of America at Bolinas, Cal., which was completed a short time ago. Mr. Brisbane came to America in 1906 from Scotland.

H. F. Beakey, chief of the secret service of the Interborough Rapid Transit Company and New York Railways Company, New York, N. Y., died recently. Mr. Beakey was chief of the secret service of the old Manhattan Railway from 1896 to 1902, later taking charge of the watchmen for some time. Mr. Beakey became chief of the secret service department of the New York Railways when it was formed in 1912 and took over the Metropolitan Street Railroad.

Major Thomas B. Lee, a leader in the field of civil engineering in the South, died at his home in Charlotte, N. C., March 13, 1922. His age was 87 years. Major Lee was in active practice of his profession up to the time of his death, and as a construction engineer had been connected with some of the largest and most important undertakings in the South. He was born at Camden, S. C., and was educated at the Citadel, Charleston. After his graduation he had his first practical experience in railroad construction with the old Blue Ridge Railroad from Anderson, S. C., to Knoxville, Tenn., in 1865. He had charge of the construction of the Seaboard Air Line Railroad from Monroe, N. C., to Atlanta, Ga., which line he subsequently extended to Birmingham, Ala. He concluded the last section of this work in 1905. Shortly after coming to Charlotte in 1905, Major Lee became actively associated with his nephew, W. S. Lee, vice-president and chief engineer of the Southern Power Company. In 1910 he became chief engineer of the Piedmont & Northern Railway and had charge of construction of this road from Charlotte to Gastonia, N. C., and from Spartanburg, S. C., to Greenwood and Anderson in that state. On the completion of this work he resumed his private practice, which he continued until his death.

Manufactures and the Markets

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

ROLLING STOCK PURCHASES

BUSINESS ANNOUNCEMENTS

Several Large Orders for Rolling Stock Placed

Information just received indicates that purchasers of rolling stock are again becoming active. Some of the recent orders reported are fifteen merchandise cars for the Chicago, North Shore & Milwaukee Railroad, ordered from the Cincinnati Car Company. This road is also considering the purchase of twenty-five additional passenger cars. The Chicago Elevated Railways is considering the purchase of 100 passenger cars. The Brooklyn Rapid Transit Company has arranged with George Tontrup for the conversion of 150 of its 28-ft. double-truck cars to one-man operation. The work includes the lengthening and closing in of the semi-vestibuled platforms. This work will be done at the Coney Island shops of the railway. Fifteen cars were also recently purchased for service in Lafayette, Ind.

arisen through different interpretations of term in universal use.

"The International Chamber will make clear the accepted meanings of the terms in each country and will set up a preferred list of definitions most commonly accepted, leading to universal understanding on this important matter."

The Coal Situation

Last week's flurry in the bituminous market is subsiding. Interest at first centered around Pittsburgh, where an active demand existed, with high volatiles leading the list, due to the urgent fuel needs of the Steel Corporation. The call soon spread to other steel companies and to low-volatile coal. So much tonnage became immediately available that cancellation orders are now forthcoming and coal has lost its top-notch quotations of last week.

In the Middle West stocks are dwindling and consumers are feeling a little uneasy, as indicated by a growing number of inquiries. Eastern coals are not so plentiful following the inroads made by steel mill orders. Domestic coal is difficult to sell and the many no-bills of lump in southern Illinois are being worked off very slowly. Mine-run and steam grades are on a price par with domestic coals in the union producing regions.

There is no trade awakening in the Northwest. Dock shipments are light and price cuts made to stimulate business have had little effect. Dockmen are becoming uneasy lest some of their stocks be on hand when the strike is settled. About 500,000 tons of coal is in Lake vessels and 3,000 cars (about 150,000 tons) are at the lower ports awaiting dumping. With this reinforcement to dock stocks consumers are not apprehensive of a shortage and are not buying in excess of current needs.

\$750,000 Track Program for Toledo

Toledo car riders will not have to pay the repaving costs between street car tracks, it was learned on April 19 at the meeting of the public improvement committee of the Council, when Street Railway Commissioner Cann announced a \$750,000 improvement program during the present year.

The repaving cost will be borne by general tax payers and automobile owners who use the pavements. It was argued by Commissioner Cann, and the Council committee concurred, that if the Community Traction Company paid the repaving bills it would come out of the car riders' pockets and this was unfair because it is the other class of persons who destroy the pavement.

Commissioner Cann says the improvement program includes laying of new foundations and new tracks and repair of old tracks which are in good shape so far as wear is concerned. More than 1,700 tons of new rails have been ordered, the commissioner announced.

\$150,000 for Electric Railway Improvements in Knoxville

The officials of the Knoxville Railway & Light Company have announced that, following an agreement between the officials and the City Commission, improvements will be made costing approximately \$150,000. The plan includes the granting by the city of a franchise in the center of North Central Street for a line that is to be moved from the east side of the street. This line was constructed under a franchise granted by the county. The county franchise will be relinquished and the tracks will be moved to the center of the street on a franchise to be granted by the City Commission.

The Park Avenue line of the Knoxville Railway & Light Company is also to be reconstructed. Steel rails and other materials are to be obtained which are necessary for this work.

Car Building Plant Ordered Sold

The properties of the Barney & Smith Car Company, Dayton, Ohio, will be sold at auction by order of Judge Edward T. Snediker of the Common Pleas Court, Montgomery County, to meet a \$2,000,000 bond issue underwritten by the Guaranty Trust Company, New York.

The trust company was awarded judgment for \$1,835,196, representing outstanding bonds and \$156,737 interest, from which \$321,540 was deducted from previous sales of the car company assets. Bids are to be received for amounts of two-thirds of the appraised value. They must be accompanied by a \$50,000 deposit. The upset price has not yet been fixed by the court.

The car company originally went into the hands of a receiver on June 23, 1913, as a result of the March, 1913, flood. The receivership was lifted two years later, but again put into effect in 1919. During 1921 a bondholders' protective committee was formed to plan a reorganization, but insufficient subscriptions resulted in abandonment.

Metal, Coal and Material Prices

Metals—New York		April 25, 1922
Copper, electrolytic, cents per lb.	.....	12.875
Copper wire base, cents per lb.	.....	14.125
Lead, cents per lb.	.....	5.375
Zinc, cents per lb.	.....	5.375
Tin, Straits, cents per lb.	.....	31.125
Bituminous Coal, f.o.b. Mines		
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	.....	\$4.80
Somerset mine run, Boston, net tons	.....	2.70
Pittsburg, mine run, Pittsburg, net tons	.....	2.75
Franklin, Ill., screenings, Chicago, net tons	.....	1.875
Central, Ill., screenings, Chicago, net tons	.....	2.50
Kansas screenings, Kansas City, net tons	.....	2.50
Materials		
Rubber-covered wire, N. Y. cents per lb.	.....	5.90
Weatherproof wire base, N. Y., cents per lb.	.....	15.50
Cement, Chicago net prices, without bags	.....	\$1.97
Linseed oil, (5-bbl. lots), N. Y., cents per gal.	.....	91.00
White lead, (100-lb. keg), N. Y., cents per lb.	.....	12.25
Turpentine (bbl. lots), N. Y., cents per gal.	.....	84.00

Trade Terms to Be Defined

A preferred list of trade terms commonly used in the business world will soon be issued by the trade terms committee of the International Chamber of Commerce, according to information just received by the American Section of that organization. In commenting on this proposed publication, the American Section says, in part:

"For many years the business men of all countries have been caused a great deal of inconvenience and in many cases financial loss by the various interpretations given to the terms or abbreviations used in shipping and quotations on overseas transactions.

"The more commonly used terms involved in international trade are: f.o.b.; f.a.s.; c.i.f.; c.&f.; l.c.l.; f.o.r. and f.o.t. Probably the best known and most used of all these is f.o.b., which, by virtue of long tradition, means in England 'free on board boat.' To indicate the same meaning in the United States the word 'vessel' is added, and in this latter interpretation other member countries of the International Chamber concur. The paramount importance of a mutual understanding of such terms as this is evidenced by a case recently decided in which an Australian had purchased certain goods f.o.b. from an American firm. The latter charged trans-shipment expenses and others, over and above the price agreed upon; the Australian, considering that he had bought the goods to be delivered free on board vessel, refused to pay the additional expense until forced by the courts to do so. The foregoing is but one of many cases that could be cited in which, despite the bona fides of international traders, disagreements have

Rolling Stock

Kentucky Traction & Terminal Company, Lexington, Ky., purchased ten cars from the Cincinnati Car Company, as announced in the *ELECTRIC RAILWAY JOURNAL* for Feb. 4, 1922. Additional details regarding the equipment and size of these cars are now available as follows:

Number of cars ordered.....	10
Name of road.....	Kentucky Traction & Terminal Company.
Order placed	October, 1921
Delivered	February, 1922
Builder of car body.....	Cincinnati Car Company.
Type of car.....	Motor—full convertible
Seating capacity	44
Weight:	
Car body	12,257 lb.
Trucks	7,800 lb.
Equipment	5,043 lb.
Total	25,100 lb.
Bolster centers, length.....	21 ft.
Length over all	40 ft. 3 in.
Truck wheelbase	5 ft.
Width over all	8 ft. 6 7/8 in.
Height, rail to trolley base.....	12 ft. 2 in.
Body	All steel
Interior trim.....	Cherry, mahogany finish
Headlining	Agasote
Roof	Arch
Air brakes.....	General Electric CP-27 safety car complete.
Armature bearings.....	General Electric, CP-27 sleeve.
Axles.....	Cincinnati Car Company A.S.T.M. specifications.
Bumpers.....	Cincinnati Car Company 6 in. channel.
Car signal system.....	Faraday 4-V, Edison battery.
Car trimmings.....	Cincinnati Car Company oxidized brass.
Center and side bearings.....	Cincinnati Car Company friction.
Control.....	General Electric, K-35, H.H. Couplers.....
Couplers.....	Cincinnati Car Company stationary pocket.
Curtain fixtures.....	Curtain Supply Company, protected groove
Curtain fixtures.....	Curtain Supply Company, pantasote-J.
Designation signs.....	Electric Service Supply, Keystone I. L. R.
Door operating mechanism.....	Safety Car & Equipment Company.
Fare boxes	None
Fenders or wheelguards.....	Cincinnati Car Company pilot.
Gears and pinions.....	General Electric grade M.
Hand brakes.....	Cincinnati Car Company
Heater equipment.....	Holden & White C.H. type.
Headlights.....	General Electric Company J-12, 500 watt.
Journal bearings.....	United Lead Company (Frary metal), M.C.B.
Journal boxes.....	Symington M.C.B., 3 x 6
Lightning arresters.....	General Electric Company aluminum cell.
Motors.....	General Electric 264, four per car
Motors	Inside hung
Paint.....	Ame white lead and color
Registers	Ohmer No. 60
Sash fixtures.....	Cincinnati Car Company wedge type.
Seats.....	Hale & Killburn, No. 108. Spec.
Seating material	Plush
Slack adjuster	None
Springs.....	Union Spring & Manufacturing Company.
Step treads.....	Cincinnati Car Company aluminum pat., No. 548
Trolley catchers.....	Ohio Brass Company
Trolley base.....	General Electric Company U. S. No. 15
Trolley wheels or shoes.....	Holland Trolley Supply Company 6 in. wheel.
Trucks.....	Cincinnati Car Company arch bar
Ventilators.....	Cincinnati Car Company, West Penn type.
Wheels.....	Standard Steel Company steel, 26 in.
Special devices, etc.....	Marker lights, 6-8 v., 4 c.p.
Lights	6-8 v., 2 c.p. operated by Edison Storage Battery, 3 cell, 4 v.

San Diego (Cal.) Electric Railway has placed an order for ten more Birney safety cars with the American Car

Company. This will bring the total of the Birney safety cars in use here to thirty-five. Electric equipment for the new cars is to be furnished by the General Electric and Westinghouse Companies, each furnishing 50 per cent.

Electric Short Line Railway, Minneapolis, Minn., has bought three all steel gaso-electric motor cars with a seating capacity for 100 persons. They are valued at \$100,000 and can make 65 miles an hour.

Cincinnati & Dayton Traction Company, Hamilton, Ohio, has just placed in service the first of fifteen safety cars purchased from the National Safety Car & Equipment Company of St. Louis, Mo.

Pacific Electric Railway, Los Angeles, Cal., has ordered 200 National gondola dump cars. The cars will have steel underframes and wooden sides. They will be 40 ft. long and 8 ft. 9 in. wide, and will be used for hauling gravel and crushed rock.

Boston Elevated Railway, Boston, Mass., has just ordered 100 semi-convertible cars from the J. G. Brill Company of Philadelphia. It is stated that these cars will weigh 30,000 lb. and cost approximately \$10,000 each. Delivery is expected in August. The construction is arranged so that these cars can be utilized for one-man operation if found desirable. Platforms will be provided with double doors and the cars will have wider aisles than safety cars. It is stated that these are intended to replace the articulated type of cars now in operation.

Track and Roadway

Kitchener, Ont.—The City Council approved of the extension of the Waterloo & Wellington Railway through to Guelph.

Georgia Railway & Power Company, Atlanta, is required to repave Lee Street from Park Street to McCalls Crossing, in a Supreme Court decision recently handed down.

Harrisburg (Pa.) Railways expects to start work in a few days in reconstructing 1 1/2 miles of city track and overhead construction. The material required has already been ordered.

Southern New York Power & Railway Corporation, Oneonta, N. Y., expects to start construction soon of 1,600 ft. of new track to be laid in pavement and three concrete and steel bridges.

Carolina Power Company, a subsidiary of the Carolina Power & Light Company, Raleigh, plans to extend its tower line from Sanford to Badin to transmit power purchased from the Tallassee Power Company.

Public Service Railway Company of New Jersey has begun reconstruction of the Haddonfield line in Westmont on the Camden division. More than 1,000 ft. of new track has already been laid and the work is progressing rapidly.

Interstate Public Service Company, Indianapolis, Ind., will be required to take up the unused car track on East Fourth Street from Spring to Main Streets in New Albany. The Council adopted an ordinance to this effect.

Springfield (Mass.) Street Railway. Petition for a franchise to lay tracks around Court Square Extension to provide a loop for traffic across the new Connecticut River bridge was postponed until May by unanimous vote of the Board of Aldermen on April 17.

Frankford, Tacony & Holmesburg Street Railway, Philadelphia, Pa., expects to rebuild about 2 miles of track, with 7-in. 105-lb. Lorain section grooved rail. An order has already been placed for 100 tons of rail, and the remainder will follow later.

Ford City, Ont.—T. U. Fairlie, railway engineer for the Hydro-Electric Power Commission of Ontario, estimates the cost to Ford City of moving the tracks from the side of Ottawa Street to the middle of the thoroughfare at \$19,040.

New York (N. Y.) Transit Commission will readvertise at once contracts for construction of the Fourteenth Street Eastern District subway line. The Board of Estimate is returning the contracts to the Transit Commission after refusing to sign them.

Seattle (Wash.) Municipal Railway has received the approval of the city utilities committee of the City Council to reconstruct tracks on Westlake Avenue from Pine Street to Roy Street. An ordinance appropriating \$28,000 from the railway depreciation reserve fund for the purpose was recommended.

Electric Short Line Railway, Minneapolis, Minn., plans to add 50 miles to its line operating from Minneapolis to Hutchinson. Extension has begun to Clara City, Minn., tending toward an ultimate terminus at Madison, S. D. The company will utilize 100,000 ties and 2,500 tons of 70-lb. rail.

Indiana Service Corporation, Fort Wayne, Ind., has asked permission of the Board of Public Works to double track the line on South Wayne Avenue from Creighton Avenue to Kinsmoor. It is stated by S. W. Greenland, general manager, that it is necessary to relay the tracks on South Wayne Avenue and that while doing this it is considered best to double track the line.

Indianapolis (Ind.) Street Railway has been ordered by the Board of Public Works to extend the English Avenue car line from Keystone Avenue to Sherman Drive, a distance of a mile and a half. A number of the delegations of the property owners have presented petitions to the board asking for an extension and it was announced some time ago that the board would grant the extension.

San Diego (Cal.) Electric Railway will start reconstruction work on its tracks about July 1. At the head of the program for improvements presented to Mayor and Council are Park

Boulevard from El Cajon Avenue to Mission Cliff gardens; East San Diego line in two sections, first on University Avenue from Park Boulevard to Thirtieth Street and second from Thirtieth to Daley; National Avenue line from Sixteenth Street and Market to the end of the line.

Duluth (Minn.) Street Railway Company has begun the relaying of its tracks on Superior Street. Seven-inch 93-lb. rail will be used with oak ties laid on a broken-stone foundation. Screw spikes with steel tie plates will also be used, and the joints will be welded by the Thermit process.

Muskogee (Okla.) Electric Traction Company will provide transportation to the bathing beach at Honor Heights this spring and summer. Surveyors are at work on plans for running tracks from the end of the West Broadway line to the site of a \$500,000 soldiers' memorial hospital, and this line will be extended about two blocks further for patrons of the bathing beach.

Knoxville (Tenn.) Railway & Light Company has agreed to move its tracks to the middle of Central Street between Scott and Morelia Avenues at its own expense. The City Commission in return has agreed to grant a right-of-way franchise similar to the existing one. The question of paving between the rails of the new track will be settled later. The company also agreed to rebuild its tracks on Park Avenue from Gay Street to the viaduct and will pave between the rails of each track and between the double track.

Cincinnati, Ohio.—The Board of Rapid Transit Commissioners, has awarded the contract for constructing section five of the rapid transit loop to the Hickey Brothers, Columbus, Ohio. The Hickey Brothers were awarded the contract, although their bid was \$12,823 higher than that of the lowest bidding company, but members of the commission said that their bid was the best. The lowest bid came from the J. T. Adams & Winchell Company, Columbus, Ohio. The Hickey Brothers' bid was \$323,680 while the engineer's estimate was \$399,635.

Trenton, N. J.—The State Public Utility Commission has denied the application of the City of Trenton, N. J., to compel the New Jersey & Pennsylvania Traction Company to lay additional tracks on West Hanover Street, to relieve congested traffic and alleged consequent danger to the public. The board said that much of the straight track and some of the special work soon must be reconstructed. Then the proper rearrangement can be made. The board said that the existing conditions were not sufficiently dangerous to justify the necessary expenditure for making the proposed change at this time, particularly in view of the financial condition of the company. The city's estimate of the cost was \$38,236.40, plus 20 per cent for contractor's profit. The company's estimate was \$75,000.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has started on its program of extensions by the replacing of special work at East Water and Michigan Streets. This job consisted of the placing of a new double track crossing with connecting curves on the southwest and northwest corners and is done to permit the rerouting of the Vliet Street cars, which are now operating by way of Third Street, Sycamore, Michigan and East Water Streets to the South Side, returning the same way. In this program of replacements will be the rebuilding of the curves and tracks at Reed and National, at West Water and Grand, and at several other important corners. It is also planned to extend the Center Street line from Sherman Boulevard to Fifty-first street, with a double track. The new work at East Water and Michigan Streets will cost some \$35,000; that at Reed and National, about \$50,000; that at West Water and Grand some \$40,000 and the extension of the Center Street tracks about \$40,000 without paving.

Shops and Buildings

Harrisburg Railways Company, Harrisburg, Pa., is installing two new Heine boilers with high furnace combustion chambers and Cox stokers, made by the Combustion Engineering Company.

Columbus, Delaware & Marion Electric Company, Columbus, Ohio., will spend \$500,000 in improvements at the new power plant in Scioto, 7 miles south of Marion. The plant originally cost \$1,000,000.

New York, N. Y.—Nine bids have been submitted to the Transit Commission in connection with the construction of additional stations and elevators on the Brooklyn-Seventh Avenue subway line, the Fourteenth Street-Eastern line and the miscellaneous work on various rapid transit lines. The highest bidder was George Colon & Company, \$235,109. The lowest bid received was submitted by Joseph S. Brown, \$207,792.

Wilkes Barre & Hazleton Railway, Hazleton, Pa., has been asked to arrange for the work necessary on switches and sidings from its line to connect with a new million dollar substation at Ashley Plains which will be put up by the Pennsylvania Power & Light Company. This substation will step down the high-tension current delivered by the Harwood power house to Wilkes-Barre. Work on the high-tension line has already been started.

Municipal Railway of St. Petersburg, Fla., will be driven by municipal current if the recommendations of a committee appointed by the City Commission are carried out. The committee has returned from a tour of Florida's municipally-owned power plants and has gone into the St. Petersburg situation with prospects for added demands due to the growth of the street railway. It advises the build-

ing of a 1,500 kilowatt plant immediately to furnish power for the municipal enterprises—street car line, gas plant, waterworks and street lighting—upon expiration next January of the present contract with the St. Petersburg Lighting Company. With this view in mind an electrical engineer has been called in to go into the situation and report to the commission, which is willing to call an election for bonds up to \$300,000 for such plant. C. T. Baker is the consulting engineer who has been secured.

Oregon Electric Railway, Portland, Ore., has placed an order for automatic substation equipment, said to be the largest single order for automatic equipment of this kind ever placed in this country. Seven stations at present manually operated will be equipped with synchronous converters. These stations, which have been in operation since 1912, range in capacity from 500 to 1,000 kw., and generate power for the 180 miles of interurban system of the company at 1,200 volts, direct current. The automatic equipment will include separate exciters for the synchronous converters to insure correct polarity at starting and will be designed along standard lines for present railway practice. The equipment at each station will consist essentially of a motor-driven drum controller, exciter, contactors, switches and relays with protective devices and load-limiting resistors. The stations will be cut in on the line or shut down according to the demand for power, which will vary with the number of cars operating on the line.

Trade Notes

Johnson Fare Boxes.—The Chicago Surface Lines has arranged with the Johnson Fare Box Company for a trial installation of fifteen electrically driven fare boxes. These are of a new design providing instantaneous registration.

The Ohio Brass Company, Mansfield, Ohio, states that its cars will be used O. A. Lawrie as district sales manager in the New England territory with headquarters in Boston. For the past sixteen years Mr. Lawrie has been with the American Copper Products Company.

The Westinghouse Electric & Manufacturing Company has received an order for 50,000 suspension insulators from the Southern California Edison Company, Los Angeles, Cal. The insulators will be used in the reinsulation of 275 miles of high-tension line, to increase from 150,000 to 220,000 volts.

Differential Car Company, Findlay, Ohio, states that its cars will be used in Cleveland and Toronto this summer for hauling wet concrete from a central mixing station. Experiments made in Cleveland last fall indicate that the character of the concrete is not changed in transporting even with a maximum elapsed time between the mixer and ground of eighty-three minutes.

Western Electric Company, New York, N. Y., announces the appointment of Edward B. Craft as chief engineer. This appointment is the result of a reorganization of the administrative department by which the operating functions are divided among four major departments. Dr. F. B. Jewett, vice-president of the company, has charge of the telephone department; vice-president H. A. Halligan has charge of the purchasing, traffic, legal, accounting, treasury and publicity personnel; F. A. Ketcham, general sales manager, takes charge of the supply department, and G. E. Pingree, vice-president and general manager of the International Western Electric Company, has the foreign department.

Wagner Electric Manufacturing Company, St. Louis, Mo., is advertising the Pow-R-Full Motor, which provides a pull box as a part of the motor frame into which the leads of the motor extend. The box may be turned in four directions for conduit connections. The advertisements of the motor accentuate the fact that vibration has been very largely eliminated and that the motor runs quietly.

Dutchess Bleachery, Inc., Wappingers Falls, N. Y., announces that its insulation division has taken over the sales of its products which were formerly sold through American Di-Electrics, Ltd. The new coating plant at Wappingers Falls has a present capacity of 2,000,000 yd. per year, which includes varnished fabrics of all standard gages and widths. Additional equipment is in the course of construction.

Westinghouse Electric & Manufacturing Company has separated the divisions of power and railway at the Pittsburgh office, and some new appointments have been made. Barton Stevenson, who previously was manager of both divisions, will continue as manager of the power division. F. G. Hickling has been appointed manager of the railway division, and S. R. Shave will act as manager of the price section for both divisions.

Combustion Engineering Corporation, New York, N. Y., has recently completed arrangements with the Power Plant Equipment Company, Kansas City, Mo., whereby that company will represent the corporation in that territory which covers, in a general way, eastern Kansas, eastern Nebraska, western Arkansas, and western Missouri. This district was taken over by the Power Plant Equipment Company on March 1, 1922. The Kansas City address of the Combustion Engineering Corporation is 1002 Coco-Cola Building.

Ford, Bacon & Davis, New York, N. Y., a firm of specialists in engineering and management of public utility and industrial business, outlines the facilities at hand and scope of service it is prepared to render in a booklet just issued. The company handles investigations, reports and valuations, organization, financing and development, engineering designing and planning, con-

struction, accounting and management. Another booklet describes the United States Army supply base at New Orleans, La., which the company is constructing.

Roller-Smith Company, New York, N. Y., announces the following changes in its sales organization: The Perkins-LeNoir Company, which formerly represented the Roller-Smith Company in Philadelphia, has been succeeded by Esherick & Hoyle, Otis Building, who will handle the company's line of electrical instruments, meters and circuit breakers in the Philadelphia territory. The Perkins-LeNoir Company, which formerly represented the Roller-Smith Company in Baltimore, has been succeeded by J. E. Perkins, 113 E. Franklin Street, who will handle the company's line of electrical instruments, meters and circuit breakers in the Baltimore territory.

Railway Audit & Inspection Company, Philadelphia, Pa., has announced the following officers for this year: E. C. Hathaway, chairman of the board; H. N. Brown, president; T. C. Cary, first vice-president and general manager; C. H. G. Larrimore, assistant general manager; C. E. Horney, second vice-president and treasurer; George W. Reif, secretary. The field covered by the company was divided as follows: K. H. Wendling, managing central division; I. F. Heidler, supervisor central division, Frick Building, Pittsburgh, Pa.; W. B. Edwards, assistant manager central division, Perry-Payne Building, Cleveland, Ohio; P. H. Diehl, manager western division, Webster Building, Chicago, Ill.; F. W. Stockmar, assistant manager western division, Railway Exchange Building, St. Louis, Mo.; Harry Preston, manager southern division, Candler Building, Atlanta, Ga.; J. P. Graham, district manager, Drivers & Mechanics National Bank Building, Baltimore, Md.; J. H. Cain, district manager, Little Building, Boston, Mass.; C. E. Harbison, district manager, Candler Building, New York City, N. Y.; L. D. Rice, district supervisor, Brown Brothers Building, Philadelphia, Pa.

New Advertising Literature

Schutte & Koerting Company, Philadelphia, Pa., has issued a flyer showing the straightway valve being marketed by that company.

Westinghouse Union Battery Company, Swissvale, Pa., has issued Bulletin No. 1102 descriptive of its radio batteries and Bulletin No. 1201-A descriptive of its storage batteries for farm lighting.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has published a folder on Shurvent fuses. The folder explains the application and design of fuses for the protection of low-voltage circuits up to 600 volts for both alternating and direct current.

Heine Boiler Company, St. Louis, Mo., is distributing a reprint of a message from C. R. D. Meier, president of the company, to Heine boiler salesmen. This contains a discussion on present business conditions and includes diagrammatic curves of wholesale prices in the United States for 110 years.

Electric Railway Equipment Company, Cincinnati, Ohio, has issued a folder giving construction details and installations of Elreco combination railway and lighting poles, and ornamental brackets. A list of cities which have these in use is given, together with illustrations of the completed installations.

Heine Boiler Company, St. Louis, Mo., has issued a folder entitled "Forty Years of Progress." This contains information on several new developments in boiler design and announces a change in the name of the company which was previously Heine Safety Boiler Company. The change consists in dropping the word "Safety."

Ingersoll-Rand Company New York, N. Y., has issued bulletin describing the Price type "PO" horizontal single cylinder oil engine. One of the outstanding features of these engines is the shape of the combustion chamber and the arrangement and construction of the spray nozzle used for direct-injection of fuel.

The Page Steel & Wire Company has just issued a new handbook giving information on Page-Armco welding rods and electrodes. This gives information on the various products manufactured, the sizes, weights, etc., together with specifications for welding rods and electrodes as issued by the American Welding Society, and tests for welding electrodes.

Uehling Instrument Company, Paterson, N. J., has recently issued Bulletin 112, covering Uehling CO₂ recording equipment, for guiding the engineer and fireman in reducing the waste of fuel up the chimney. Features are the separate recorder for the engineer's office and indicator for the boiler front, continuous chart record and dry method of absorption.

Atlas Valve Company, Newark, N. J., is distributing a small booklet giving information on reducing-valve economy. Information is given on the flow of steam through pipes, together with handy tables for determining the size of pipe needed. Information is also given on superheated steam, extra heavy pipe, pipe fittings, leaders to heating systems, pipe friction allowances, and steam velocities.

Westinghouse Electric & Manufacturing Company has just published some electrification data in Vol. III, No. 2, of its *Data* publications. This points out the value of electrification of railroads as a means of conserving energy and contains information regarding desired standards for railroad electrification and discussion as to the future of railroading and existing electrifications.

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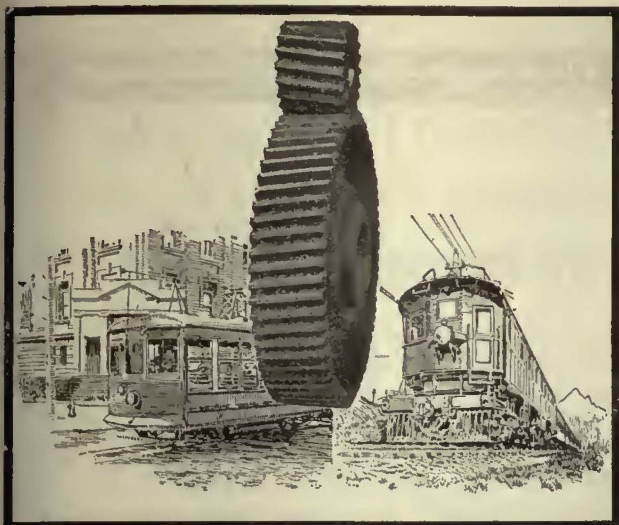
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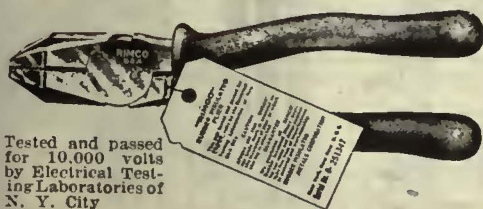
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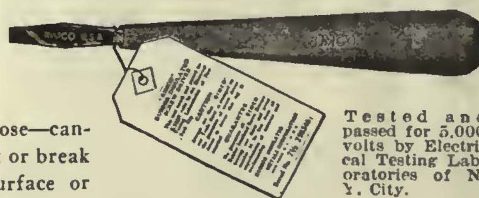
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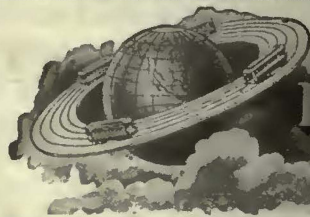
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Each and every one of these points is given special consideration in the construction of *Dayton Resilient Ties*.

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DAYTON

JUSTIFIES THE LAYOUT TRACK BUILDING TIME

When track costs per annum equal or exceed interest and investment costs on a new track, then it's time to consider complete reconstruction and—

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What you want is the coming thing in track construction—Dayton *Resilient* Ties.

Accurate cost figures show that this track saves \$6000 a mile over wood ties in con-

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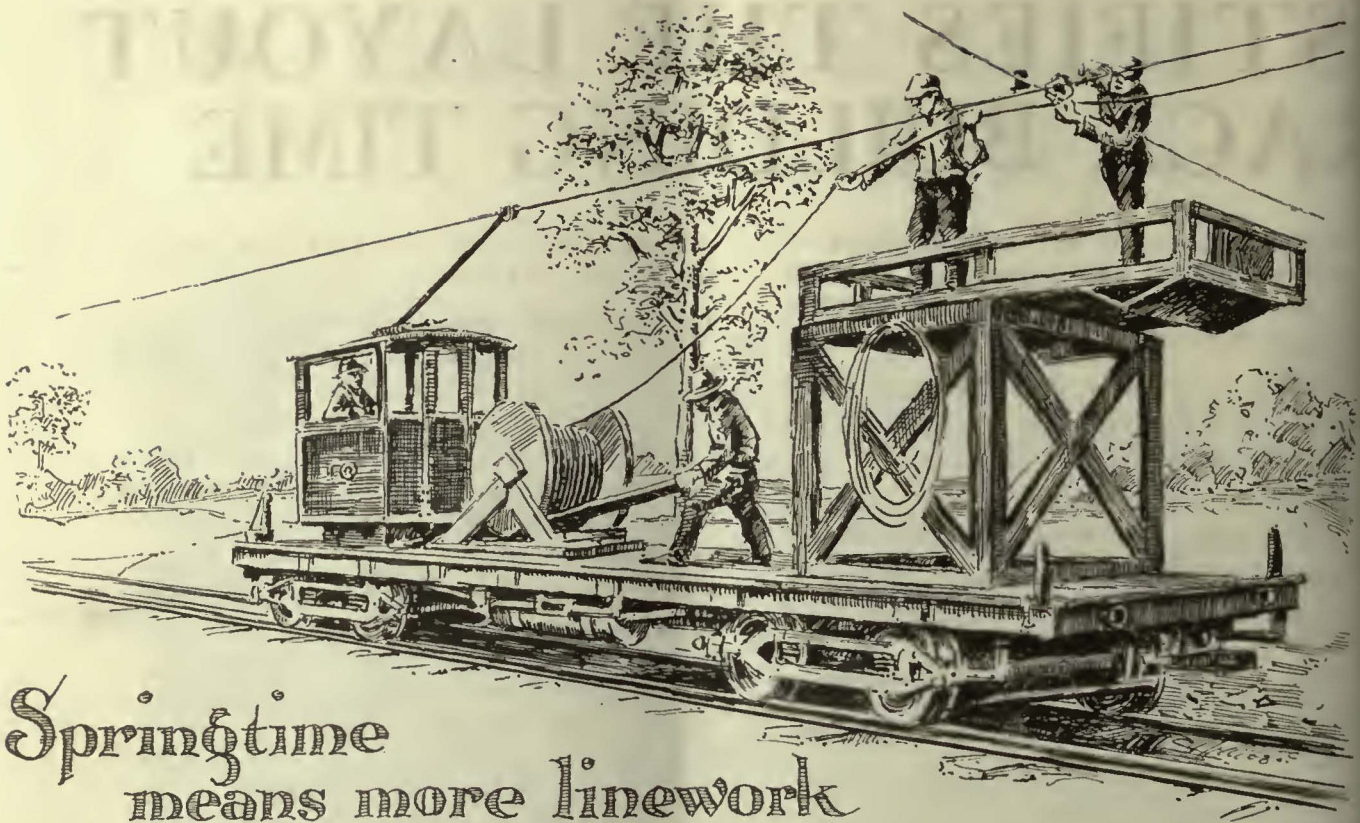
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The
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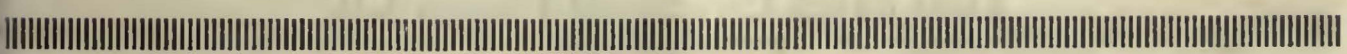
Springfield, Mass.

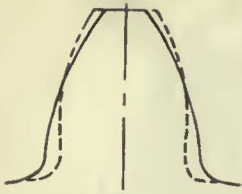
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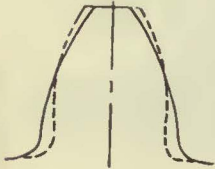
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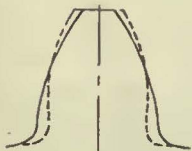




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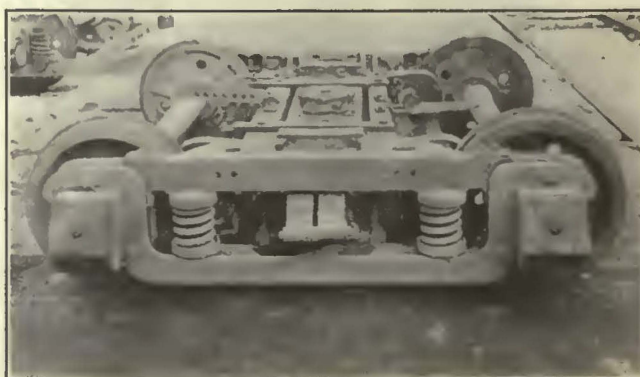
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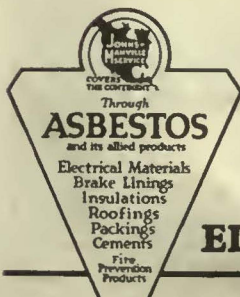
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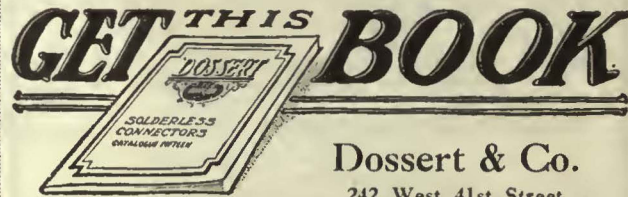


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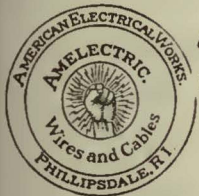
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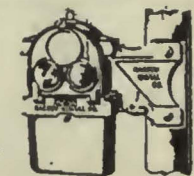
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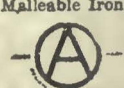



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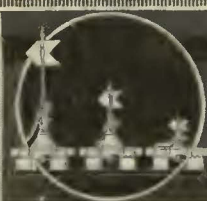
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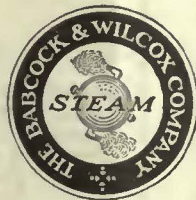
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- Anchors, Guy
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Ohio Brass Co.
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Bemis Car Truck Co.
Cambria Steel Co.
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- Axles, Car Wheel
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Ajax Metal Co.
More-Jones Br. & Metal Co.
- Babbitting Devices
Columbia M. W. & M. I. Co.
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Internat'l Register Co., The
- Batteries, Dry
National Carbon Co.
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Railway Track-work Co.
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- Bushings, Case Hardened and
Manganese
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Brill Co., The J. G.
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Cables)
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Carbon)
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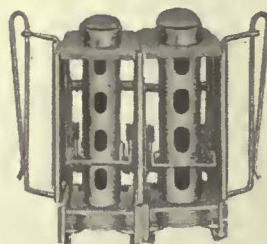
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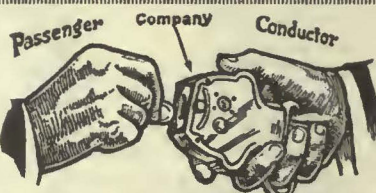
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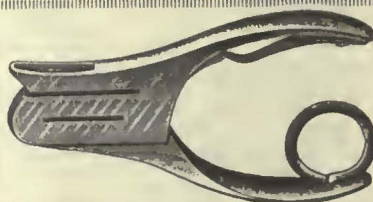
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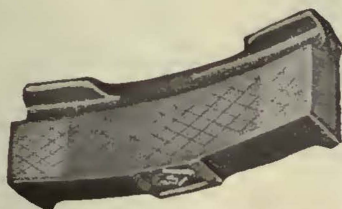
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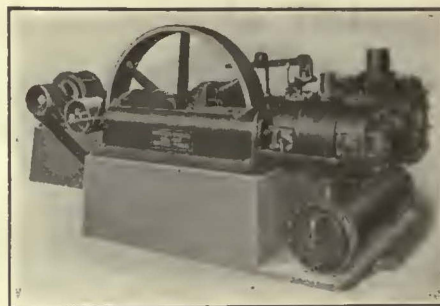
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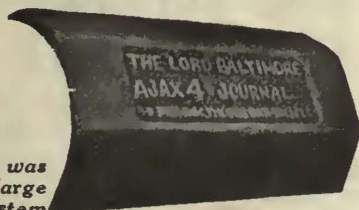


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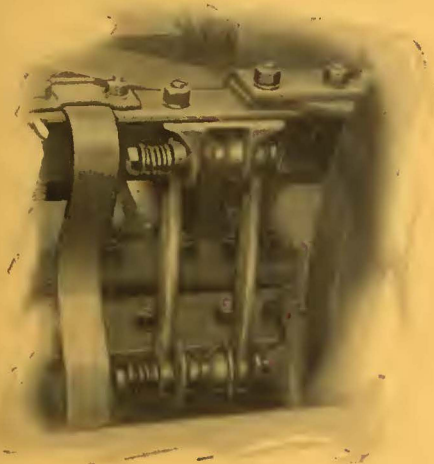
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