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143

ELECTRIC RAILWAY JOURNAL

Last Call!

The Seers Predict a Severe Winter

No. 532-B Motor

Prepare For Winter

Preparedness Results in Better Service and Lower Maintenance

Are your snow sweepers overhauled and tested?

Have the snow plows been amply motored to withstand the worst storms of the coming winter?

If not: review the splendid line of standard Westinghouse Motors ready for prompt shipment, to put your snow-fighting equipment in shape for the winter conditions.

Authorize your stores department to carry an ample stock of insulation and renewal parts to keep your rolling equipment in service through any possible weather emergency. ***This is good insurance.***

The nearest Westinghouse office is ready to cooperate and assist in the solution of any transportation problems. Discuss your problems with our representative. ***He is there to serve you.***

No. 535 Motor

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in all Principal Cities of the
United States and Foreign Countries.

No. 557 Motor

Westinghouse

Vol. 64, No. 18 New York, November 1, 1924 55-792

ELECTRIC RAILWAY JOURNAL

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Webster Confirms It

NOT long ago the railway in one of the largest cities of this country had occasion to refer to ELECTRIC RAILWAY JOURNAL in advertisements which it was using in its cars. In order more definitely to identify this paper in the minds of the general public, the explanatory phrase was used "Official Journal of the Railway Industry."

This indication of the high regard in which the management of that property holds the JOURNAL was gratifying to the editors. But the question arose whether a paper published independently and not controlled nor subsidized by the industry could properly be called "official." A look in the dictionary, however, showed that the author of the advertisement was entirely correct. Webster gives as the first meaning of the word official "discharging or performing an office, service or function." Under this definition the evidence constantly coming to hand confirms the statement referred to above — that the JOURNAL really does qualify as the "official" paper of the industry.

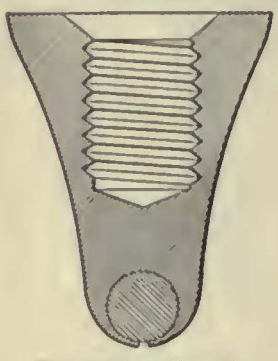
Number of Copies Printed, 6,150

The Importance of Trolley-Ear Renewals

Westinghouse ET Low-Center Trolley Ear

Bottom View, Showing Lips Peened to Trolley Wire

The following quotations, from the report of the committee on Transmission and Distribution of the American Electric Railway Association on the Renewal of Trolley Ears, speak for themselves:



Full-scale section of Westinghouse Type ET Low-Center Trolley Ear. Height at Boss, 1¾ inches.

"No matter what the type of ear, it is most important that the ear should be renewed as soon as the metal in the lips, underneath the trolley wire, has become worn away."

"It will be found cheaper to renew the ears with greater frequency than is often the practice, rather than renew entire stretches of trolley wire."

The design of Westinghouse ET Low-Center Trolley Ears is such that the lips give the maximum protection to the trolley wire, assuring the longest service.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in all Principal Cities of the
United States and Foreign Countries.

Westinghouse

The Coffin Prize Winner

Under the head of economies introduced in operation by the prize winner, The Northern Texas Traction Company, appears this:

> "The cost of maintenance of way and structures has come down from 2.5 cents per car mile in 1920 to 1.4 cents in 1924. Besides the effect of light-weight rolling stock in this figure, the extensive use of track-welding equipment and modern track tools have had a bearing on producing the results."

This prize winning property uses Railway Track-work Company's track grinders exclusively.

The grinders we show here and the "Ajax" welder are lowering maintenance of way costs on progressive roads throughout the length and breadth of this nation. How about your own road?

Get a set of bulletins and a quotation

Railway Track-work Co.

3132-48 East Thompson Street, Philadelphia

AGENTS:
Chester F. Gailor, 30 Church St., New York
Chas. N. Wood Co., Boston
Electrical Engineering & Mfg. Co., Pittsburgh
Atlas Railway Supply Co., Chicago
Equipment & Engineering Co., London

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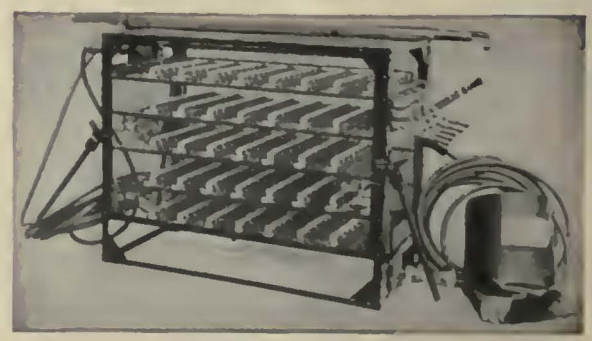
"Reciprocating" Track Grinder

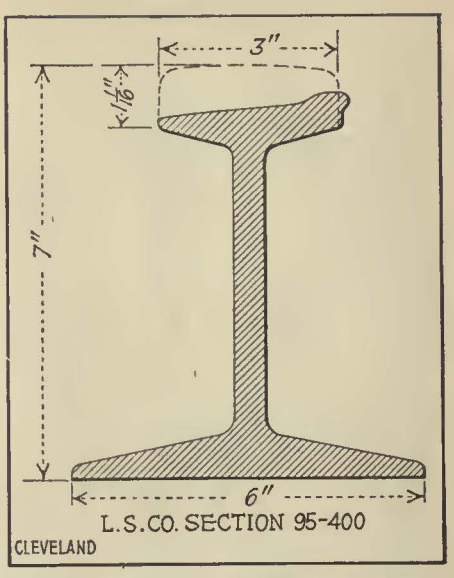
"Universal" Rotary Track Grinder

"Atlas" Rail Grinder

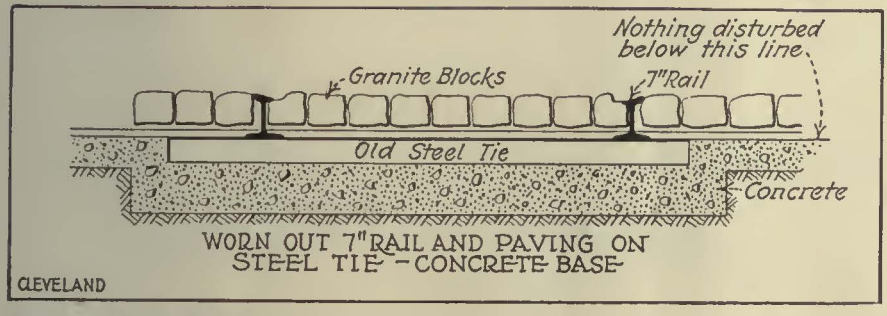
"Hercules" Swing Frame Rail Grinder



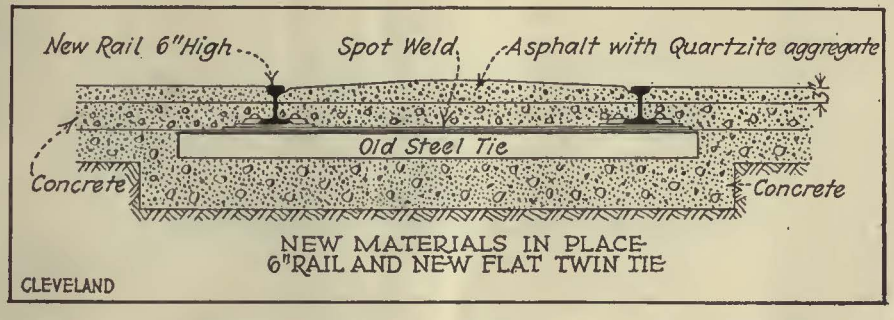
"Ajax" Electric Arc Welder



Cross Section of Rail on Euclid Ave., Cleveland, Showing Wear on Ball of Rail



Cross Section Showing Details of Track Construction on Euclid Avenue, Cleveland. Rail Worn Out, Concrete Base Still in Good Condition.



Details of method of Replacing Rail on Old Concrete Base, Using Special Flat Steel Twin Ties.

Low Cost Construction that Outlasts the Rail

The most startling development in track construction for paved streets has been successfully worked out during the past two years in the renewal of rail and paving on a Steel Tie Concrete Base.

Planning your new paved track for renewal by using Steel Twin Tie Construction will require no large investment in initial cost. Our definite cost records for 1924 show costs as low as $8.35 per single track foot for the track complete, including removal of the old construction and concrete paving surface.

For conservative-minded executives who have questioned the comparative life of concrete construction there is a complete answer in the reconstruction of such track at the end of a satisfactory rail life in Cleveland and elsewhere.

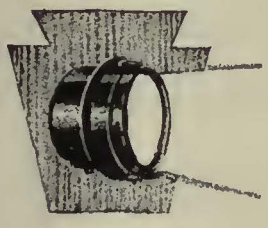
In planning 1925 paved track construction investigate the low cost paved track construction that outlasts the rail with all assurance that asking us to present all the data by personal call or in the mail will involve no persistent or annoying solicitation.

The International Steel Tie Co., Cleveland, Ohio

Steel Twin Tie Track

Economical — Permanent — Renewable

How KEYSTONE EQUIPMENT helps sell the service

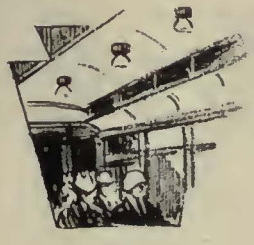


GOLDEN GLOW HEADLIGHTS—*Distinguish the car!*

Despite darkness and distance, far up the road, the characteristic beam of golden yellow light announces the approach of a trolley. Golden Glow Headlights are non-glaring. They throw a flood of brilliant penetrating illumination, yet are non-dazzling.

KEYSTONE-HUNTER SIGNS—*Advertise the service!*

They'll pass up the taxis, if your car signs help them to find their destinations. Few people willingly pay the higher cab fares, when street cars are readily available. Tell the public where your cars go. Advertise routes as well as destinations, with Keystone Hunter Signs.



KEYSTONE COMPENSATING FIXTURES—*"Read While You Ride!"*

One series circuit of five fixtures gives ample and unfailing illumination for newspaper readers, and at the same time reduces costs. Wiring is simplified, bulb renewals are fewer and appearance is improved. Satisfactory lighting goes a long way toward making satisfied passengers.

FARADAY SIGNAL SYSTEMS—*"Ring for your stop!"*

Don't make passengers wade through the crowd or stand on a seat to let the motorman know they want to stop. The installation of Faraday Signals—Buzzers and Push Buttons—makes it easy and convenient for passengers, and avoids carrying them past their streets.

Ask for detailed specifications

ELECTRIC SERVICE SUPPLIES CO.

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PITTSBURGH
829 Oliver Building

NEW YORK
50 Church St.

SCRANTON
316 N. Washington Ave.

CHICAGO
Monadnock Bldg.

BOSTON
88 Broad St.

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

The WABCO Smile

A sense of satisfaction comes to all those who have experienced the benefits of WABCO Brake Cylinder Packing Cups.

The motorman feels secure in knowing that the air he puts into the cylinder will stay there to provide the degree of car control that he intends. No air can pass *through* WABCO cups, and they cling to the cylinder walls so tightly as to prevent leakage *around* them.

The shop man knows that his work of maintaining brake cylinders is lessened because WABCO cups do not need frequent replacement. They retain their effectiveness over very long periods even under severe service conditions. Neither do compressors come in so often for overhauling as they are not overworked to maintain cylinder leakage.

Moreover, the man who pays the bills is pleased with the economical advantages that follow the adoption of WABCO cups. They function better and wear longer, saving operating and maintenance expense.

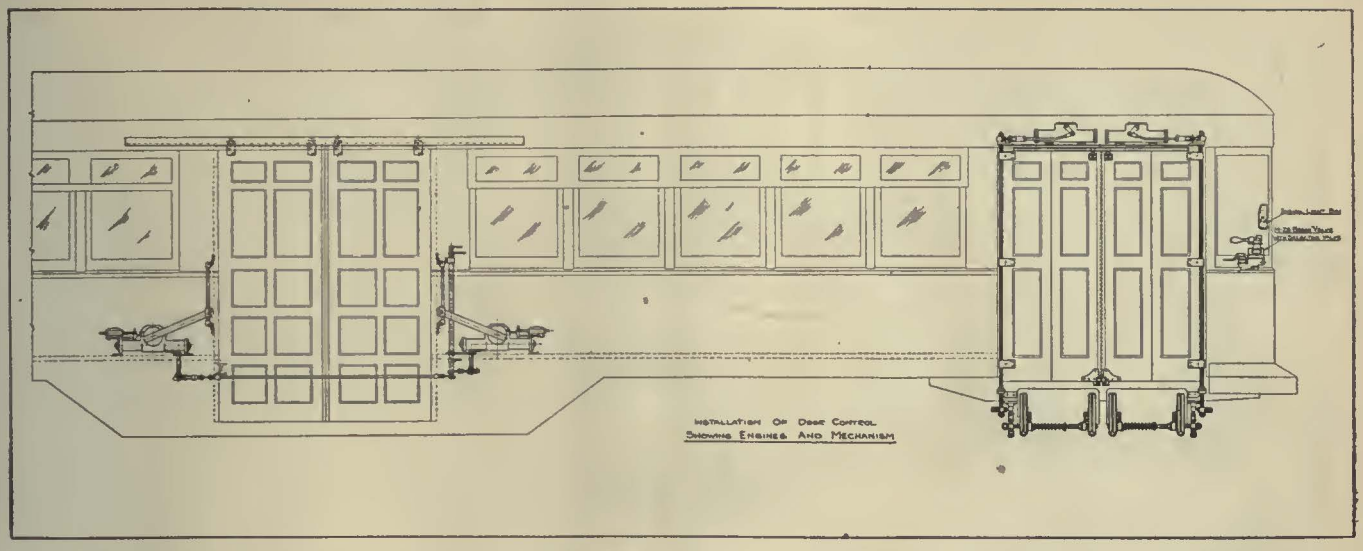
WABCO

WESTINGHOUSE TRACTION BRAKE CO.

General Office and Works: WILMERDING, PA.

2141

WESTINGHOUSE TRACTION BRAKES



NATIONAL PNEUMATIC SERVICE

What it means to you!

How to install door engines and when to install them for best results are big questions. But the assistance rendered by National Pneumatic Service goes beyond that. It helps you on problems of selective door control—on proper location and size of entrance and exit facilities—on interlocking safety features. In short, the one hundred percent kind of service goes with every National Pneumatic deal. And our follow-up service shoulders the responsibility for perfect performance.

NATIONAL PNEUMATIC DEVICES

Door Engines
Door and Step Control
Operating Mechanism
Motorman's Signal Lights

National Pneumatic Co., Inc.

Originators and Manufacturers

Executive Office: **50 Church St., New York**

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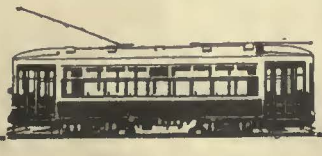
General Works—Rahway, New Jersey
Manufactured in Canada by
Dominion Wheel & Foundries, Ltd., Toronto, Ont.



Twenty-t
Quantity Bo

This Motor Coach body, built by Auto Body, presents a striking appearance and is combined with rugged strength, durability and refined comfort. It is here shown mounted on a Reo chassis.

Since 1902 this organization has devoted its plant and personnel to the exclusive manufacture of automobile bodies. Throughout these years the facilities, the capacity and the co-operative spirit of the Auto Body Company have secured and held the business and good will of leaders in the automotive industry.

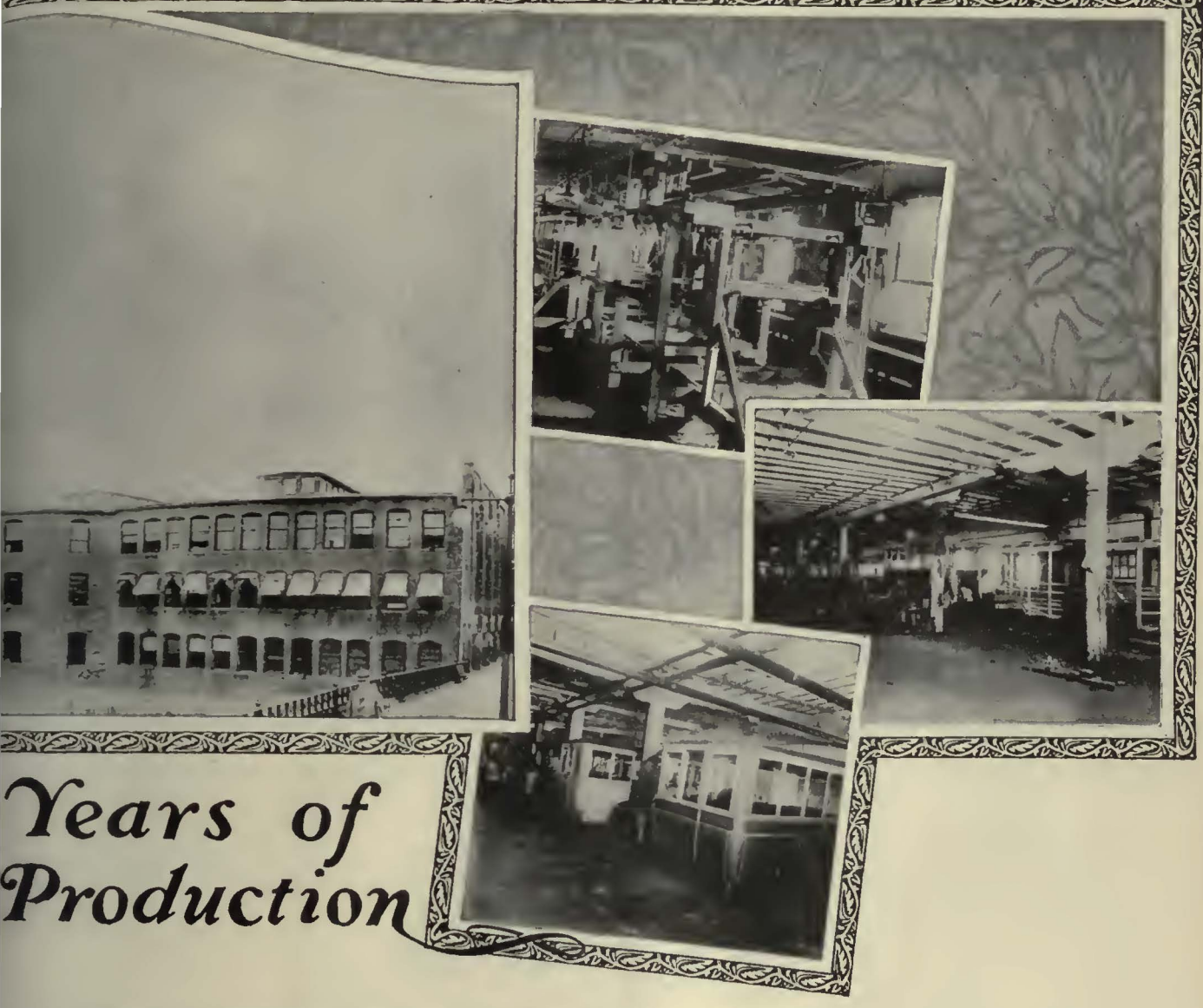
Engineering ability and manufacturing experience have been vital factors in the development of Auto Body Service.

THE AUTO BOD

Designers and Manufactu

Open and Enc

LANSING,



Years of Production

Beginning with fabrication in the dry kilns, mill rooms, metal working, machine and die departments, through to the frame assembly, assembly line, painting and trimming departments—steel, wood and expert craftsmanship are here wrought into form—making every completed unit a high standard of durability, quality and appearance. The progress of production is expedited by adequate floor space, equipment and resources.

Let Auto Body engineers consider your problems. Wire or write for information.

Rugged Auto Body Pay-Enter Bus types have the stamina to withstand rough usage over a long period of service. These built-in Auto Body features are important to you economically.

COMPANY

Motor Coach and Bus Bodies
omobile Bodies

MICHIGAN

Detroit Representative
CHARLES. P. PARSONS
1442 Majestic Building

out new territory—

EXPENSE and uncertainty absolutely prohibit experimenting with street car lines.

The Bus is ideal for such pioneer work because of the comparatively low initial investment and the flexibility of bus service. Buses doing such work may be transferred any time to other sections of the system if conditions make such transfer desirable, or the route can be altered with small expense to meet changing conditions.

Electric railways are rapidly including the bus in their transportation plans and fitting in bus service as an integral part of their systems. The low initial cost of buses solves many an experimental and financial problem. The steady, dependable and economical operation of Mack buses, combined with their pleasing lines and comfort places the Mack in the lead when it comes to a selection.

A Mack bus, from bumper to tail-light, is planned and built by Mack—worked out in every detail by Mack bus engineers and then built in the Mack plants. Mack supervision controls throughout.

The result of this is recognized in the sturdy long-life Mack engine.

In the specially designed low bus chassis.

In the wide front axle, assuring safety and permitting a short turning radius.

In the Mack dual reduction drive axle especially designed to give maximum road and under-body clearance.

In the Mack transmission with ground gears.

In the Mack Shock Insulator. (All spring ends are embedded in rubber Shock Insulator cushions, eliminating metallic contact between springs and frame, absorbing vibrations, affording yielding support to springs and banishing shackle wear, rattles, lubrication.)

And these are only a few of the many Mack features that help to assure the economies in daily operation and maintenance costs for which Mack buses are famous.

MACK TRUCKS, INC.

INTERNATIONAL MOTOR COMPANY

25 Broadway New York City

Builders of City and Sedan Type Buses

Eighty-three direct factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY" and "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION."

The Mack Bus

25 Passenger, City Type

Performance counts!

Stick to Known Value

One operator says: "G-E Coils couldn't be improved. So now they're packaged to guarantee original quality on the job."

There is no true substitute for G-E Armature Coils for G-E Motors. And now supplied in cartons, G-E Coils are sure to be preserved undamaged until ready for use. Besides, the cartons are a great convenience, each containing a set of coils for one armature.

To get the same efficiency as from your original coils, to secure maximum armature life, and to insure satisfactory service from your G-E Motors you must rewind with G-E Armature Coils. Each is an exact duplicate of the other.

Use your Catalog

General Electric Company
Schenectady, N. Y.
Sales Offices in all Large Cities

GENERAL ELECTRIC

New York, Saturday, November 1, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 64
Number 18

Are We Determining Street Railway Wages in the Right Way?

TWO serious questions are raised by the increases in wages since the first of the year on a number of electric railways as the result of wage arbitrations. First, what is the industry going to do if wages continue to go up, or even if they remain at their present level? Second, is the right method being used generally now to determine the rate of wages to be paid?

As to the fact that wages on electric railways are very high at present, there can be no question. Albert S. Richey's index figure for October, 1924, published in this paper last week, was 221.9. This is larger than at any time during the war, and in the history of the industry it has been exceeded only for thirteen months in 1920 and 1921, at a time beginning at the peak of all the other common index figures.

Another disquieting fact about the present wage index figure is that during the last year and a half it has constantly been going up. Thus in April, 1923, it was 207.3. During the next six months it gradually went to 217.5. In January of this year it was 218.9 and in February it was 219. By June it had reached 220.4. In July, August and September it was 221.4 and October showed the figure of 221.9, already mentioned. The figures quoted are weighted, according to the method Mr. Richey has been following, on the basis of passenger cars operated by the different companies.

Obviously, if railway companies could increase their receipts in the same proportion as wages go up, their balance would still be on the right side of the ledger, but it is not always easy legally to raise fares nor always advisable economically to do so. Boston, it is true, has raised its local suburban fare from 5 cents to 6 cents due to its recent wage increase, but the effect on traffic is yet to be determined.

The second question likely to be raised in connection with recent wage increases—and closely connected with it—is whether the right method is being used generally by arbitration boards to determine the rate of wages. As a rule, in such proceedings held recently, the decision on whether wages will go up or down involves the question of whether there has been an increase or decrease in living costs, as shown by the various index figures and testimony on local conditions.

There are three manifest objections to the use of changes in the cost of living as the basis for a change in wages. The first of these is that the fairness of a wage schedule so determined must depend entirely upon the fairness of the one previously used. The second is the difficulty of determining the exact percentage of change in cost of living from the testimony usually presented. The third objection is that the extent to which it is used requires a corresponding disregard of the old measure of "supply and demand."

One advantage of the "supply and demand" method of determining wages is that generally it is capable of only one interpretation. Where the turnover is large, the wages are probably too low. If the turnover is very low, the wages may be unnecessarily high. Many electric railways have recently enjoyed a very low labor turnover. By itself this is a very desirable condition, but it is also evidence that employment conditions must be very satisfactory as compared with those, including wages, existing in other industries. In such circumstances, the question naturally arises: Is an increase in wages economically justified if those paid at present are enough to attract and retain competent employees?

Twenty Years of Transit Development

THE dinner given this week celebrating the twentieth anniversary of the opening of the first of New York City's subway lines, at which Frank Hedley, president and general manager of the company, was guest of honor, marked in a fitting way this milestone in the progress of metropolitan transit. The need for better facilities had been felt for a long time. The original elevated railways had been built some 30 years earlier, and operated first with steam and much later with electricity. Surface cars were installed on all the principal streets of the city, and were working to the limit of their capacity. Even subways had been projected years before, the first one having been proposed as early as 1868 and others following from time to time. Subway building, however, costs more money than the early planners could command. It took the courage and tenacity of August Belmont and his associates to finance the project, which in those days was an enormous undertaking for private capital.

At the time the subway was begun it was difficult to see the profound effect that event would have on the future development of the city, for the new line was looked on only as a supplement to the existing system of elevated lines which had been developed for many years. It was built in preference to an elevated largely on account of a civic pride that barred all overhead obstructions from the better streets of Manhattan, and incidentally to save damage claims from property owners. But on account of removing these objections it was possible for the new line, unlike the elevated roads that had been built earlier, to make its path through the heart of Manhattan, and as an extension on an elevated structure, well out into the Bronx. Soon it was extended to the center of Brooklyn through tunnels under the East River, doing away with the ferries and the transfer at the Park Row terminus of Brooklyn Bridge. Then, too, it gave a type of high-speed express service never thought possible on a purely urban railroad.

This original subway was but the beginning of a network that has been made to cover four of the five

boroughs of the greater city and weld them into a homogeneous city, far greater than that dreamed of before rapid transit was a reality. While before the transportation systems were the child of the city, the city became the child of the transportation system. The entire face of the metropolis was transformed. Manhattan, once complete in itself, became the workshop of the greater city, and the farms and pastures of the old days became the residence districts. Instead of the promoters having to beg the city for permission to build, the city is now in the position of being the subway promoter, as it has been realized that only by rapid transit can the city prosper.

But a subway once built must be operated, and to be successful financially it must carry more people and at less cost than any other form of transportation. As one of the speakers at the dinner humorously remarked, it took a genius to pack 'em in for twenty years in the rush hours in such a way that the people still demanded more subways. That is the accomplishment of Mr. Hedley, who has managed the property during the entire 20 years of its existence, as well as the network of elevated lines of the Interborough system. One of the speakers remarked that his job is the hardest railroad job in the world. Under his direction the road has not only been operated as planned, but stations have been enlarged, trains have been lengthened, signals have permitted much closer headways, and automatic devices on the cars have permitted higher train speeds with a material reduction in the platform labor needed, so that the original subway is now carrying about four times as many passengers as it was designed for. With all this rush and bustle, the service continues day after day with scarcely an interruption. And "The New York subways always have returned to every customer more than full value for every nickel received." Surely this is an accomplishment of which any man can be proud, as the speakers at the dinner pointed out in paying tribute to the leadership of Mr. Hedley.

Making Anti-Friction Bearings Win

IT IS to be hoped that something more than a quizzical raising of the eyebrows will greet the account of progress with anti-friction bearings on some thirty-seven continental properties, as presented to the Internationaler Strassenbahn und Kleinbahn Verein in a paper by Karl Pforte, manager of the Hagen Street Railways. This report, abstracted elsewhere in this issue, is a strong reinforcement of a like statement on Franco-Belgian street railways by Ch. Harmel, manager of the East-West Tramways of Liége, which was abstracted in the issue of Aug. 30, 1924.

On the mere face of American experiences with anti-friction bearings, a certain degree of doubt as to their value would be justified. Operators in this country have tried, discarded and tried again both the ball and roller bearing in motors and for car journals. Most of the unfortunate experiences, also, have been with the journal bearings rather than those in the motors.

Manufacturers of anti-friction bearings no doubt began to use them on electric car equipments without a full realization of the hard service to which they would be subjected. But going deeper than a superficial summary it will be found that the manufacturers have been far less at fault than the assemblers and maintainers of car equipment, as well as those responsible for standards of track upkeep. One case comes to mind where it was absolutely impossible to run a batch of cars fresh from the builder because the ball-bearing journal boxes had been wrongly installed. Again, more than one failure of anti-friction bearings has been traced back to the shops where a graduate of the village smithy rather than a precision mechanic had the responsibility for results. In many cases, also, it was forgotten that a street car bearing has no rubber tires to absorb shocks that are ruinous to the anti-friction types.

If so many European properties can show good results from the use of anti-friction bearings, there must be several good reasons aside from matters of design and quality of material. Two reasons, undoubtedly, are the employment of better-skilled labor and the insistence upon smoother track. Certainly there is no reason why Americans cannot obtain results as good as those across the Atlantic.

Tell the Men the Real Meaning of Transportation

IN THE broiling heat of a summer afternoon, a railway shopman is engaged in the tiresome job of cleaning and inspecting the equipment of a snow sweeper. Such a task on such a day seems a cruel mockery. Who can blame the man for performing his work half-heartedly? Yet, because he is a real railway man, he does it with the same care and attention that the painter uses when decorating the exterior of a car.

Railway operation at times is full of interest, excitement—and sometimes of danger. The work of the moment may be to clear a blockade quickly, or to reroute cars in case of a fire so that passengers will not be delayed. It may be to pick up a fallen live wire or to keep the lines open during a terrific storm. Transportation means providing service as safe, as speedy, and as comfortable as may be possible—in the face of whatever obstacles nature or man may place in the way.

But transportation has another and less romantic side. It means keeping everlastingly after small details. It means inspecting brakes, tightening nuts, testing signals or walking the track in a dark subway. The excitement that sustains the men engaged in the actual operation of cars is lacking to those in the mechanical, electrical, or track departments.

There is nevertheless a certain satisfaction in knowing that the lives of the passengers may depend quite as much on the thoroughness of the man working unseen in the pits as on the care exercised by the man at the controller. Old railway men realize this. They know that responsibility for carrying the public safety rests equally on the men in every department and that the real reward in the transportation industry is not the wage paid but the consciousness of service rendered. Money alone would hardly induce a mechanic to work for hours in the heat of summer to put equipment in shape for the winter. Only the knowledge that it was part of the game would make him do a good job.

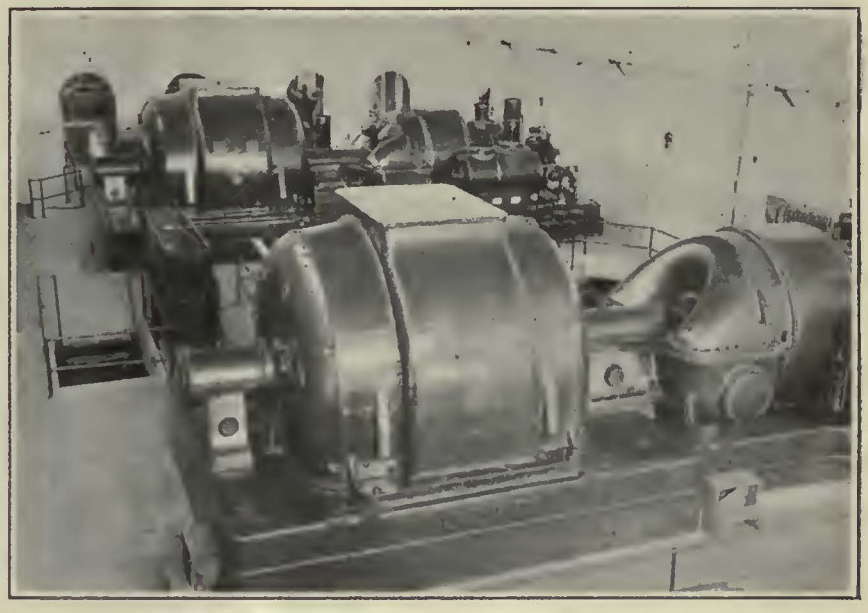
But new blood must be brought into the industry if it is to survive and progress. The new men taken into railway organizations every year do not always understand and share the point of view of the experienced transportation man. Yet nothing is more important than that every workman should be an enthusiast about his own business. No pains should be spared, therefore, in imbuing the new men with the spirit of transportation that has always made it one of the favored vocations of men with ability and vision.

Denver Tramway Modernizing the Power Plant

Faced with an Urgent Need for Increased Power Supply, and Unable to Buy Additional Power Advantageously, the Denver Tramway Has Increased the Capacity of Its Platte Street Plant So as to Meet All of Its Needs for a Number of Years

RECENTLY completed changes and additions to the Platte Street power plant of the Denver Tramway represent the final solution of a serious and perplexing power supply problem that faced this company in 1922. At that time the economical generating capacity of the railway plant, together with approximately 15 per cent of purchased power, was insufficient for its needs. In addition, there was no reserve capacity to take care of the existing demand in the event of a shutdown of the principal turbine unit, and available facilities of power companies in the district offered no advantageous relief.

With this situation confronting it, the management made a careful analysis of the existing conditions and also of the probable future requirements for power. Finally, through a fortunate purchase of surplus generating equipment from the government, the railway company has been able to modernize its plant thoroughly and also to provide on an economical basis reserve capacity for the future.



Interior View of New Section of the Turbine Room Shows the Two Units Recently Installed. The Entire Cost of the Plant and Buildings Is Now Less than $63 per Kilowatt of Capacity

Low Investment and Operating Cost

The cost of the completed plant as now operated is less than $63 per kilowatt of capacity. This includes not only the cost of new equipment and installation labor in that part of the plant which is now operated, but also includes all real estate and buildings (a good portion of which is taken up by a building that houses old reciprocating equipment which will ultimately be disposed of). It also includes the total cost of six 750-hp. capacity Stirling boilers and the cost of a considerably larger boiler room than is actually required for the equipment which is now being used. This boiler room gives available space for future expansion of boiler capacity.

For a comparatively small station, the total costs of generated power are also maintained at a low figure. On page 760 a table gives a consecutive record of the cost of power to this company for a period extending back to 1910. In analyzing these figures it must be borne in mind that this is practically all railway load, which has an inherently poor load factor, and that the increased use of private automobiles has resulted in making this condition worse than was formerly the case.

Old Plant Lacked Capacity

An approximate idea of the situation confronting the company in 1922 may be obtained from an examination of the conditions existing before the plant was reconstructed. At that time the power was supplied by the equipment listed below.

In addition to the generated energy, the tramway company purchased approximately 15 per cent of its requirements in the form of hydro-electric power from the Colorado Power Company.

Combining the capacity of the plant and the purchased power gave a total of 19,575 kw. available. With No. 8 turbine shut down this capacity was reduced to

Platte Street Power Station		
Nos. 1 and 2	Two 800-kw. d.c. generators, engine driven	1,600 kw.
No. 4	One 1,600-kw. d.c. generator, engine driven	1,600 kw.
No. 5	One 1,500-kw. a.c. generator, engine driven	1,500 kw. at unity p.f.
Nos. 6 and 7	Two 2,000-kva. a.c. generators, turbo driven	4,000 kw. at unity p.f.
No. 8	One 7,500-kw. a.c. generator, turbo driven	9,375 kw. at unity p.f.
Total generating capacity		18,075 kw. at unity p.f.
Delaware Substation		
60-cycle purchased power Rotary	One 1,500-kw. rotary converter	1,500 kw.
Total capacity of all sources of power		19,575 kw.

10,200 kw. The hourly peak load averaged 11,500 kw., so that with the No. 8 turbine out of commission, the maximum hourly peaks of 13,500 kw. could not be taken care of. Swing peaks were running up to approximately 16,000 kw. Because of the high water rates of the two small turbines and the reciprocating units the boiler capacity was only sufficient for about 10,125 kw. with No. 8 turbine shut down.

From the foregoing, it is apparent that if No. 8 turbine was shut down the old generating equipment would not be able to take care of the demand except under excessive overloadings. Its age and physical condition was such that this was taking unwarranted chances. No. 8 turbine was five years old and getting to a point where overhauling periods were becoming longer each year.

For years the average kilowatt demand of the system changed very little, but the maximum demand during rush hours has steadily increased. This is due to the increased rush-hour business of the company and the effect the automobile has had in holding down the off-peak load.

The capacity of generating equipment is determined by the maximum demand and the economy of the plant, and the proper size of generating units is fixed by the load factor. To determine just what was needed in the way of additional capacity, load factor curves were prepared, which took into consideration past loads, rate of increase in population, increased use of passenger automobiles, capacity of business district to accommodate parked automobiles, size of motors necessary under rolling stock, car speeds, number of cars required, etc. A period of 15 years was covered.

THREE PLANS OF PROCEDURE CONSIDERED

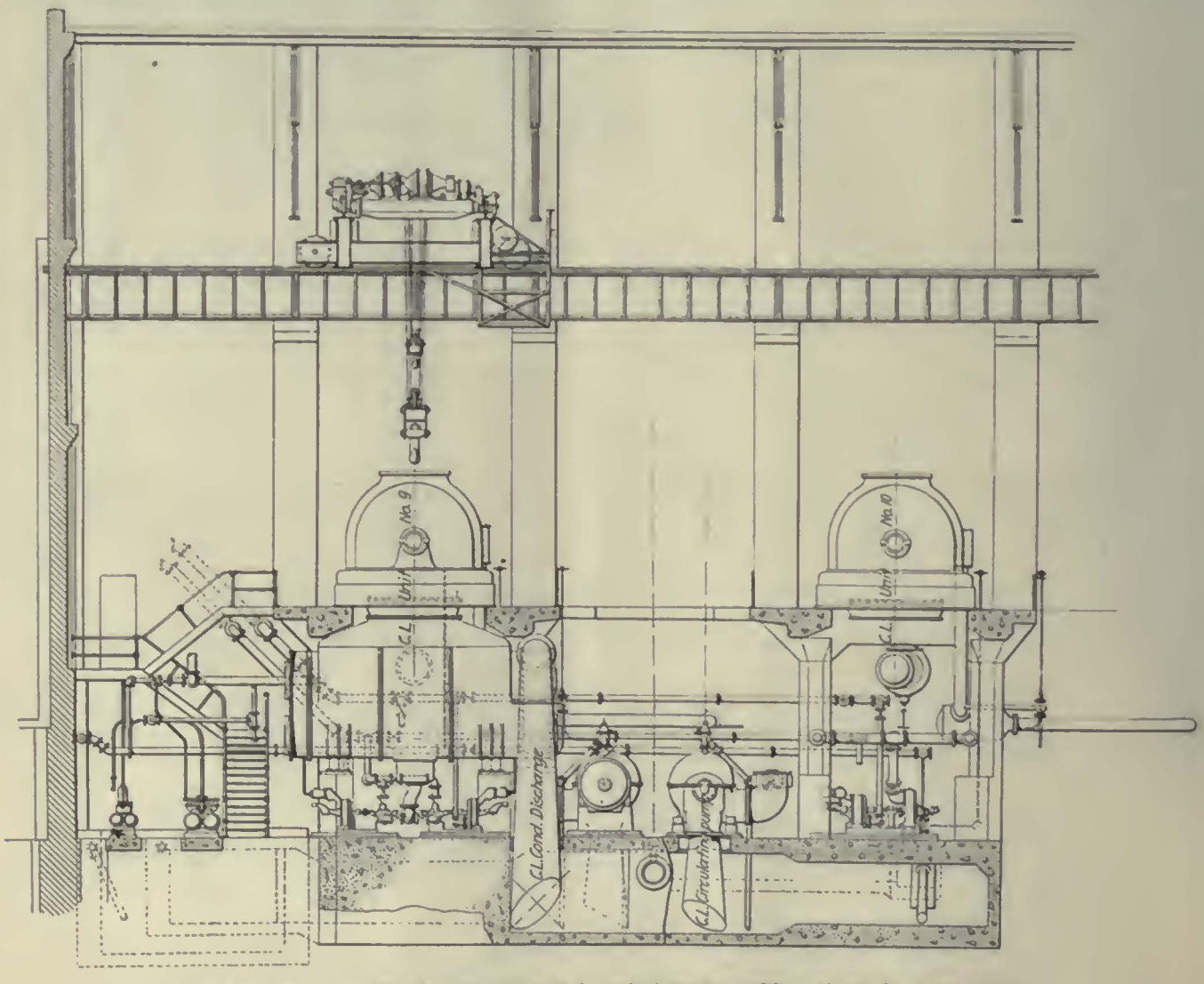
In view of the above situation it was necessary either to install more generating equipment or enter into contract for additional purchased energy. Three possible plans of procedure were considered.

1. To purchase all of the energy required by the company.

2. To generate all of the energy required by the company.

3. A combination of generation and purchase.

These plans were studied carefully. The "all purchase" plan was found impossible. There were two power companies in the field. The first did not have sufficient capacity to take care of the entire railway requirements, and even with sufficient capacity available, the rate was not attractive to the company. This situation was further complicated by the fact that the power would be delivered over long-distance transmission lines, making it necessary to have sufficient steam standby available to take care of interruptions. Steam



Cross-Section Through the Remodeled and Enlarged Platte Street Plant Shows the Arrangement of Turbines, Foundations and Auxiliaries

standby in sufficient amount to guarantee continuity of service meant fixed charges to be added to the power company's charges.

A second power company in the field was not in a position to furnish the railway with power and suggested that it wait until a project the power company was working on had been completed. However, the time was too far in the future and the company was faced with the danger of a breakdown at any time. The rate offered, compared with the railway's own generating costs, also put this plan out of the question.

Another important reason why the company could not consider the purchase of all of the energy required by it was that its substations were all 25-cycle and the power companies were proposing to furnish 60-cycle energy. The conversion losses would be high, or if the company was required to sell the 25-cycle equipment and install 60-cycle apparatus, an expense of $600,000 would have been incurred with very little opportunity for recovering any part of this expense through the sale of the 25-cycle equipment.

The third proposition was a combination of purchase and generation, and this was rejected for some of the reasons outlined in the preceding paragraph, and also because the power company could not supply energy at a cost low enough to be attractive.

All Generation Plan Adopted

The second proposition of "all generation" was finally adopted. With the fact established that it was impossible to work out a satisfactory purchase scheme, either for all or part of its power, there was only one proposition left for the tramway company and that was to increase the generating capacity. The contract with the hydro-electric plant was expiring and could not be renewed on the old basis, so inquiries were made for one additional turbine unit of 10,000 kw. or larger capacity, which with No. 8 would have given approximately 20,000 kw. modern generating capacity. Proposals were solicited from the various manufacturers, estimates prepared and plans started for the addition of one new unit. There was sufficient building capacity to house this unit and sufficient boiler capacity available to supply the necessary steam requirements.

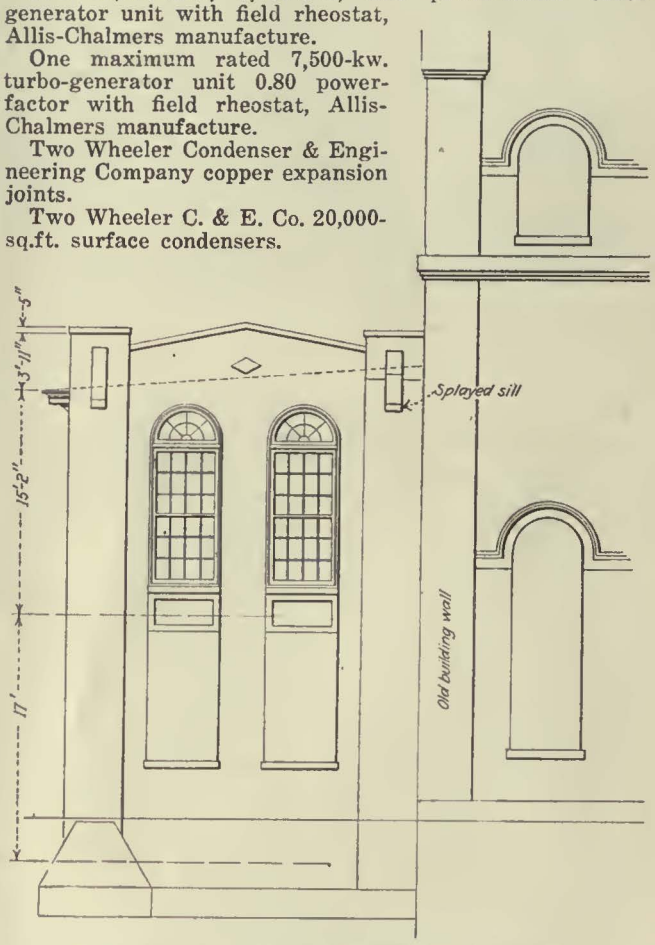
While securing bids the company's attention was directed to an advertisement by the government offering for sale generating equipment at one of the arsenals. The specifications of this equipment were identical with those covered in the specifications for the proposed additional capacity. Negotiations were started and resulted in the purchase of this equipment, which included the following:

One 10,000-kva., 8,000-kw., 0.80 power-factor turbo-generator unit with field rheostat, Allis-Chalmers manufacture.

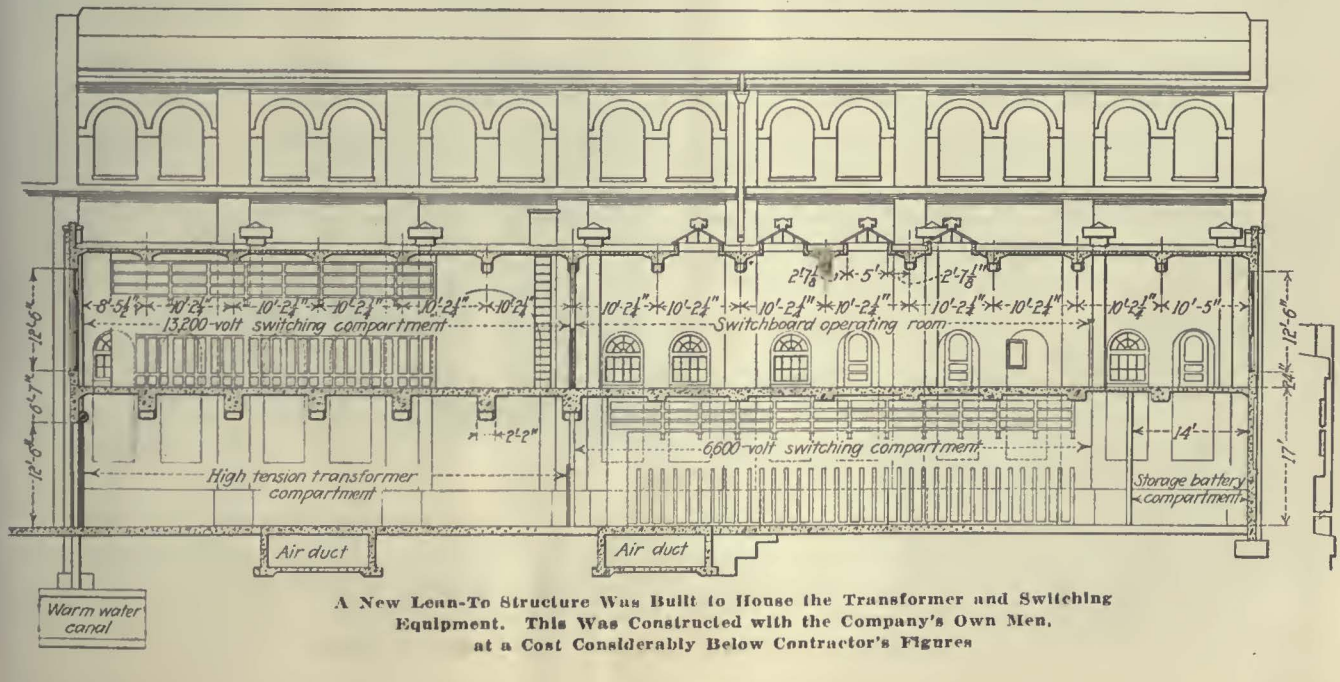
One maximum rated 7,500-kw. turbo-generator unit 0.80 power-factor with field rheostat, Allis-Chalmers manufacture.

Two Wheeler Condenser & Engineering Company copper expansion joints.

Two Wheeler C. & E. Co. 20,000-sq.ft. surface condensers.



End View of Addition Housing the Transformer and Switching Equipment



A New Lean-To Structure Was Built to House the Transformer and Switching Equipment. This Was Constructed with the Company's Own Men, at a Cost Considerably Below Contractor's Figures

ENERGY COST ON DENVER TRAMWAY, 1910-1924

Year	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923*	1924†
Energy generated and purchased, cost per kilowatt-hours (cents)	0.81	0 89	0 82	0 88	0.92	0 87	0.77	0.70	0.72	0 80	0.84	0.88	0.79	0.74	0 68
Pounds of coal per kilowatt-hour	4.97	5.03	4.91	4.89	4.90	4.48	4 19	3.94	2.51	2.46	2.57	2.55	2.55	2.47	2.53‡

*First new unit tried out November, 1923.
Both new units in service and old machines shut down—Nos. 8, 9, 10 in regular service and No. 4 as standby.
†Colorado lignite slack, average about 9,000 B.t.u.
‡Four months.

Four Wheeler C. & E. Co. hot well pumps direct connected to G.E. turbines.

Two Wheeler C. & E. Co. centrifugal air pumps direct connected to G.E. turbine.

Two Wheeler C. & E. Co. 24,000-gal. per minute circulating pumps direct connected to Allis-Chalmers motor with compensator.

Three "Rex" revolving intake screens, with motor drives.

Two Crane Company steam separators.

One General Electric Company 100-kw. exciter with field rheostat direct connected to G.E. turbine.

One G.E. 120-kw. exciter with field rheostat, direct connected to G.E. motor with compensator.

One "Northern" 50-ton electric traveling crane with 10-ton auxiliary hoist.

Three 750-kva., three-phase, 25-cycle, 6930/13860Y/480Y, G.E. transformers.

One Laidlaw-Dunn-Gordon 600-cu.ft. air compressor belt driven by G.E. motor with compensator.

One Allis-Chalmers 400-gal. per minute centrifugal boiler feed pump direct connected to Allis-Chalmers turbine.

One Allis-Chalmers 300-gal. per minute centrifugal service pump, direct connected to Allis-Chalmers turbine.

Two American Spray Company 25,000-cu.ft. per minute air washers with motors.

This equipment was new; some of it had never been uncrated; one of the units had been partially set up and the other was on the floor just as taken off the cars. It developed that these two units, having a total capacity under the conditions obtaining in railway operation of nearly 20,000 kw., which had never been used, could be purchased at a reasonable price. It was impossible to negotiate with the government for the purchase of one machine, so therefore, inasmuch as they and their auxiliaries were so well suited to the needs of the Denver Tramway, both units were purchased and installed. The net result is that this power plant is thoroughly modernized and has sufficient capacity to produce power economically for years to come. From a study of the load forecast it was apparent that a single 10,000-kw. machine would have given sufficient capacity only until 1926.

Installation of New Equipment Has Given Railway Adequate Capacity

The two units purchased from the government are known as Nos. 9 and 10. They are located in the power house in the same position as No. 8, set on reinforced concrete foundations, column design. The condensers are at right angles but directly underneath the discharge end of the turbine, close connected. These condensers are Wheeler C. & E. Co. 20,000 sq.ft. capacity ultimate, now equipped with 12,500 sq.ft. of tubes. They are served with Wheeler C. & E. Co. hot water pumps connected to G.E. turbines and Wheeler C. & E. Co. centrifugal air pumps connected to G.E. turbines. There are two hot well pumps for each condenser. Each condenser also has a Wheeler C. & E. Co. circulating pump direct connected to an Allis-Chalmers motor. Allis-Chalmers service pumps of 300 and 400 gal. per minute are installed. The air intakes to the generator are protected with an American Spray Company 25,000-cu.ft. per minute air washer, motor operated.

The high-tension switches for this station had been located in a building that had long since become overcrowded, and it was necessary to build a new structure to house this equipment. This new switch house is of concrete lean-to construction, two floors, housing the high-tension transformers, 13,000-volt concrete bus-cell structure and the 6,600-volt concrete bus-cell compartments; also the generator feeders and the auxiliary switchboards, which in the old arrangement were located in the lower part of the old engine room. The transformers, oil switches and bus construction are of modern design.

All of the foregoing work was undertaken and consummated by operating forces of the tramway company with the exception of one Allis-Chalmers superintendent of erection and the construction costs were appreciably lower than those estimated in the bids which were submitted by contractors.

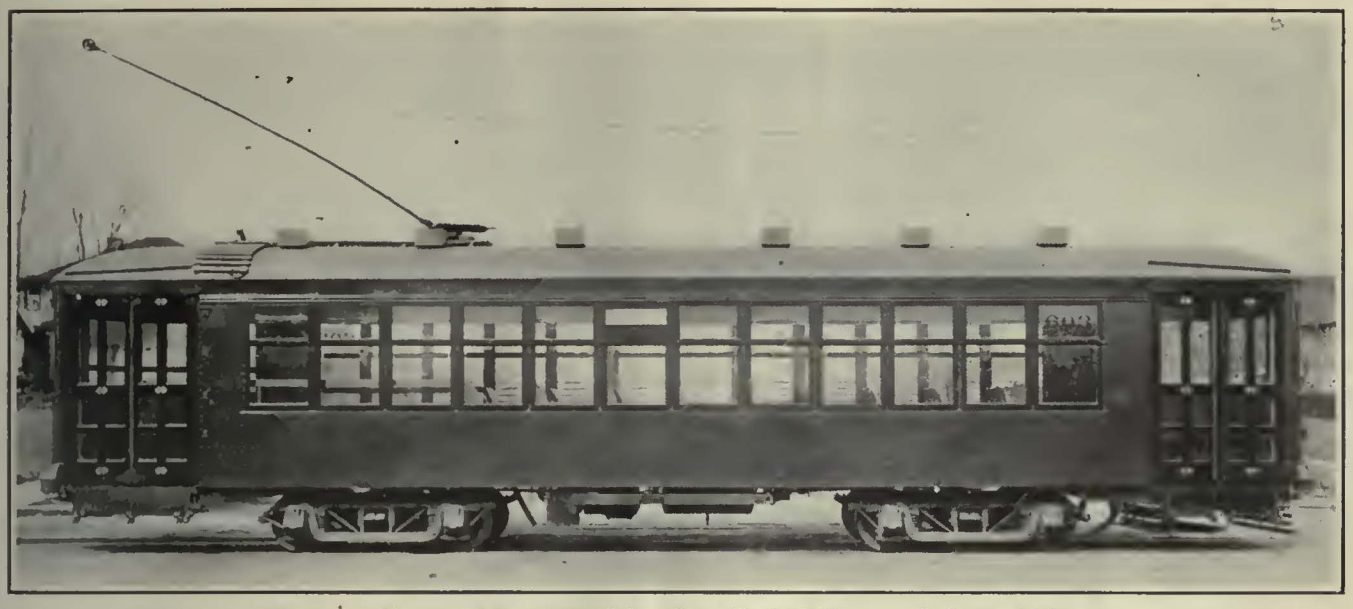
The new equipment was installed with no interruption of service. The turbines were erected, tested out and placed in operation in conjunction with the old equipment. At no time was it necessary to shut down the plant on account of this construction work. The changeover from the old switch house to the new was carried on under operation.

Painting to Widen the Car

AN UNUSUAL camouflage scheme is being tried on the dash painting of a number of the cars of the Schenectady Railway. The design shown in the accompanying illustration is worked out to give the appearance of greater width than actually exists. By an optical illusion the car at a casual glance appears to be several inches wider than it actually is and the object of this is to deceive automobilists and truck drivers into giving the car a little more room than they ordinarily would. It is being tried out by Niles Persons, master mechanic of the railway. It is believed that it will reduce accidents of the side-wiping type between street cars and other vehicles on the street.

How Schenectady Cars Are Camouflaged to Give Appearance of Greater Width

Another peculiar painting design was tried on the new cars of the Brooklyn City Railroad, but in this case it was for the purpose of attracting attention to the new cars as a means of inviting traffic and informing passengers that it was one of the new front-entrance, center-exit type cars.



These Low-Floor Cars Have Proved Popular with the Riding Public in Des Moines

Medium-Weight Low-Floor Cars in Des Moines

New Cars Have Proved Popular with Passengers—Single-End Construction Gives Seating Capacity of 48 and Total Weight of 38,000 Lb.

TEN new cars of moderate weight and pleasing appearance, which were put in service in Des Moines early in the summer, have proved very popular with the riding public. These cars are arranged for single-end operation and are equipped with four G.E. No. 247 motors and K-35 control. They are of the straight side girder type of construction with arch roof and folding doors and steps at front and rear. The platform floors are carried flush with the car body floor, and a 3½-in. ramp from the bolsters to the end sills serves to reduce the height of steps.

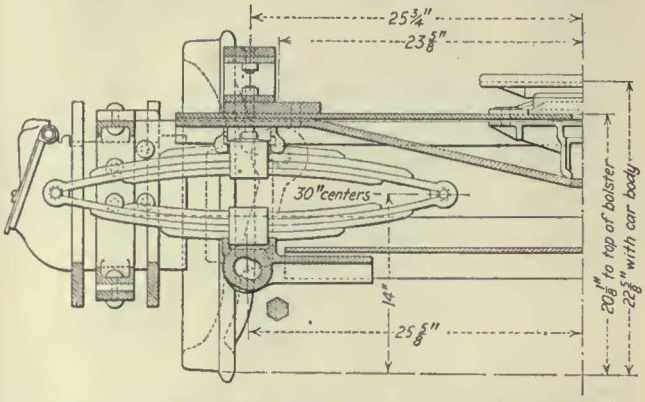
Side posts are spaced on 2-ft. 5½-in. centers, and with an over-all length of 46 ft. a seating capacity for 48 passengers is obtained. By carrying the inside lining close to the girder plate the cross-seat width is made 35 in. and the aisle is 25⅜ in. between the seat aisle plates. The seat backs are offset at the aisle end so that the distance between the edges of the backs across the aisle is 29⅜ in.

Cherry is used for the interior trim. The headlinings are painted cream color and all interior rails and stanchions are of aluminum.

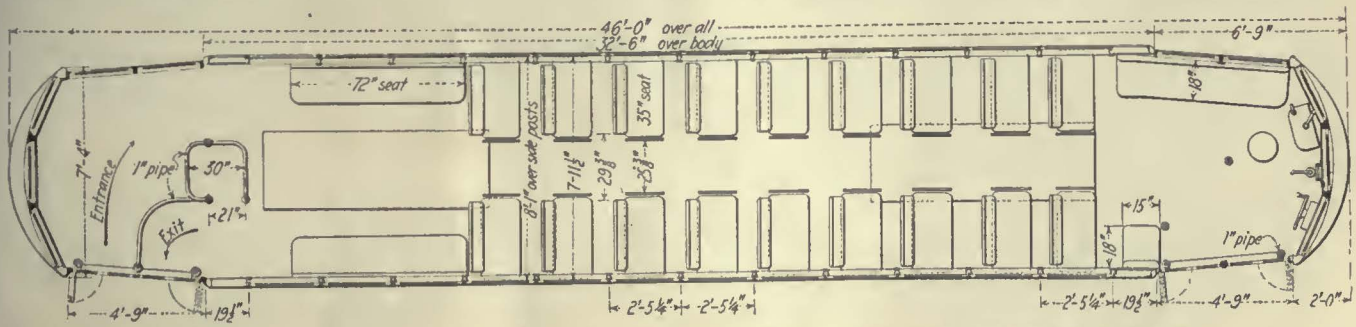
The principal dimensions and distribution of weight are as follows:

Length over all	46 ft.
Width over all	8 ft. 2 in.
Bolster centers	20 ft. 6 in.
Side post centers	2 ft. 5½ in.
Width over side posts	8 ft. 1 in.
Height over trolley board	10 ft. 11 $\frac{9}{16}$ in.
Height from rail over car floor	33½ in.
Height from rail to bottom of side girder	26 $\frac{13}{16}$ in.
Height from rail to platform floor	30 in.
Height from rail to step	15⅝ in.
Height from step to platform floor	14⅜ in.
Wheel diameter	26 in.
Wheelbase of truck	5 ft. 6 in.
Weight of car body complete	20,000 lb.
Weight of truck with four GE-247 40-hp. motors	10,000 lb.
Weight of equipment	8,000 lb.
Total weight completely equipped	38,000 lb.

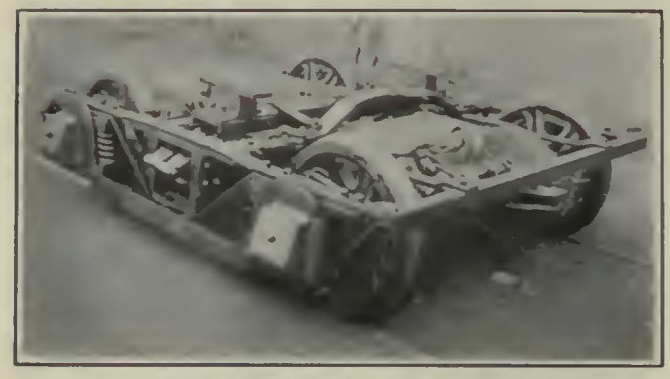
The cars were built by the McGuire-Cummings Manufacturing Company, and are mounted on McGuire-Cummings type MC-62 low-level trucks. These trucks are



The Arched Brake Beam on the Special Type of Low-Level McGuire-Cummings Truck Has Two Long Shoes that Ride on Longitudinal Straps and Keep the Beam from Tilting



Single-End Construction Gives a Seating Capacity of 48—Folding Doors Are Pneumatically Operated



Low Car Level and Ample Road Clearance Are the Objectives in the Truck Design

of the equalizer type and are specially designed to give the low level and at the same time maintain a minimum clearance of 4 in. above the rail. The brake rigging is arranged with an arch brake beam having a long forged sliding shoe at each end which rides on top of longitudinal members extending from the transom to the end frame, and which are designed to keep the brake beam from tilting. The double-length brake hangers are provided with a spring on the top to prevent chattering. Compensating-type full elliptic bolster springs are arranged to provide for variation in the live load.

All wearing parts of the trucks are case hardened, including pins and bushings. Pedestals are made of forged steel, machine finished. A cast-steel yoke connects the 2½-in. x 7-in. flat-bar transom to the side frame, and heavy gussets are provided to reinforce the corners and support the brake rigging. The bolster is of built-up construction, composed of channels and plates. Journals are 3¾ in. x 7 in.

Four GE-247 40-hp. motors provide the motive power for these cars and the control is type K-35-JJ. The detailed specifications and list of equipment are as follows:

Compressor .....GE CP-27	Trolley base US-131
Seats .....Heywood-Wakefield upholstered rattan	Door equipment, National Pneumatic Co
Heaters, Consolidated Car Heating Co.	Headlight .....Golden Glow
Thermostats, Railway Utility Co.	Sand trap, Des Moines standard
Ventilators, Railway Utility Co.	Outside paint, Pratt & Lambert Vitrolite
Curtain fixtures....Ring No. 88	Axle.....Standard Steel Works
Curtains, Double-face pantasote	Wheels .....Illinois Steel 26-in. rolled steel
Hand brake .....Peacock	Lifeguards .....H-B
Headlining .....Agasote	Register .....International R-5
Control .....GE K-35-JJ	

Saving by Radio Announcing

AN INTERVIEW in the Detroit *News* with H. M. Gould, assistant general manager of the Department of Street Railways, Detroit, gives the savings up to date from the use of radio for summoning repair crews. An account of the method followed in this matter was published in the ELECTRIC RAILWAY JOURNAL for July 12.

During May, June, July and August of this year, 113 radio calls went to the emergency trucks, whose crews were able to spend 3,655 hours at routine work, when, without the radio, they would have remained idle. The saving to the Department of Street Railways is estimated at $14,109.19 for the four months. The cost of operating and maintaining the receiving sets and the salary of the additional radio operator required is placed at $907.19, making a net saving to the city of $13,202.11.

The broadcasting at present is done only between 11 a.m. and 3 a.m., except on Sundays and holidays. Later, it is expected that the system will be in force 24 hours a day. It is also planned to equip with radio the six construction trucks now in use by the department, one fire truck, and the track department's two emergency trucks. In addition to its use by the Department of Street Railways, the broadcasting station is used to call the "cruisers" and "flyers" of the Detroit police department. In fact, the station was installed primarily for this service, and the use for the street railways came later. The police cruising cars are equipped with portable receiving sets and have no difficulty in receiving messages while they are running at a high rate of speed.

Auto Truck Sands Track in Utica

BECAUSE track is sanded ordinarily only on the grades in Utica, the New York State Railways has found a small Ford auto truck to be superior in that city to a trolley sand car for this work. It is stated that much time is saved by its ability to cut across from one street to another and that it is cheaper to operate than a railway car. A 4-ft. piece of air hose extends from a hole in the bottom of the truck down to the rail. The position of the free end is controlled by a light steel rod manipulated by a man who sits on the back of the truck, as shown in an accompanying illustration.

Track in Utica Is Sanded by Means of This Small Auto Truck

The flow of sand is stopped simply by pulling up the end of the hose.

In winter this truck is also used to carry around men who salt the track switches. Two men on the truck take the place of about 12 men who formerly were required for this work. During the construction season the truck is used also to deliver materials for small maintenance jobs.

Careful Engagement Reduces Turnover

The Method of Engaging Trainmen on the System of the United Railways of St. Louis Has Secured an Excellent Selection and the Turnover Has Become Negligible—The Forms Used in Employing and Training Men Show the Care Used

THE success of a method is proved by its disuse. This may seem a contradictory statement, but it is true when applied to the employment methods of the United Railways of St. Louis. The plan followed in engaging men is the result of extended experience and has brought into the service such a group of satisfied and satisfactory employees that the turnover has become very low. In fact, the report of the employment department on July 1, 1924, that no new platform men had been hired since the corresponding report of May 1, and that no new men would probably be required until the end of August, shows a notably satisfactory condition of affairs. It should be said that the number of motormen and conductors on the company's payroll on May 1, 1924, was 3,748, which is a large number to keep practically intact in these days of business activity.

Of course, a large factor in this low turnover is the fact that excellent relations exist between management and men, and this keeps down both resignations and discharges, but an equally large factor in the situation is the care taken in the selection of the men in the first place. Every effort is made to discover the unfit man before he is engaged. This is of benefit to both company and man. Where care is taken to select men qualified for the work, the most frequent cause for turnover disappears.

Applicants for employment are first interviewed by Joseph D. Crafton, who has long held the position of employment superintendent of the company and has the faculty of being able to judge very accurately from the manner in which a new man talks and carries himself whether he has the makings in him of a good and steady trainman. Mr. Crafton's practice, when a man applies for a job on the road, is to let him do most of word and listening to him with a great deal of sympathy.

Preliminary Application Blanks

This interview being satisfactory, the new man is asked to make out the preliminary application blank, shown in the first form. If the answers to the questions on this blank meet the requirements, the applicant goes to the company's medical director to receive a physical examination. This calls for a test of the sight and color perception of right and left eye and the hearing of each ear by watch and voice, as well as the condition of lungs, heart, spine, etc. The applicant is also asked as to the extent of his use of alcoholic beverages and tobacco. The blank carries front and back diagrams of the human form upon which any peculiar characteristics or marks of the applicant can be indicated by the examiner. This blank is signed by both the applicant and the medical director, and then it is returned to the superintendent of employment.

If the applicant has passed successfully all tests up to this point, he receives a printed copy of the specifications for uniform, and also a more extended form of application blank, on which he enters his full name, date and place of birth, physical characteristics, address, length of time a resident of St. Louis, number of dependent relatives, previous occupation, and name of previous employers. A statement on this blank warns the applicant that $50 in cash will be needed by him for the purchase of his uniform and for living expenses before he begins to earn any wages. The employment blank also carries the following printed agreement, with place for affidavit by a notary public.

In consideration of being permitted to make application for employment by Rolla Wells, receiver of the United Railways Company, I hereby agree with Rolla Wells, receiver of the United Railways Company (hereinafter called "employer")

To deposit with said employer the sum of $5 as a surety fund for the faithful performance of my duty.

To work under instruction on and during trial period, without pay, for such time as said employer may deem necessary.

That if I am discharged, or leave said employer's service voluntarily at any time during or after said trial period, I shall have no claim against said employer for services rendered or expenses incurred by me during said trial period.

That wages are to be paid only for such time as I am engaged in operating or running a car for said employer, or in actually doing such other work as may be assigned by said employer computed at the current rates shown on the employer's printed schedules or bulletins.

That these wages are satisfactory to me, and, if I am employed by the said employer, to work contentedly and faithfully.

That I will make no charge, claim or demand against said employer for the time spent in reporting for duty at the request of said employer or any foreman or agent thereof, or waiting after so reporting before actually beginning work.

I hereby warrant the truthfulness of the above statements, and certify that I can read and write the English language and that I personally filled out this application, and enter into the following:

[Read every word of this carefully as you will be held to a faithful performance of the conditions set forth.]

Further Agreement

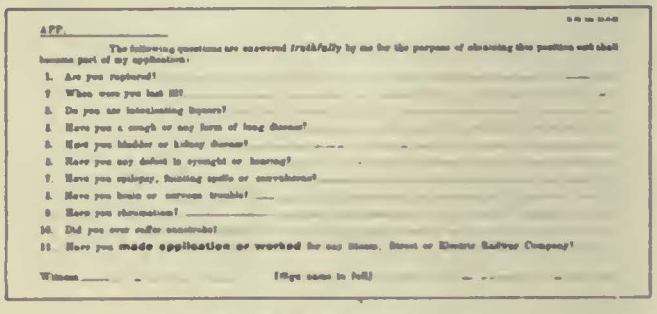
In case I am employed by Rolla Wells, receiver of the United Railways Company of St. Louis, as a motorman I ..... hereby agree that I will abstain from the use of intoxicating liquors, and will at all times be strictly temperate; that I will faithfully observe all the rules and regulations governing employees which the management may from time to time establish, and willingly perform all duties assigned me; that any wages earned by, or owing me, shall not be due and payable until the regular pay day of the said employer. When my employment with said employer ceases, I will at once return to him all badges or other property of said employer in my possession, or pay for the same at a price fixed by the said employer.

And I further agree that I will at once return to said employer any badges or other property of said employer, or any property I may have received from any other source arising out of my connection with said employer after I have been discharged, or my employment in any way shall cease, and agree that 25 cents per day can be deducted from

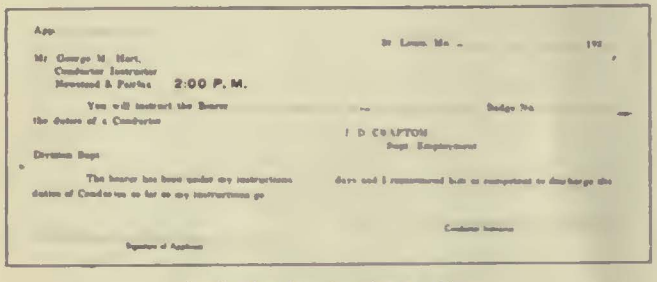
my pay due me for each and every day that I fail to return same, as liquidated damages for such failure.

And I further agree that any wages due from said employer when my employment under this contract shall terminate shall be retained by said employer until said property is by me delivered to said employer.

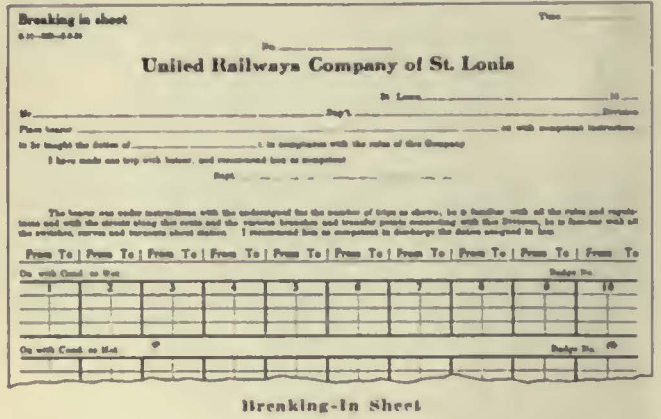
I am informed as to the character of the work for which I am an applicant, its conditions and requirements, and rate of wages, and I am in earnest in my desire to enter and remain in said employer's service, and as evidence that I am not trifling with the question or uselessly consuming the time of the employer's officials in considering my appli-



Preliminary Application Form



Authorization for Instruction



Breaking-In Sheet

cation, I agree that if I voluntarily leave the employer's service within ninety days after the date of my employment the company shall retain as liquidated damages the five dollars ($5) deposited by me upon entering the company's service.

I have made truthful answer to every question in my application; as a guarantee of which I hereby agree that if at any time it develops that any written answer I have made is untrue or if said employer should find my references or my past record not entirely satisfactory I will accept discharge from the employer's service without protest.

I promise to deal honestly with said employer, and if at any time in the performance of my duty of motorman I fail to use my utmost endeavor to have a fare deposited in the box or to get a proper ticket or transfer or other authorized form of transportation from each passenger boarding car, or if I in any manner become possessed of a fare and do not deposit same in the box, or in any manner prevent the company coming into possession of its rightful fares, I agree to accept discharge without protest.

To provide myself with a standard uniform in accordance with the rules and regulations of said employer before assignment to duty.

CAUTION

Statements made by you and references given in your application are fully investigated. False statements render you liable to a fine or imprisonment under the Penal Law.

I have read all of the above, I understand it, and sign knowingly and voluntarily.

Two other signatures are required of the new man. One relates to his wages during the breaking-in period and appears on the application blank. It reads as follows:

I agree to break in as motorman on my own time without any remuneration from Rolla Wells, receiver of the United Railways Company of St. Louis. If I finish the breaking-in period, said receiver is to pay me $15 for the breaking-in period (not less than fifteen days), provided I remain in his service ninety days or longer; said payment to be made after I have been in his service thirty days and passed all the requirements. But, if I am discharged or resign, before I have been in his service ninety days, or for any reason fail to remain in his service ninety days, the $15 advanced me shall be taken from any money due me at the time I leave his service. (*Experienced men do not receive any money for breaking in, neither do men who have been a conductor or motorman, in changing from one position to the other.*)

The other agreement relates to the use of intoxicating liquor. Every employee has to sign an abstinence pledge reading as follows:

I, ..., hereby promise that, in consideration of being retained in the service of the United Railways Company, I will, whilst I remain in its service, totally abstain from the use of all intoxicating liquor, both whilst on duty and off, nor will I visit or frequent saloons or gambling places, and I further stipulate that if I violate this agreement, I will accept discharge without notice and will forfeit to the company all wages due me or money in the custody of the company at the time of discharge.

This pledge is subscribed and sworn to before a notary public.

On the day that the new employee files his final application, he also receives his badge. As employee transportation is entirely on badge, the new employee agrees to use it only in accordance with the regulations of the company, to deposit a dollar as security for its proper use and care, and to return it when employment ends or when requested to do so. In case it is not so returned, the employee agrees to pay the company for each day the badge is retained the sum of 50 cents as liquidated damages. For office employees the deposit required for a badge is $2 instead of $1. Two card records are kept of all badges issued, one under the name of the employee and the other under the number of the badge.

After this application for employment has been accepted by the company and the applicant has purchased his uniform, the company's photographer takes two photographs of him for the company's files. One of these photographs shows him with his cap on and one without the cap. The applicant is then assigned to some depot.

Forms Used During Instruction

When he goes to his depot, the new employee, if a conductor, carries with him a blank like the second one reproduced in which the superintendent of employment authorizes him to receive instruction. A blank very similar to the one illustrated, but addressed to the motorman instructor, is used for applicants for the position of motorman. As will be noticed, the blank carries space for the signatures of both employee and instructor when the new man has become competent to

operate a car so far as that particular instruction goes. During this period of instruction, the company keeps a record of the names of the instructors for each new man on what is called a "breaking-in" sheet. The upper part of one of these sheets is reproduced. In addition to the names of the instructors and the time they spent with each man this blank contains, at the bottom, space for the signatures of the two supervisors and the superintendent in charge, the name of the depot to which the man is assigned and the name of the foreman. When considered by these officials to be competent, the man is told to report to the employment office for his final instructions.

At this time he brings his filled-out "breaking-in sheet," which is stamped with the date and the number of days that he has been breaking in on the road. He then receives his "ready for work sheet," illustrated, in which he acknowledges the receipt of his badge, ticket punch and pocket book, all of which he agrees to surrender on leaving the employ of the company or pay for them at a definite price. This form also serves as authority to the division superintendent to put the new man at work. At this same time the new man signs and dates another card, known as his "signature reference card," which goes to the general timekeeper, who keeps these cards on file for reference as to signatures. At the same time he receives a card explaining that every day of the year the name and number of hours work by each of the conductors and motormen employed reach the accounting department to be entered on the payroll. To avoid errors in crediting this time, experience has shown that observation of the following rules is essential:

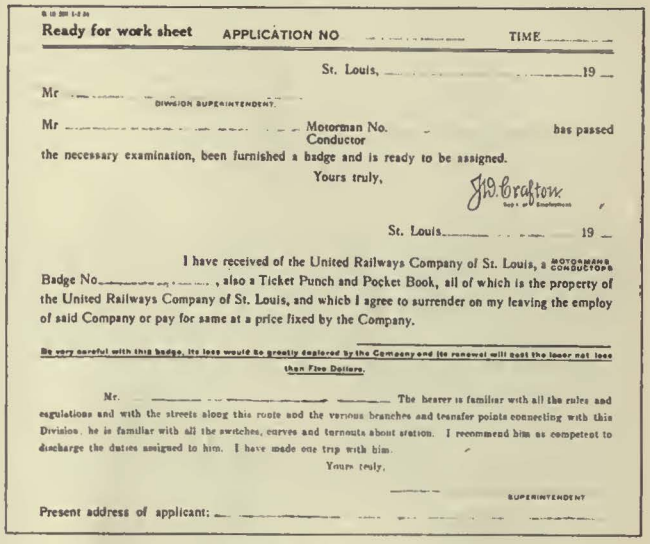
1. That the signature be made the same in every instance.
2. That the name be plainly and legibly written.
3. That the pencil be used rather heavily, making the signature plain and black.
4. That the signature bear either the usual two initials, first name in full with middle initial or, when the person has no middle initial, the first name in full, though usual abbreviations, such as Geo., Jno., etc., may be used, if desired.

Before motormen are sent to the depots to which they are assigned, they go back to the motorman and instructor for final instructions, but conductors go immediately to their depots.

During their breaking-in period both conductors and motormen are taught the proper way to fill out an accident report. The company uses two forms of accident reports, one to cover collisions with vehicles, persons or cars, the other all other kinds of accidents. The instructions at the top of the blank say:

> Conductors and motormen are required to make written report of all accidents, disturbances or occurrences out of the ordinary. Collisions, accidents, persons falling on the car, falling getting on or off, falling approaching the car or after they have safely left the car, fights, quarrels, disputes as to fares, transfers or change, injuries from any cause, even though the persons may say they are not hurt; report it all; do not try the case and conclude that a report is unnecessary; that is the duty of our attorneys after reading your report. Give names and addresses of all injured persons and witnesses. Take pains in making report; write plainly, conductor and motorman both signing same report.

Before they start in, each employee receives a rule book, for which he signs a receipt and agrees to return on request or when he leaves the service; a map of the city of St. Louis, showing the tracks of the company and those of connecting electric railways; an up-to-date list of the numbers of lost or stolen badges, so that these badges can be taken in if they are presented for transportation, and a witness slip book. He also receives three envelopes addressed to the superintendent of employment, which he is asked to send to three different persons for letters of reference, to be mailed back direct to the superintendent of employment. Conductors also receive a witness slip book and punch and motormen a small book of instructions on the use of



Ready for work sheet APPLICATION NO ..... TIME .....

St. Louis, ... 19 ..

Mr ..... DIVISION SUPERINTENDENT.

Mr ..... Motorman No. ..... Conductor has passed the necessary examination, been furnished a badge and is ready to be assigned.

Yours truly,

J.W. Crafton

Supt. of Employment

St. Louis ..... 19 ..

I have received of the United Railways Company of St. Louis, a MOTORMAN'S CONDUCTOR'S Badge No. ....., also a Ticket Punch and Pocket Book, all of which is the property of the United Railways Company of St. Louis, and which I agree to surrender on my leaving the employ of said Company or pay for same at a price fixed by the Company.

Be very careful with this badge, its loss would be greatly deplored by the Company and its renewal will cost the loser not less than Five Dollars.

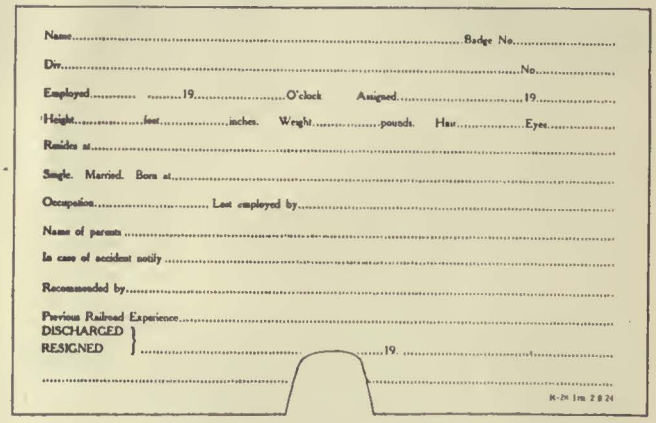
Mr. ..... The bearer is familiar with all the rules and regulations and with the streets along this route and the various branches and transfer points connecting with this Division. he is familiar with all the switches, curves and turnouts about station. I recommend him as competent to discharge the duties assigned to him. I have made one trip with him.

Yours truly,

..... SUPERINTENDENT

Present address of applicant: .....

Ready for Work Sheet



Name ..... Badge No. .....

Div. ..... No. .....

Employed ..... 19 ..... O'clock Assigned ..... 19 .....

Height ..... feet ..... inches. Weight ..... pounds. Hair ..... Eyes .....

Resides at .....

Single. Married. Born at .....

Occupation ..... Last employed by .....

Name of parents .....

In case of accident notify .....

Recommended by .....

Previous Railroad Experience .....

DISCHARGED } ..... 19 .....
RESIGNED }

.....

R-24 1m 2 8 24

Card Used for Motormen's Record

the Economy meter. The company also has a blank form of letter used to send to references.

All of these forms, when filled out and returned to the employment and record department, are filed in a special envelope, known as the application envelope, with appropriate filing data on the face of the envelope.

Records After Engagement

The company keeps a card list of all employees in the general form of that illustrated on this page. The one shown is on manila stock and is for motormen. A similar card on blue stock is used for the records of conductors. Supplementary cards, somewhat smaller and of the same colors, which can be clipped to these cards, are employed to record any changes in the wages per hour paid to the individual employees.

No wages are paid to new employees for their time during their breaking-in period unless they remain in the service for 90 days. In that case, conductors receive $10 for the last ten days and motormen $15 for their last fifteen days of breaking in. When these

payments become due, they are made on a special form of check on which the application number, badge number, date of employment and name of employee are given, with a space on which the employee receipts for the payment.

When an Employee Leaves

When a conductor or motorman leaves the service or is suspended, the superintendent or foreman in his division forwards to the employment and record office a statement on a blank provided for that purpose, giving the reason for his discharge, resignation or suspension, the date of his employment and his application number, badge number and future address. On receipt of this information, the employment office immediately notifies the claim department, sending at the same time a record of all accidents in which that particular conductor or motorman was concerned, so that if the claim department needs his testimony in any case, a deposition can be taken from him before he leaves.

After a conductor or motorman has left the service, his records are transferred from a "live" to a "dead" file, but they are retained intact for possible use.

Boston Transit Problems Explained in Radio Interview

AN INTERVIEW with Edward Dana, general manager of the Boston Elevated Railway, Boston, Mass., in which many questions of popular interest regarding that system were answered and broadcasted, took place on the evening of Oct. 24 at station WEEI of the Edison Electric Illuminating Company of Boston. Mr. Dana has given a number of radio talks in times past on the Boston transit situation. Mr. Dana asked and answered questions on traffic, mileage, employees, revenue, safety in operation, motor bus operation, electrification, etc. He concluded his talk by narratine the most humorous story that has come to his attention in the long life of his service on the Boston "L."

Hyatt Roller Bearings Are Mounted in Totally Inclosed Journal Boxes Arranged to Be as Nearly Oiltight as Possible

Chicago Surface Lines Trying Roller Bearings

A SAMPLE train of the Chicago Surface Lines consisting of a motor and trail car unit operating on the Madison Street line has been equipped for experimental purposes with Hyatt roller bearings on all journals of both motor car and trailer.

This installation has been made to obtain data on the effect of these bearings on the power consumption, and also to determine by actual operation over an extended period of time the way in which this type of bearing will stand up under the operating and maintenance conditions encountered.

A hardened steel sleeve is pressed on each journal to take the wear of the rollers, and the front covers of the boxes are tightly bolted in place to make the boxes as nearly oiltight as possible.

As the installation has been in service for only a few weeks, no definite data on the relative power consumption on this train as compared with standard babbitt-lined journal bearings is as yet available. However, in these few weeks of operation, no difficulty has been experienced.

Roller Bearings Are Being Tried Out on the Journals of This Two-Car Train Operated on the Madison Street Line, One of the Heaviest of the Chicago Surface Lines

Applications of Modern Methods in Accounting Practice

By W. L. Davis
Auditor Lehigh Valley Transit Company, Allentown, Pa.

In This Concluding Installment of This Series on Present-Day Electric Railway Accounting Practice, the Principal Topics Discussed Are Budgets, Fixed Capital Records, Daily and Weekly Reports and the Use of Machines in Accounting Offices

THE executives of any electric railway company should be furnished with operating and construction budgets, either annually or at specific periods. These budgets should include not only the estimated income and expense for the particular period covered, but also the construction work considered necessary or desirable during the same period, the net return after operating expenses, fixed charges and dividends being supplemented by such new money as might be required for the company's construction program.

While the budget may be compiled by the accounting department, it is obvious that the basic figures used be furnished by operating engineers and others familiar with the physical requirements of the company, this information being supplemented by a study of economic conditions to the extent that earnings may be forecasted to a comparatively accurate degree and increases or decreases to operating expenses may be anticipated to some extent.

In the preparation of the budget, the income account should receive attention before the amount of new money is determined. In order to do this it will be necessary to study current conditions and determine the increases or decreases in the earnings as compared with the prior year, taking into consideration any economic conditions which may affect the return. If the earnings are compared from day to day and month to month the percentage of comparison arrived at may be applied to the earnings of the year just passed and figures for the coming year forecasted accordingly.

Operating expenses should be reviewed in detail and present average costs applied to the operating and maintenance schedule as determined for the coming year by the operating department. This should also take into consideration economic conditions. The schedule of operation and maintenance work should of course be compiled on a tentative basis for comparison with the income as forecasted and changes made accordingly before the budget is finally prepared and furnished to the various departments. The operating expense budget should be compiled in such a way that each department head will get the benefit of the estimated cost for his department as he should compare the estimates with the actual costs from time to time as they are incurred. The Operating Expense Budget should also contain the necessary figures on general expenses and taxes. These figures can usually be determined by the accounting department to a fairly accurate degree.

In connection with the operating expenses, there should also be included any contemplated expenditures for increasing the amount of material on hand for operating purposes, with particular reference to fuel stock. Fixed charges are easily determined and may be included by the accounting department as required. Dividends should be included in the budget only after the company's policy is determined.

A Typical Modern Railway Accounting Office, Showing Extreme Use of Tabulating Machines

Construction expenditures should be included after the cost of the various jobs has been determined by the department heads responsible. It might be well to compare the contemplated construction expenditures with the result of the estimated income account before the budget is finally prepared, as it might be necessary to eliminate some of the items, particularly if conditions are such as to render new financing difficult.

After the construction expenditures are finally determined upon, the amount of new money required should be computed and reflected in the budget either as cash to be raised from the sale of bonds or as an item subject to short term financing. This latter subdivision of course depends to some extent upon the class of construction work contemplated and the subdivision of the final accounting between capital and non-capital expenditures.

The preparation of the budget as described above cannot be handled with any degree of satisfaction unless the records of the company are drawn up in such a way that

EDITORS' NOTE.—The previous installments of this article appeared in the issues of this paper for Sept. 27 and Oct. 4.

the revenue accounts and details of charges to operating expenses are readily available. Proper comparisons cannot be made between the actual transactions of the prior year and the contemplated operations of the coming year unless the factors entering into both are easily comparable with each other.

It would appear that there is a responsibility on the part of the head of the accounting department to prepare his daily records in such a way that this information can be had, and toward this end it is recommended that the daily transactions be recorded in self-analyzing form as far as possible. This information should be available to the operating and construction engineers who are responsible for the preparation of the basic figures for the budget.

It is obvious that the conditions in our industry are such that it would be somewhat difficult for a department head to live up to the letter of his budget and at the same time take care of unforeseen requirements as they come up, and accordingly, it will often be necessary to prepare revisions of the budget and supplements thereto. These should be prepared along the same lines as the budget itself and should cover the same period.

It will also be advantageous for the company to prepare at different intervals a statement of estimated cash receipts and requirements for a stated period ahead. These estimates, of course, contain the same elements as the budget, but as the budget is necessarily based upon figures which contain a certain number of accrued accounts and other similar transactions not representing actual cash receipts and disbursements, the budget and cash requirements statement can hardly be expected to parallel each other in all respects.

The statement of cash receipts and requirements should reflect the months in which the receipts may be expected and payments made, together with the dates at which temporary loans are to be made during the year. In order to prepare this statement accurately it will be necessary to review the items set up in the annual budget with a view toward eliminating from the cash statement any items representing large quantities of material to be issued from stores and similar items which must be charged to the operating and construction accounts for which no cash need be spent during the particular period. This statement should also be reviewed from time to time and changed in accordance with current conditions.

Fixed Capital Records

One of the comparatively recent developments in the electric railway industry is the fixed capital record, or perpetual inventory of property. This is not strictly an accounting department function, but the preparation and handling of a record of this kind is dependent to a great extent upon the records kept by the accounting department, both past and present.

A fixed capital record should include all of the various property units, and should be based upon a plant inventory compiled as of a specific date. This basic inventory is supplemented by additions covering new property and withdrawals covering units withdrawn from service for one reason or another. After costs are applied thereto and recognized elements of intangible costs are added, the fixed capital record may be used as a property valuation.

The preparation of the physical data and the application of intangibles are usually handled under engineering supervision, but it is often necessary to refer to the records of the accounting department to secure cost data of various kinds. This work has resulted in revealing numerous defects in the accounting records of former years, and although the present-day auditor cannot do much to correct the mistakes and inaccuracies in old records he should profit by such omissions and handle his current work in such a way that construction costs may be determined to a reasonably accurate degree.

In handling construction costs, the best results can be attained by using the work order method. A separate work order is assigned to each construction job and charges are made accordingly during the process of the work. Each work order should be reviewed by the accounting department in advance in order that proper distribution of the costs by accounts may be determined. The daily and monthly charges to the work orders should also be distributed as to accounts as the costs are incurred.

Overhead charges should be determined and applied monthly wherever possible. After the work is completed, the cost thereof should be analyzed as to labor, material, and other elements, and the complete analysis subjected to a check with the physical conditions. After the costs are subjected to the physical check, results of the work order can be included both in the general ledger and fixed capital record with the assurance that the entries in both records contain the same elements.

Property retirements can be recorded very readily if the company maintains a fixed capital record, as the description of the retired property as set forth in the fixed capital records may be supplemented by estimated costs of installation.

The fixed capital record can also be used in determining divisional investments and operating costs and will be found valuable in other ways. The initial cost of such a record is quite heavy, but if accurate construction accounts are kept, it will not be difficult to keep it up to date, thereby affording a basis for a valuation at any time.

Daily and Weekly Reports

It is very important that the executive department be advised of current conditions as reflected by the accounting department records, but the requirements of the various companies are so widely different from each other that no two managements will expect exactly the same kind of information along these lines.

The accounting records of any company can be arranged in such a way that they could, if necessary, be closed daily, but as this would entail considerable expense and require a large organization it is hardly necessary to consider it at this time. However, it will not be difficult for the accounting department to furnish daily information to the executive covering certain functions of the property. Most electric railways account for their receipts on the daily basis and it is a comparatively easy matter for the accounting department to prepare a summary of such receipts from the original records.

These daily reports should be made divisional in form and show the day's earnings on each division as compared with the corresponding day of the prior year, tabulating increases and decreases on each line, with percentages if desired. This report might also show the corresponding figures for the month to date, which can easily be compiled in cumulative form from day to day.

In this connection it might be said parenthetically that the figures for the previous year may be tabulated in advance.

It might be of interest to the operating executive if this daily report would show not only earnings, but car mileage and car hours on the various lines from day to day during the month, thereby avoiding the delay in receiving the complete operating report, as the final report must necessarily be delayed for some time after the month's accounts are closed. This information might also be supplemented by tabulations showing the various operating costs per car mile and car hour if such information is considered necessary. This report can be made to include as many daily figures as the executives may need, and if the required figures are prepared and tabulated daily as a part of the routine it will not present any serious difficulties to the accounting department.

Daily reports of cash should also be prepared for the information of the treasury department and other officials who may be interested. These reports can also be compiled on a daily basis without much difficulty if the routine is established accordingly.

Use of Machines in Modern Offices

It would be manifestly difficult for any auditor responsible for the efficient handling of an up-to-date accounting organization to attempt to get along without some of the up-to-date machines designated to reduce work and promote accuracy. We are all more or less familiar with some of these machines, but in an article reviewing the requirements of the present day accounting department it will not be amiss to compare some of the work now being done with what had been done prior to the development of this apparatus.

Almost any one knowing anything at all about office routine understands the operation of the adding machine, but it has only been during the past twenty years that these machines have been used to any great extent. In former days it was necessary to prepare trial balances and monthly reports by hand and add them mentally, but if the 1924 office were to be handled strictly on that basis it would be almost impossible to handle the current detail requirements without a substantial increase in the payroll, which would be entirely out of line with our present ideas of what this kind of expense should be.

Adding machines, both listing and non-listing, have a large field of usefulness and if properly handled will enable the accounting department to save many times the interest on the investment in the course of a few years, but on the other hand if they are not properly used they can become a burden to the organization. While it undoubtedly promotes accuracy to use these adding machines for as many different purposes as possible, on the other hand their use should not be encouraged to such an extent that the ordinary employee cannot handle the simplest kind of addition without them. The requirements of the department should be studied and machines used wherever practicable, but there are numerous small self-checking computations which properly trained clerks can handle mentally.

The routine work in the accounting department is such that computation of averages, percentages, and proration schedules are required almost continuously, and it would be manifestly difficult for any office management to handle the requirements without the use of some one of the numerous machines designed to handle problems in multiplication and division. There have been substantial developments along these lines during the past twenty years and the initial investment on these machines and the expense in carrying them are almost negligible in comparison with the benefits derived from their use. However, the use of these machines can also be developed to such an extent that the office employees are practically helpless without them, and while it is somewhat difficult to avoid this situation and still receive the benefit of the use of these machines, the auditor should watch the conditions carefully and see that the mental capabilities of his employees do not become neglected.

The development and use of the typewriter during the past twenty-five or thirty years has also brought with it a number of new inventions designed to take care of the preparation of numerous copies of reports, schedules, analyses, contracts and other tabulations and documents of every description. These inventions have enabled the modern office to turn out reports with twenty-five, fifty and one hundred copies, which would have been almost impossible under conditions that existed a generation ago.

The present requirements of the accounting department include the preparation of numerous daily, monthly and other periodical reports on financial conditions, income, details of revenue, details of expenses and the like, and as these statements usually show both red and black figures it was necessary to develop some kind of operation wherein the two could be handled at the same time. In this direction the recent inventions of the duplicating machine companies have been almost invaluable. It is now possible to insert in the typewriter a ribbon with two colors of heavy ink on it and tabulate a statement showing both red and black figures with one operation. This sheet can then be used in connection with a duplicating machine and as many copies prepared as would be required under ordinary conditions. These machines, however, are subject to some limitations, as it is not possible to procure more than one hundred legible copies at one operation and often conditions are such that only half that number can be had. In order to take care of this difficulty, a stencil machine may be used in connection with which the typist can prepare a master stencil from which copies can be run off almost indefinitely. In connection with this operation, however, it is rather difficult to insert red and black figures on the same tabulation without performing considerable additional work.

Computing and Tabulating Machines

The detail work in the large electric railway office is such that the computing and tabulating machines can also be used to advantage, especially in preparing revenue and traffic statistics and similar information where the bulk of the work is such that the assorting and assembling of such figures by hand would entail a prohibitive cost. The man in charge of this work should keep in touch with his requirements to such an extent that he can recommend the installation of these machines when economies can be effected.

During recent years the preparation of freight waybills has undergone a considerable change. In former times these waybills were made by hand and copies made by means of old-fashioned copy book

and press, but later this work, to a great extent, was superseded by the use of machines from which numerous copies could be prepared at the same time either by hand or by machine process similar to that of the typewriter.

The work in connection with counting daily cash receipts and ticket collections has also been facilitated during recent years by the invention of ticket counting and coin counting machines. By the use of these machines the accounting department has not only reduced the time required in handling this detail work but has also developed the checking of conductors' returns to a more accurate degree than was possible in the past.

There are numerous other machines of different kinds which the modern accounting department can use, and it will be of considerable advantage to those in charge of the accounting departments of the various companies to keep in touch with these inventions and see that their companies get the benefit of them as soon as possible, with due consideration for the usefulness of the machine to the particular organization and the return on the investment to the purchaser.

In conclusion it might be said that the man at the head of the accounting department of the modern electric railway should build up an organization and an accounting system that will enable him to handle present-day requirements promptly, satisfactorily and economically, and at the same time give him enough time away from routine and special requirements that he can develop his own capabilities and study the present and future requirements of his position.

Educational Program in Boston

Boston Elevated Railway Announces Five Series of Departmental Group Conferences for Employees, with Other Advanced Courses — Arrangement with Massachusetts Department of Education Effected

THE program of the educational courses to be open during the season of 1924-1925 to employees of the Boston Elevated Railway are announced in a circular just issued by Edward Dana, general manager. Altogether there are four series of group conferences for male employees, conducted respectively in the transportation, rolling stock, maintenance and power departments, and a series of conferences for the women employees, for the purpose of informing them as to some of the general problems of the railway. In each case, the conferences begin with a half-hour talk on some specific topic by a well qualified speaker, followed by a discussion occupying not more than 1 hour.

In addition to these group conferences, there will be a few general meetings during the season, at which the general manager, his representative, or an outside invited speaker will give a perspective view of some of the larger aspects of electric railway operation. A third branch of the educational work on the Boston Elevated is an arrangement with the Massachusetts Department of Education, Extension Division, by which certain courses in applied mathematics, practical electricity, and dynamo electric machinery will be open to employees if a sufficient number enroll. All these meetings begin early in November.

Most of the group conferences will be held in the rooms of the instruction school which has been fitted up at the Sullivan Square station, but some of the conferences of the rolling stock group will be held at different points in the Everett shops.

A brief summary of the scope of the topics to be pursued by the various departmental groups follows:

The maintenance group, John B. Flaherty, chairman, will hold 19 conferences, taking up such widely varied topics as track, signals, stores, equipment, accident prevention, relation of maintenance department to state, city, and town officials and to labor organizations, etc. No fee is charged for this group.

The power group, Joseph A. Howard, chairman, takes up the operation and maintenance of the steam equipment with special reference to combustion, and the operation and maintenance of the electrical equipment, including the substations and distribution. If sufficient enrollment is secured in this group, arrangements may be made with the State Department of Education, Extension Division, to furnish the instruction in the course. A nominal fee will be charged for this instruction, but it will be refunded by the trustees to all who complete the course to the satisfaction of the Department of Education.

The rolling stock group, John Lindall, chairman, will hold 20 conferences on such topics as car construction, car body repairs, trucks and truck maintenance, railway motors, control equipment, air brakes, shop practice, and buses. No fee is charged in this group.

The transportation group, E. A. Kelley, chairman, will hold 20 conferences on such topics as accident prevention and reports, relations with employees, treatment of passengers, carhouses and stations, the bus and its place in transportation, power saving, fare collection on cars, traffic surveys and time-tables and handling street traffic. No fee is charged in this group.

The women's group, Miss E. E. Mullen, chairman, will have 12 informal talks by experts if there is sufficient enrollment. The topics were selected by a committee of women employees and include accounting and auditing, accident prevention, collection and registration of fares, economical operation of cars, relations with employees, maintenance of track, snow fighting, public relations, and financial features of electric railroading. No fee is charged in this group.

Buying Coal for Employees of a Small Railway

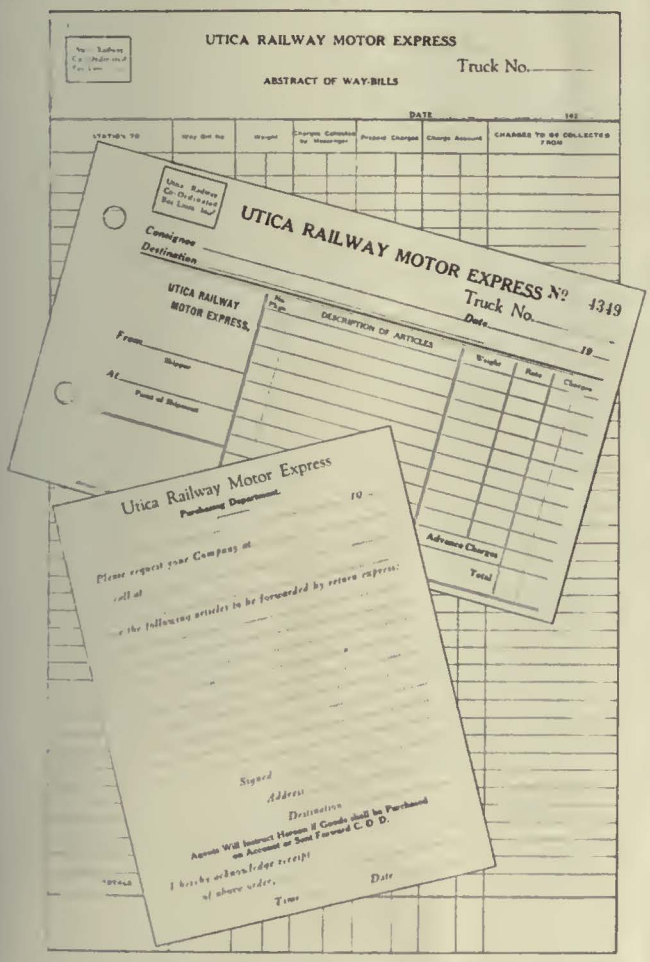
A SIMPLE method of buying coal for employees and distributing it to them has been followed for several years by the Beech Grove Traction Company, Indianapolis, Ind. Coal is purchased by the railway in carload lots. The car is placed on a convenient siding and the employees send and get the coal, paying the cost of haulage themselves. The company is paid for the coal on the installment plan.

Trucks Used by Railway for Local Freight Haulage

The New York State Railways, Utica Lines, Has Inaugurated a Trucking Service in Addition to Its Regular Electric Express and Freight Service

BY F. W. WATTS
General Express Agent New York State Railways, Utica Lines

SOME time ago the New York State Railways, Utica Lines, found that the freight and express department was steadily losing business to various unorganized motor truck competitors. In spite of the irregular service furnished by these competitors, their fluctuating rates, and the irresponsible method of operation, the merchants and wholesalers of the district were diverting more and more of their business from the railway to the trucks. It was felt by the management, therefore, that the institution of a financially responsible line, with regular service, reasonable and fixed rates and



These Simple Forms Have Reduced to a Minimum the Amount of Clerical Work Necessary

proper equipment for all year operation would recapture the business and provide a new source of revenue for the railway.

With this end in view a trucking service was inaugurated, operating from Utica as the center, and serving the towns of Rome, Frankfort, Ilion, Mohawk, Herkimer, Little Falls and Dolgeville. The equipment used consists of two 3½-ton White trucks and two 2-ton White trucks with special covered bodies. The type of vehicle used is shown in an accompanying illustration. The trucks operate within an area outside the city, handling the express business as well as special truckload lots of fruit, vegetables and manufacturing material. The cars continue to handle the long distance and heavy freight.

At the very outset it was discovered that the problem was not only one of transportation, but also one of salesmanship. Business could be secured in the face of the existing intense competition only by a picked personnel. A crew of two men was placed on each truck, to drive, load, and unload and also to secure business. This arrangement has resulted in a considerable saving of time in loading and unloading, and in a gratifying

New York State Railways Does Local Express Business with Trucks of This Type

increase in traffic on account of the success of the crews as business getters.

For example, when delivering goods to a dealer in a small town from a wholesaler in the city, the crew carries order forms and makes it a point to inquire if the dealer wishes to order anything from his wholesaler the next day. In case he does, the order is taken by the driver, presented to the wholesaler the same afternoon, and the goods are delivered by the driver to the dealer the next morning. Trucks call daily on every dealer and wholesale shipper in the district. These truck calls are in addition to the constant canvassing which is done by the general express agent and by his assistants.

Claims for loss or damage are less with the trucks than they have been with the company's electric cars. This is due largely to the fact that the truckmen have an eye on the load all the time, thus preventing loss by theft or mishandling. Moreover, the chance of damage in transit is reduced by the fact that the material is handled only twice—once in loading and once in unloading—instead of several times, as might be the case if it were transferred from the truck to an electric car, and then from the car to the truck again for delivery. The fact that the goods proceed in an almost direct line from the shipper to the consignee has reduced to a minimum the time required, and has also eliminated the expense of operating freight terminals. While the rates secured are not as high as those paid for shipments by railway, the cost of operation for doing this type of business is considerably less than it would be by electric car. Combined with a reduction in the overhead expense and damage claims, this has made the motor truck operation a profitable adjunct to the company.

Association News & Discussions

Lay Your Money on the Counter*

The Way to Tell the Railway Story Is to Buy Space in the Advertising Section of the Newspaper, Not to Beg Space in the News Columns

By W. P. Strandborg
Publicity Manager Portland Electric Power Company

WE ARE confronted with a strange situation in our present-day affairs. The two greatest constructive forces shaping the social, political and economical destinies of our American people are the public utilities and the public press. And yet as monumental institutions of progress they understand very little about each other.

A mighty change has been coming over the public utility industry of late and it is one of the most hopeful signs for the future. Only a few years ago the public utility men of the country believed that there was only one department of the newspaper business which was of any concern of theirs. That was the news columns. By all odds the most valuable part of the newspaper is the one which the average utility of ten years ago thought it was perfectly proper to raid whenever it wanted to tell some message to the public. Utilities sincerely and honestly believed that they had a right to full and free access to the news columns for every kind of utterance, no matter whether it had legitimate news value or was of the most malicious type of propaganda.

There are still quite a number of utility men in the United States who hold the same pitiful misconception of what a newspaper's duty is to its readers with reference to the selection of material that is to go into its news columns. I have no more patience with a newspaper which will accept and publish free of charge in its news columns, without weighing it scrupulously in the balance of public interest, material offered for publication by a utility, than I have with the public utility company which tries to sneak such stuff into the papers. In cases of that kind, the newspaper man and the utility man are equally discreditable to their respective businesses.

For a number of years a small group of the younger generation of utility men has been striving valiantly to hurl forever into the limbo of forgotten things the pernicious press agent and free propagandist. We regard him as an anachronism and an unmitigated evil, and I am happy to say that we can report substantial progress in all sections of the country. We started so late, however, and have had so much ground to cover that up to the present time we have hardly been able to more than scratch the surface. We are pledged to work with our managers and executives in the public utility industry to the end that we may convince them that the best policy is to place the copy on the counter with the cash in the business office downstairs. If we want to have any dealings with the city editor and his staff upstairs, we should carefully search our pockets to see that they are not contaminated with any typewritten copy for the news columns.

We honestly hope that the day will come when we can have the daily newspapers of the United States coming to us and asking us for news, and so far as possible to keep ourselves free from even offering a suggestion to a newspaper as to what might or might not constitute a news story relating to any of our activities, policies or business affairs.

Progressive Policy Adopted by Utility Companies

We hope that we may enlarge, so that it will cover the entire country, a policy which has been recently adopted by some of the larger and more progressive public utilities in dealing with the editorial and news departments of the daily press. We believe that every public utility company in the country, large or small, should have a man within the organization who has some knowledge of the newspaper business. This man should make it a point to become thoroughly conversant with every phase of his company's activities in the community. Then he should make it a point to visit frequently, perhaps once or twice a week—or oftener if necessary—the city editor, the reporter who handles the industrial beat, and the editorial writer who comments on industrial matters.

This representative of the public utility should sit down and tell the city editor or the reporter or the editorial writer, or all three of them, just exactly what is going on in his company, what it is doing, what plans it has for future expansion, what it is doing in the way of making its service more adequate and satisfactory. So far as he possibly can, he should add to the mental equipment of these three newspaper men a groundwork of information about his company that will be of value when any real item of interest "breaks." The utility company can never give a newspaper too much information about its business. The representative of the utility company who calls upon the newspaper should be a man of absolute integrity and reliability and he should be permitted to discuss the affairs of his company with the utmost frankness.

This utility man, who is generally dignified by the title of "publicity man," should supplement these visits to the newspapers by keeping closely in contact with everything that goes on in his company that might develop into something which his judgment and experience tells him has news value. He should then telephone the city editors if they think the matter in question has any news value. He should also offer to prepare that material in news form if the city editor thinks it is worth printing, or he should tell the story to a reporter in case it is a matter which can be handled over the phone.

The awakening which has come to the public utility industry is not limited alone to a change in the method of dealing with the new staffs of the press, but carries with it a growing realization that sound business principles demand that the dealings between the utility company and the newspaper must be be largely confined to the business office and more specifically to the advertising manager of the newspaper. Nowadays the more the utility company turns its back on the city editor, the more it faces eyes front to the advertising department, the more sure the utility will be of accomplishing one of its major objectives, namely, the creation and establishment of better public relations. That is why the Public Utilities Advertising Association is advocating so strongly the putting of cash with our copy on the counter.

A high standard is maintained in public utility advertising copy. A survey of the entire public utility field in the United States through the national vigilance committee of the Associated Advertising Clubs and the forty Better Business Bureaus operating in our most important metropolitan districts shows that in the past 12 years, since the "Truth in Advertising" movement was inaugurated, there has not been found a single piece of questionable electric railway advertising copy. Moreover, in the rare instances where the Better Business Bureaus have suggested to other utilities that a change in their copy would conform more closely to the standards set up, these companies have always and without question made the suggested changes. Indeed, a number of the Better Business Bureaus managers have said that if other advertising was as clean as that of the public utilities, they would have to look for another job.

*Abstract of a paper presented at the meeting of the Inland Daily Press Association, Chicago, Ill., Oct. 14, 1924.

To Advance Railway Interests

Purpose of the Ohio-Pennsylvania-West Virginia Organization Is to Develop Passenger and Freight Traffic

MEETINGS have been held at the offices of the Steubenville, East Liverpool & Beaver Valley Traction Company at East Liverpool, Ohio, and a constitution and by-laws have been prepared for the Tri-State Electric Transportation Association. These will be presented at a meeting for permanent organization purposes. H. O. Allison, commercial manager of the Beaver Valley Traction Company, New Brighton, Pa, who sponsored the organization, is temporary chairman.

The by-laws were prepared as the work of a special committee composed of C. M. Marsh, superintendent of the Wheeling Traction Company, Wheeling, W. Va.; J. Howard Maxwell, president of the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio; Frank E. Wert, director of public relations of the Pennsylvania-Ohio Electric Company, Youngstown, Ohio; F. B. Lawrence, general manager of the Newell Electric Railway, Newell, W. Va., and E. O. Shyrock, general manager of the Youngstown & Suburban Railway, Youngstown, Ohio.

The constitution stated that the purposes of the organization were the cooperation of the members in the development of the use of electric railways for passenger transportation and freight traffic; the dissemination of information about the service rendered and the economy and convenience of electric railway travel.

If the plans materialize close to 1,800 miles of street railway property will be represented in the association. In the Ohio section buses are being operated quite extensively and the question of admission of such concerns was paramount when the selection of a name was considered. It was held that the association was primarily and fundamentally for the purpose of advancing the interests of electric railways, and that while there was no objection to the admission of railways operating buses and the consideration of them in the transportation need, yet the door was closed to the independent operator of buses.

The committee in charge of the organization work will recommend, among other things, that a booklet be prepared descriptive of the territory and containing a map showing the electric railway lines, time-tables and fares. This would be a source of information for the public placed in public places such as hotels, restaurants, etc. The committee believes that time-tables, advertising cards and the like that are purely local to individual lines can be put out at the expense of the company issuing them. These should be distributed and available at ticket offices, hotels and other points throughout the entire territory. The committee believes that special attention should be given to the investigation and bringing about of a connecting interurban service, and to the interchange of ticket rates and freight haulage for the various companies. It also will recommend a coordination of effort and policy in standards required and in training of employees so that they may be conversant with the particular railway facilities in their territory.

Job Analysis Promotes Safety*

Accidents Can Be Prevented by Study of Hazards—By a Similar Process, Courtesy Can Be Taught

BY JOHN J. CONNORS
Safety Supervisor Nashville Railway & Light Company

THE greatest cause of industrial accidents is carelessness. Statistics show that 90 per cent of all accidents could be prevented by the exercise of greater care. After mechanical safety devices have been provided and unsafe conditions are corrected, thereby eliminating the 10 per cent of accidents attributable to these factors, the safety supervisor must direct his efforts toward the elimination of carelessness.

With this objective in mind, the writer early in the year 1923 adopted the job analysis method in investigating the causes of such accidents. Carelessness was thoroughly analyzed. Discussion developed that a man does careless things because of contributing causes such as lack of sleep, worry, grief, anger, hatred, malice, envy, and false estimate of values.

A lineman in climbing a pole, as he nears the top, must negotiate his body through two sets of wires. The secondary or low-voltage set are 18 in. below the primary or high-tension set. For some reason, he passes the harmless set of wires without recognizing this fact and comes in contact with the high-voltage wires and is killed. What is the cause of this accident? Did the lineman enjoy a full period of refreshing sleep the night previous? Was his mind free from worry, grief or other disturbing factors? In his estimation, was doing the job in the least possible time more important than his personal safety?

The accompanying table is an example of the way the hazards of the lineman's job can be analyzed. The hazards of operating a street car can be analyzed in a similar way.

This method of reasoning may be applied also to improve the quality of service, by specifying the things that trainmen should do, and should not do. A small number of additional fares per day may change a deficit into a profit. With this in mind we organized in April of the present year a group of 25 motormen and conductors in what we termed a "salesmanship class." We listed on the blackboard a few factors that were pertinent to salesmanship. The group decided that courtesy was the most important factor, and therefore, this was analyzed. To date, 175 men have completed this analysis, spending one-half day on the company's time for a few days. Using the case method, in which actual situations arising in the daily work of street railway motormen and conductors were mentioned, a thorough analysis of courtesy in dealing with the public was developed, similar in a general way to the safety analysis of the lineman's job.

*Abstract of a paper at an extra session of the National Safety Congress, Louisville, Ky., Oct. 2, 1924.

SAFETY ANALYSIS OF OVERHEAD LINE WORK

Job	Operations	Hazards
Setting poles	Raising small end	Pole turning.
	Placing deadman	Deadman slipping and pole falling.
	Placing pikes	Pike slipping.
	Rocking up	Deadman improperly set.
	Raising pole with pikes	Pole turning and pikes slipping.
	Changing pikes and ground	Pikes slipping.
	Lining up	Pikes slipping.
	Tamping	Danger of knocking pikes out.
Stripping pole	Climbing	Tacks in pole.
		Knots in pole.
		Pole rotten.
		Safety belt in wrong position.
		Pole giving way.
	Transferring primaries	Defective rubber gloves.
		Touching other wires.
		Touching ground.
	Taking off crossarm	Dropping crossarm.
	Loosening guys	Guys coming in contact with other wires.

Many Types of Locomotives at the Berlin Railroad Exposition

CONSIDERABLE space at the railroad exposition at Seddin, near Berlin, which opened on Sept. 24 and continued until Oct. 19, was devoted to electric locomotives and motor cars for rapid transit service. The exhibitors of electric locomotives included the German State Railways and all of the principal German builders. Single-phase equipment predominated. Storage-battery locomotives and motor cars for the Berlin rapid transit system and various tramways were also shown. This exposition was held under the auspices of the Verein Deutscher Ingenieure.

One of the most novel exhibits was a 2,000-hp. standard-gage turbine locomotive, with water condenser, exhibited by the Krupp interests. To provide for operation backward, an auxiliary turbine, revolving in the opposite direction to the main turbine, was used. The turbines were geared to the driving wheels. A number of locomotives with Diesel engines were also shown. One of these, of the 1-E type with electric drive and a drawbar pull of 55,000 lb., is for use in Russia.

Progress in Anti-Friction Bearings*

Excellent Results Are Quoted on Reduction of Armature Trouble, Increased Interval Between Lubrications and 10 to 22 per Cent Power Saving

By Karl Pforte
Manager Hagen Street Railways, Hagen, Germany

THE reports made from time to time on the use of anti-friction bearings by electric railways indicate their increasing use as well as continuous improvement by the manufacturers. These reports all tend to indicate that roller bearings are more adaptable to street railway conditions than ball bearings. Some users of ball bearings, for example, reported that breakage compelled them to return to ordinary bearings.

The questionnaire upon which the deductions in this report are based was answered in the spring of 1923, inasmuch as the report was intended for the convention of September, 1923. As the latter was postponed to September, 1924, it will be understood that the data are more than a year old and that the actual use of anti-friction bearings is more extensive than the report discloses.

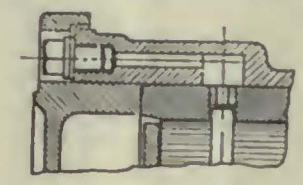
Thirty-seven operators with 20,931 motors reported that 1,107 or 5.3 per cent were equipped with roller bearings, 534 motors or 2.6 per cent with ball bearings and 28 motors or 0.14 per cent with one roller (pinion end) and one ball bearing (commutator end) each. In short, 8 per cent of the motors were equipped with anti-friction bearings. Only two motors had motor axle bearings. These are of the Jaeger roller type and have been in use on the Hagen Street Railway for two years. In October, 1923, the same maker also equipped two motors for the Zürich Street Railways. The makers of the different bearings and quantity delivered follow:

	Roller Bearings	Ball Bearings
G. & J. Jaeger, Elberfeld	746	.
Norma Company, Stuttgart-Cannstadt	225	2
S. K. F. Norma, Berlin	98	186
Fichtel & Sachs, Schweinfurt	22	104
Fries & Höpflinger, Schweinfurt	14	..
Allgemeine Elektricitäts Gesellschaft, Berlin	4	4
Wälzlager-und Maschinenfabrik, Stuttgart	2	...
Kugellagerwerke J. Schmid-Roost, Oerlikon		160
Swiss		14
Deutsche Waffen-und Munitionsfabrik, Berlin		8
Karl Klass, Nürtingen		6
Unknown	24	50
Totals	1135	534

Among the users are Berlin, 390 motors; Hamburg Elevated, 154; Hagen, 134, and Cologne, 154. Most of the existing installations are of the arbitrary dimensions developed by individual makers, but since the July, 1923, Zürich international conference on standardization the possibility is offered of achieving a certain degree of interchangeability.

The roller bearings are almost always lubricated with grease exclusively, but ball bearings frequently receive oil. The period between grease lubrications averages four months, but between oil lubrications only one month on the average mileage of 4,150 km. (2,580 miles) a month. Some operators report a performance of 45,000 km. (27,900 miles) between lubrication.

Plain bearings averaged per motor per annum a lubricant consumption of 43 kg. (94.6 lb.) compared with 5.8 kg. (12.76 lb.) for anti-friction bearings. The roller bearings averaged 5.7 kg. (12.54 lb.) and the ball bearings, 6 kg. (13.2 lb.) These results mean an appreciable saving in both lubricants and labor.



Method Used in Hagen for Lubricating Roller Bearings Through Screw-Sealed Housing

Life of Plain and Anti-Friction Bearings

An inquiry into the rate of wear of ordinary bearings showed that the average waste of metal per motor per annum on 35 properties was 8.2 kg. (17 lb.). The rate of wear, of course, is dependent upon the proportion of tin, an expensive ingredient. Thus the Hagen system with a tin base of only 40 per cent showed a wear of 3.2 kg. (7.04 lb.) per motor per annum, whereas in Zürich with an 80 per cent base, the wear was only 0.7 kg. (1.54 lb.). It is possible that the high cost of good tin-base bearings has encouraged the purchase of anti-friction bearings, which, at least, have no such high upkeep costs for relining, lubrication and labor.

Replies in regard to the longevity of anti-friction bearings showed the greatest diversity. A general deduction here would be unfair in view of the fact that the answers are a year and a half old. Some individual records do show long life. The Heidelberg Street Railways has had Jaeger roller bearings since April 15, 1911, Elberfeld has had the same make for 10 to 15 years, and the Barmen Mountain Railway has been using them since pre-war days. These records indicate that the higher first cost of anti-friction bearings is equalized in a fraction of their lifetime.

Some of the troubles reported with motor bearings are obviously the result of avoidable weakness in construction where the trouble is not due to insufficient strength for the load. In the case of anti-friction journal bearings, the faults may be due to such outside causes as bad track. Defects appear as failure of packing and breaks or other damage of raceways, balls, rollers and cages. However, the reports show that the later designs are much freer from these troubles.

The replies also indicated the great protection which anti-friction bearings afford against armatures going down on the pole pieces. On motors equipped with plain bearings, it was necessary to rewind 7.5 per cent of the armatures per annum compared with 0.5 per cent on one property and none at all on the others. This is clear proof of the value of anti-friction bearings in reducing crippled cars and so avoiding the loss of revenue mileage.

The Coblentz Street Railway reported that the use of anti-friction bearings had made possible a 10 per cent reduction in the shop personnel. Other railways also reported a saving in labor. Further advantages named were: Easier starting, less strain on motors, less heating and the exact centering of armatures to insure constant air gap and reduction of latter to 2 mm. if desired.

The many advantages of well-built anti-friction bearings should not only lead operators to replace plain bearings in existing motors, but also induce the manufacturers to use such bearings as standard.

Anti-Friction Bearings for Journals

Of 32 properties operating 9,004 motor cars, 34 have roller bearings and 224 have ball bearings. Of 7,527 trailers, 110 were equipped with roller bearings and 436 with ball bearings. The total number of anti-friction vehicles was therefore 804 or 4.7 per cent of all cars. It will be noted that the trailers were equipped in the proportion of 7.3 per cent; and the motor cars, 2.9 per cent. The bearings were furnished by the makers.

CARS EQUIPPED WITH ANTI-FRICTION JOURNAL BEARINGS

	Roller Bearings Motor	Roller Bearings Trailer	Ball Bearings Motor	Ball Bearings Trailer
G. & J. Jaeger, Elberfeld	19	21		
Fichtel & Sachs, Schweinfurt	3		4	4
Moffelt-Rollenlagergesellschaft, Cologne	1	71		
Nordiska Kugellager, Gothenburg	1	1		
Wämag	1			
Norma Company, Stuttgart-Cannstadt		10	.	1
Wälzlager-und Maschinenfabrik, Stuttgart		5		
S. K. F. Norma, Berlin		2	1	25
Ed. Weiler, Berlin-Heinersdorf			105	223
J. Schmid-Roost, Oerlikon			94	156
Deutsche Waffen-und Munitionsfabrik, Berlin			6	2
Ludwig Loewe, Berlin			1	
Karl Klass, Nürtingen				20
Schuchardt & Schütte, Berlin				1
Unknown	9		13	4
Totals	34	110	224	436

*Abstract of a paper before the Internationaler Strassenbahn and Kleinbahn Verein, Homburg von der Höhe, September, 1924.

Among the principal users are: Berlin, 222 trailers and 101 motor cars; Zürich, 77 trailers and 87 motor cars; Dresden, 39 trailers and Dortmund, 30 trailers. As with motor bearings, it is expected that standardization will limit the number of types and permit interchangeability.

The lubrication averages show seven-month periods for grease against two-month periods for oil. The average performance per car is given as 3,700 km. (2,294 miles) per month. On the Hagen system, lubricant is delivered to the journal without removing a lid. This is accomplished by forcing the grease through an upper housing ordinarily sealed with a screw. The grease passes through a channel, as shown in the accompanying drawing, whence it bears directly on the two sets of rollers.

The average annual requirement of lubricant for a plain journal is given as 8 kg. (17.6 lb.) as against only 1.5 kg. (3.3 lb.) for an anti-friction bearing. Therefore, a car with anti-friction journals will give five times the mileage between lubrications obtainable with plain bearings.

As regards wear of plain bearings, the replies show almost no use of tin, as might be expected. On the other hand, long life is being obtained from bronze shells. The anti-friction journals are already showing instances of 10 years life or more, both in the ball-bearing and roller designs. Many of the defects are due either to pioneer designs or to some entirely outside cause like track.

10 to 20 per Cent Energy Saving

Although few operators have made tests of relative energy consumption, one would not be far wrong in crediting anti-friction journals with a saving of at least 10 per cent. The Malmö Street Railway made the following interesting tests along this line:

A route 3.3 km. (2.04 miles) with very few curves was selected for tests at constant voltage of the power requirements for trailers fitted with plain and S.K.F. ball bearings respectively. The ball-bearing trailer weighed 6,750 kg. (14,650 lb.) and the plain-bearing trailer, 5,810 kg. (12,782 lb.). The test comprised non-stop operation, but no account was taken of the energy used for turning at the ends.

The ball-bearing trailer required an average of 21.5 kw. per ton-kilometer compared with 27.5 kw. per ton-kilometer for the plain-bearing trailer, a saving of 22 per cent with ball bearings new. As the number of stops and curves increases, the saving would become relatively less, say 15 per cent.

Tests were also made for a month with motor cars over routes with few curves, easy grades and long intervals between stops. In this case, the saving was approximately 10 per cent.

One management reported that although anti-friction bearings ran easier than plain bearings on tangents, it appeared that they ran less easily on curves. Dortmund and Göteborg asserted that the anti-friction bearings required more power than plain bearings, but this would not occur with properly designed bearings. The fundamental thing is to purchase bearings of high quality if the advantages of anti-friction bearings named are to be realized. On the writer's property, Hagen, 15 motor cars now on order will have Jaeger roller bearings on the armatures, motor axles and journals.

Annual Mileage Output per Platform Man*

Comparative Figures for Car Speeds, Hours of Labor and Extra Allowances Such as Days Off, Sick Leave and Vacations Are Given and Their Effects on Efficiency of the Individual Are Discussed

By K. Norregaard
Manager Copenhagen Street Railways, Copenhagen, Denmark

PLATFORM wages are one of the dominant factors in the cost of operation. There are two ways to attain a saving in this great item—the first is to pay lower wages; the second, to increase the output per man. The latter method is the subject of this paper.

To probe the subject to the very bottom, we ought to be able to determine how many passengers are served per man per annum, but this would require detail study of fares, car-kilometers operated, ratio of seats offered to seats used, density of traffic per kilometer, speed, working conditions, etc. As the data for such an investigation are not at hand, the present study will be confined to a few of the more important factors outside the question of density and earnings per kilometer.

The mileage per man per annum will depend chiefly on these considerations: (1) Average schedule speed; (2) number of men per car; (3) number of workdays per annum; (4) average number of hours per diem; (5) relation of platform to non-platform time.

Higher Speeds Mean Higher Earnings

The factor of speed is of great importance, not only in the direct relationship between wages and speed but also on account of the greater earning power of faster cars. The increasing competition of the automobile is an added spur.

Speed is affected by the state of the track, by density of street traffic, by trailer and one-man car operation, by the passenger interchange facilities on the car, by the degree of crowding, by the distance between stops, by the location of convenient or safe boarding platforms, by the discipline of the public in boarding and leaving cars, by the character of the control and braking equipment, etc. As to speed, the replies from 65 railways summarize as follows:

Number of Railways	Km. per Hour	Miles per Hour
3	11.0—11.5	6.82—7.13
2	11.5—12.0	7.13—7.44
11	12.0—12.5	7.44—7.75
12	12.5—13.0	7.75—8.06
6	13.0—13.5	8.06—8.37
4	13.5—14.0	8.37—8.68
7	14.0—14.5	8.68—8.99
3	14.5—15.0	8.99—9.30
17	over 15	over 9.30

The lowest schedule speed reported was 11 km. (6.82 miles) an hour; the highest, 30 km. (18.6 miles) an hour. The average speed for all roads was 14.8 km. (9.18 miles) an hour. If, however, we omit the 17 roads whose schedule speed exceeded 15 km. (9.3 miles) an hour, the average declines to 13 km. (8.06 miles) an hour. The great spread in speeds is due to the fact that the statistics include cross-country lines with more or less of their track on private right-of-way, hence the higher figures must be regarded with caution.

Platform Attendance—Number of Working Days

The success of many a railway will depend upon its ability to use such economies as trailers and one-man cars. In the present study, however, we are interested only in the actual miles per man regardless of the number of men per car or train.

The platform man has a number of idle days in the year due to days off, sick leave and vacation. Minor additions are due to instruction periods, misses, etc. The interval between scheduled days off varies from 4 to 16 days, but the average of 67 roads is found to be 52 days a year or every seventh day.

Sick-leave practice is also diverse. A few railways grant full pay for sick leave up to two years, while others do so only for a few days. Some begin with full pay and cut later to 60-80 per cent thereof, and still others show a range of 6 days to 1 year's payment at 10 to 90 per cent of full pay. In general, however, an employee of 3 months' to 1 year's standing will average two-thirds pay for 6 weeks, three-quarters pay for 13 weeks if he has served 1 to 3 years and four-fifths pay for 26 weeks if he has served 3 years or more. A few roads do not pay for sick leave at all.

In reply to the query as to how many days a year are lost because of sick leave, the answers were as follows:

Number of Railways	Average Days per Man
3	4 to 6
15	7 to 9
14	10 to 12
10	13 to 15
2	16 to 18
6	19 to 21
1	22 days
1	28 days
18	gave no data

The number of days lost through sick leave on half of the properties ranged from 10 to 15 days, and the average throughout was 12 days. These figures are not absolutely accurate, as it is possible that some managements included as "sick leave" periods that would have been "scheduled days off" had the employee been well.

*Abstract of a paper before the Internationaler Strassenbahn und Kleinbahn Verein, Homburg von der Höhe, September, 1924.

Vacations also show a great range of practice. German street railways tend to base vacations on length of service, the vacation periods consequently ranging from 4 days to 4 weeks. Other railways make the employee's age the chief factor. The Scandinavian and Dutch roads tend to the practice of a fixed period like one or two weeks. A few roads grant no vacation allowance.

The average vacation period on 26 roads is found to be 15 days, the range being from 10 to 18 days. In these figures, also, there is the possibility that some roads have figured into the vacation period the "scheduled days off," but this is not of consequence so long as the managements do not confuse the unpaid "scheduled days off" with the paid "sick-leave" and "vacation" periods.

On assembling the three chief causes of idle time, we find something like this—52 scheduled days off, 12 sick-leave days with pay and 15 vacation days with pay, 4 days for schooling, misses, etc. The total is 82 days, leaving but 283 effective working days out of 365, per man.

Average Apparent and Effective Working Day

Of the 68 roads which furnished data, 53 or 77.9 per cent have an 8-hour day. Five roads (7.4 per cent) have a shorter day and 10 roads (14.7 per cent) a longer day. Four of the five roads referred to have an average only a few minutes under 8 hours, but one has a workday of but 7 hours 26 minutes. Likewise part of the 10 longer-time roads exceed 8 hours by only 10 or 15 minutes. In the instances of a 9-hour day, there is compensation through getting every fourth day off, while the property which attains the maximum of 9 hours 47 minutes does so because it has a 2-hour meal relief as part of the workday.

Of course, not all of the so-called working time is effective platform time. First, there are layovers at the terminals, some of which are demanded by the schedule layout and others which are granted for relief. These latter allowances were made long before the 8-hour day, but when the latter was introduced the managements did not or could not take advantage of this change to cut down non-schedule layovers.

As 22 roads did not answer the question on layovers at all, it is possible that they do not grant any. However, the 45 which did show an average layover period of 45 minutes a day.

Meal relief usually ranges from 20 to 25 minutes and counts as part of the workday.

Signing on and off, preparation of reports and the like, on 49 properties are counted as part of the workday; on 19 they are not. The average time on the 49 which pay is 14 minutes a day.

Deadheading time to and from the reporting point usually amounts to but a few minutes and appears to be paid for only on five properties. In one case the men are paid for the time required to draw their pay.

The average effective working time of 63 roads is found to be 439 minutes, or 7 hours 19 minutes.

On comparing the schedule speeds and the effective working time of the platform men, it is found that the average performance per man per annum is 26,860 km. (16,653 miles). This figure requires modification because some operators included as platform personnel men who were assigned to other transportation duties. As these non-platform men amounted to about 3.5 per cent of the total, the actual performance is 3.5 per cent better, or 27,800 km. (17,236 miles).

As previously noted, many of these railways are of cross-country or interurban character. If, then, the properties showing more than 30,000 km. (18,600 miles) per annum per man are omitted, this leaves the street railways which appear to average 21,880 km. (13,566 miles). After certain other deductions, an average of 21,000 km. (13,020 miles) is obtained.

With 283 effective working days averaging 7 hours 19 minutes, an annual total of 2,070 hours is arrived at. If the service was devoted entirely to car movement at 14.8 km. (9.18 miles) an hour, the average of all classes of roads would be 30,600 km. (18,972 miles), but actually it is only 27,800 km. (17,236 miles), a difference of 9 per cent. Part of this difference is due to layover time required by the schedule and part through payments made to men on the extra list.

Current-Checking Means for Cars, Carhouses and Shops*

Methods of Economizing Current Analyzed from Replies of 86 Railways —Personal Supervision Without Mechanical Devices Favored In Berlin and Hamburg—Roads Using Instruments Obtain Savings

By Wilhelm Pforr
Manager Berlin Street Railways,
Berlin, Germany

ALMOST all electric railways may be said to use more current than necessary, and the current so wasted is generally used destructively. Wastage is least on routes with long free runs, long intervals between stops and appreciable grades. Wastage is most on routes with short intervals between stops and with close headways and interference from foreign vehicles. Power saving on the latter type of railway, which includes all large cities, is an absolute necessity.

Eighty-six managements replied to a questionnaire in which they were asked to explain their ways of economizing current. Of these, 17 make no effort to save power, 26 use current-checking devices and 43 depend upon power inspectors.

Most of the railways which make no attempt to regulate current consumption belong to the free-running group already mentioned, and it is not believed that it would pay them to inaugurate such regulation. This leaves 80 per cent as the proportion of railways which carry on some form of supervision, with 50 per cent using power inspectors and 30 per cent using instruments. Of the latter class, 10 undertakings use power-on clocks, 10 use watt-hour meters, 4 use ampere-hour meters and 2 use the Wolff acceleration meter.

All users of the first three devices report a saving in energy. The Wolff acceleration meter has not been in use long enough to yield sufficient experience, but it is believed that its chief value is in protecting the electrical equipment against overload rather than in the direct saving of current. Undoubtedly, there is a saving from the use of the various devices, chiefly because the motormen believe that they are under surveillance, yet the use of such devices is not recommended by the writer, at least on large city systems, for the following reasons: (1) The appreciable expense of record-keeping personnel; (2) the maintenance cost of the instruments; (3) overloads occur oftener because the instruments tend to encourage high rates of acceleration and to discourage the series running which is so valuable in congested areas; (4) false comparisons, which are drawn frequently, cause dissatisfaction among the motormen.

For these reasons, personal supervision is preferred to the use of instruments—a practice successful today both at Berlin and Hamburg. There is no extra cost because the same men who serve as motormen-instructors, to the number of one or two per 100 motormen, are used as power inspectors. The success of the method depends largely upon selecting truly skillful men. Aside from this, the motormen should receive power-saving rewards which will be sufficiently high to interest them. It is essential that the bogey of energy consumption for each route and type of car operated should be carefully determined.

It is also desirable to tally the use of current in the carhouses and shops, since this may run from 5 to 10 per cent of the total energy. Watt-hour meters are recommended for all such situations and also for service cars. A separate meter should be used for the circuits employed in car shifting, in lighting and in shop tool operation. The results, as at Berlin, have been excellent, in stimulating competition between different stations in respect to saving power. The meters are read monthly and compared with the month immediately preceding and with the same month a year before. Supervision of traction current consumption on the basis of units per car-kilometer run is conducted on a day-to-day plan, so that the effect of loading, weather conditions, etc., may be figured and appropriate steps taken to correct apparent waste.

*Abstract of a paper before the Internationaler Strassenbahn und Kleinbahn Verein, Homburg von der Höhe, September, 1924.

Utility Commissioners' Convention in Phoenix, Ariz., Nov. 11

PERILS of railroad grade crossings, the proper method of regulating motor vehicle transportation, rates and service of railroads and public utilities, valuation of railroads, uniform laws for regulating commissions and proposed amendments to the federal transportation act of 1920, are among the subjects scheduled for discussion at the thirty-sixth annual convention of the National Association of Railroad and Utilities Commissioners, which will meet in Phoenix, Ariz., beginning Nov. 11 and will last four days.

As one feature it is expected that an address will be delivered by Secretary of Commerce Hoover. There will also be addresses by at least one member of the Interstate Commerce Commission and several state commissioners; by former presidents of the association, including Carl D. Jackson of New York City; Walter A. Shaw of Chicago and Charles E. Elmquist of St. Paul. There will also be addresses by representatives of the railroads, gas, electric light and power and telephone companies.

Pennsylvania Association Annual Meeting

THE annual meeting of the Pennsylvania Street Railway Association will be held at the Penn-Harris Hotel, Harrisburg, Dec. 5.

An effort is being made to have a symposium on traffic problems led by Harland Bartholomew of St. Louis and attended by directors of public safety and chiefs of police from the various cities in Pennsylvania. Other topics to be considered are bus operation and the economy of buying equipment repair parts direct from the manufacturer or making them in the railway shops.

At the evening dinner addresses will be made by prominent men in and out of the industry.

Central Traffic Association Meeting

THE next regular meeting of the Central Electric Traffic Association will be held at the Waldorf Hotel, Toledo, Ohio, Nov 19 and 20.

The morning session on Nov. 19, beginning at 9 o'clock, Eastern time, will be in the nature of a round-table discussion, at which time matters of general association interest and particularly items to be dealt with by committees will be considered.

The afternoon session and the session on Nov. 20, will be devoted to reports of committees and other business.

Iowa Midyear Meeting at Des Moines, Nov. 13-14

ANNOUNCEMENT is made that the midyear operating meeting of the Iowa Electric Railway Association will be held at Des Moines, Nov. 13 and 14. The following program has been arranged:

Thursday morning session:

Paper, "Track Construction and Maintenance," by N. W. Freund, Davenport.

Paper, "The automatic Substation—Its Care and Maintenance," by D. H. Nail, Des Moines.

Paper, "Bus Maintenance," by W. G. Lamb, Waterloo.

Following the morning session, a luncheon will be given through the courtesy of the Des Moines City Railway. In the afternoon there will be inspection trips over the properties of the Des Moines City Railway and Des Moines & Central Iowa Railroad. A banquet will be given in the evening at the Fort Des Moines Hotel.

Friday morning session:

Paper, subject to be selected by a manufacturer's representative.

Paper, "Maintenance of Equipment," by T. E. Wood, Omaha, Neb.

Paper, "Lubrication of Railway Motors," by C. Bethel, Westinghouse Electric & Manufacturing Company.

General discussion and election of convention committee.

American Association News

Committee of One Hundred

THE executive committee of the Committee of One Hundred held a meeting at the Railroad Club Oct. 28. Those present were Gen. Guy E. Tripp, chairman; H. R. Hayes, secretary and treasurer; J. N. Shannahan, S. M. Curwen, P. H. Gadsden, T. N. McCarter, Randal Morgan, F. H. Sisson, L. S. Storrs, H. L. Stuart, F. R. Coates, E. C. Faber for Barron Collier, Morris Buck for J. H. McGraw, J. W. Welsh and Labert St. Clair.

The work of the committee since its inception in 1917 was reviewed and a report of the finances was given. A general discussion ensued as to the best means of furthering publicity and dissemination of facts and statistics for electric railways, which has been done by the advertising section of the American Association in connection with the Committee of One Hundred. A general appreciation of the work being done by Mr. St. Clair as director of the advertising section was expressed.

Comment on Foreign Report at Executive Committee Meeting

AT THE meeting of the executive committee of the American Association held at Atlantic City, on Oct. 6, a vote of thanks was passed for the work of the committee on foreign operation, consisting of J. W. Welsh, chairman; H. A. Johnson and Harry L. Brown. This was mentioned briefly in the issue of this paper for Oct. 11, page 603. In introducing the motion, J. H. Hanna, vice-president the Capital Traction Company, Washington, D. C., addressed President Budd as follows:

"Before we adjourn I would like on my own personal account to say a word of appreciation for the work of this foreign committee. I want particularly to say it now because the idea originated in your mind and you and Mr. McGraw are really responsible for it.

"I believe that the investigation and the report as rendered is about as useful a thing along the same lines you have been talking as anything I have ever seen. This bus problem is being thrown up to us all the time—the question of the bus superseding the trolley car. The great argument that these people bring forth is the fact that the bus handles the city transportation in London and other cities. I think that most of us generally have known the answer to that, but we have not had the facts. This report gives us the facts and in as clear and concise a manner as it could do. I don't know of anything that has been of more value to us in meeting that particular problem when it is brought up.

"If it is in order I would like to move a vote of thanks to that committee for the splendid work it has done."

The motion was seconded and carried.

Metropolitan Section Meeting Scheduled for Nov. 7

A MEETING of the Metropolitan Section of the American Electric Railway Association will be held at the Engineering Societies' Building, 33 West 39th Street, New York City, Friday, Nov. 7, at 8 p.m. The outstanding event on the program will be a talk by E. F. Wickwire, chairman of the committee on co-operation with manufacturers, his subject being "Friendlyizing the Public." Music will be furnished by the Interborough quartet and a moving picture called "The Strap-hangers," loaned for the occasion by the Transit Commission, will be shown. In addition to the other business of the meeting, section membership pins will be distributed.

Motor Bus Information Desired by Accountants' Committee

THE committee appointed by the American Electric Railway Accountants' Association at the recent convention at Atlantic City to draft a classification for motor bus operations is desirous of obtaining information of current practice among operating companies.

The request has been made by M. W. Glover, General Auditor West Penn Railways, Pittsburgh, Pa., chairman of the committee on bus accounting, that all companies operating motor buses forward to him a copy of the classification now in use covering motor bus operation, in order that the committee may have full information regarding all classifications now in use. Information regarding statistics which are used in connection with motor bus operations will also be appreciated.

Maintenance of Equipment

Convenient Buggy for Long Bars

By J. L. Rogers

Forge Shop Foreman Kansas City Railways

FREQUENTLY it is necessary to handle long bars of steel or wrought iron from stock to the forge shop, or from furnaces to hammers within the shop. Such bars are usually too heavy to be lifted by hand without excessive labor and fatigue. For handling this class of material, the simple two-wheeled buggy shown in the illustration below has proved an efficient time and labor-saving device, even though the Kansas City Railways shop is well equipped with hoists and cranes.

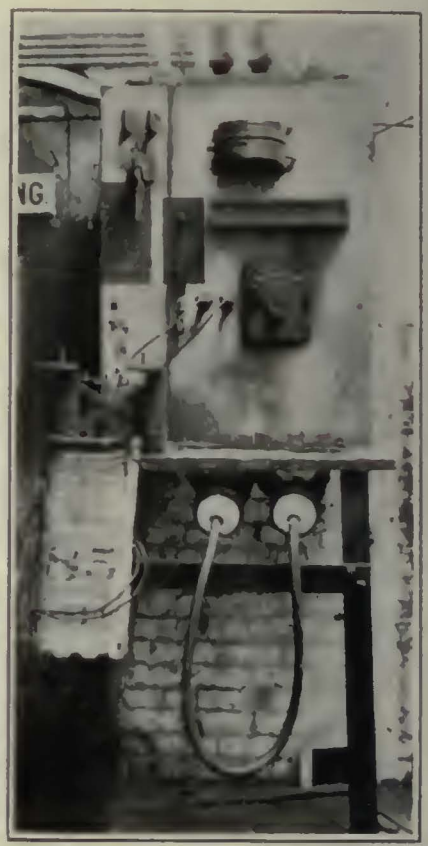
As shown in the illustration, the frame is made up of steel angles, riveted together. The top is made up with a number of cross-pieces that help to reinforce the framework and form a support for carrying the material. The carriage is mounted on two cast-iron wheels large enough that it may be readily moved over tracks or similar obstructions. The two top side angles are brought together and welded to the long handle. This enables the workman to manipulate the buggy with one hand while steadying the piece being transported with the other.

This buggy was designed of such a height that material can be pulled from the furnaces directly onto it, or can be pushed from the buggy to the bed of a steam or air hammer without lifting.

This Two-Wheeled Buggy Has Been Found Useful for Handling Long Bar Material About the Forge Shop of the Kansas City Railways

Testing Control Jumpers

TRAIN control jumpers are tested in the Wheaton Shops of the Chicago, Aurora & Elgin Railroad by passing a current of approximately 1½ amp. through each strand and noting the continuity of the circuit by means of a small indicator lamp mounted in an annunciator box. The jumper to be tested is placed in receptacles mounted under the bench of the testing board. A 600-volt series circuit is passed through each of the conductors in turn by means of a selector switch. This was originally a motor starting switch with handle and contact points, but has been wired up for this special use. In series with each of the small conductors is a small indicator lamp located in an annunciator box and a five-lamp bank which furnishes the load to the 600-volt d.c. circuit. By moving the handle from one point to another, the various conductors in the jumper cable may be tested. Moving the jumper around while it is attached will disclose any breaks in the cable, as the small annunciator light and the lamp bank will flicker.



Control Line Jumpers Are Tested by Means of High-Voltage Series Circuit with Lamp Bank Acting as Load and Indicator Lamp in Series

Mounted on the same test board is a bracket for holding motorman's portable heaters, which are tested by means of the same lamp bank and series circuit.

Increasing Usefulness of Air Drill

IN THE mill room of the Illinois Traction System shop at Decatur use is made of an overhead suspended air drill for drilling heavy timbers such as sills and bumpers. To facilitate the handling of the drill and air hose, they have been suspended from a carriage which travels on a swinging telfer arm. The carriage is approximately 3 ft. long and has a pulley suspended under each end. Over these pulleys

two ropes are carried, at the ends of which is the air drill and at the other the counter-balancing weight.

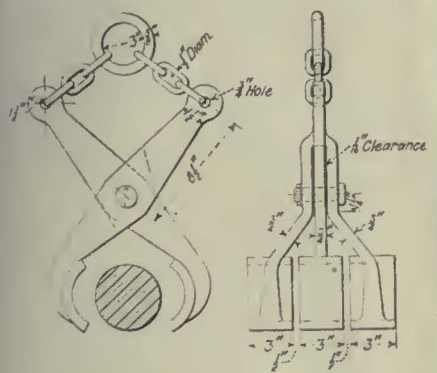
The carriage has four wheels similar to those used in hanging sliding doors. A rail on each side of the

Suspending Air Drill from Traveling Carriage on Swinging Telfer Arm Increases Its Radius of Activity

telfer arm supports the wheels and carriage. This device has greatly increased the accessibility of the drill. The arm is 12 ft. long, thus making the drill available over the area of a half circle of that radius.

Convenient Tongs for Lifting Wheels

A CONVENIENT form of tongs or shackles for lifting wheels when mounted with axles is in use in the new Hillcrest shops of the Toronto Transportation Commission, Toronto, Canada. The tongs, which resemble somewhat a pair of ice tongs, are of forged steel, with lips shaped to fit a 4½-in. diameter axle.



Lifting Shackle for Pair of Wheels and Axle

One jaw has two lips, while the other has a single one, so that the balance is the same. A short section of chain on each side connects with a 3-in. ring, so that when placed on an axle and with the crane hook in the ring, the shackle will grasp the axle automatically with no danger of its dropping while being transported by the crane. This design was worked out under the supervision of W. R. McRae, superintendent of rolling stock.

I.R.C. FORM 4013 300 4-23 PRINTED IN U.S.A.

APPARATUS RECORD

SUBJECT Rotary Converter

I. R. C. No. 46	Type H.C.C.	Form K	Scale —	Brush No. 4	2
Mfg. G. E. Co.	Class 8-2000-375	Capacity 2000 BKW	K. —	Quantity 118	42
Mfg. No. 1325818	Catalogue No. —	Dr. List —	Calibrating K. —	Width 1¼	1½
Arm No. 558818	Volts 600	Amps. 3334	Calibration —	Thickness 1/8	1/4
Contract No. 32392	Phase 6	Cycles 25	Setting —	Length 2½"	2¼"
Photo. N.O. #3	Poles 8	R. P. M. 375	Wind'g. Spec. —	Pigtail 7"	6"
Bulletins 42501-17-2 42500-14-6	P. T. Ratio —	C. T. Ratio —	Res. —	Mfg. N.C.Co. G.E.	
Prints P1831609	Reactance —	Weight 25 Ton.	Spec —	Type 255 metite	
Inventory N.O.D #19	Oil No. Vaculine B.	Gallons 5 Each bearing	Shunt —		
Installed Nov. 1918	Location North Division Sub.	Position No. #1.			

Remarks Compound wound. Interpole.
3/12/19 Conts. tightened.
7/8/19 All Connections inspected.

Record Card for Power Apparatus

Record Card for Power Equipment

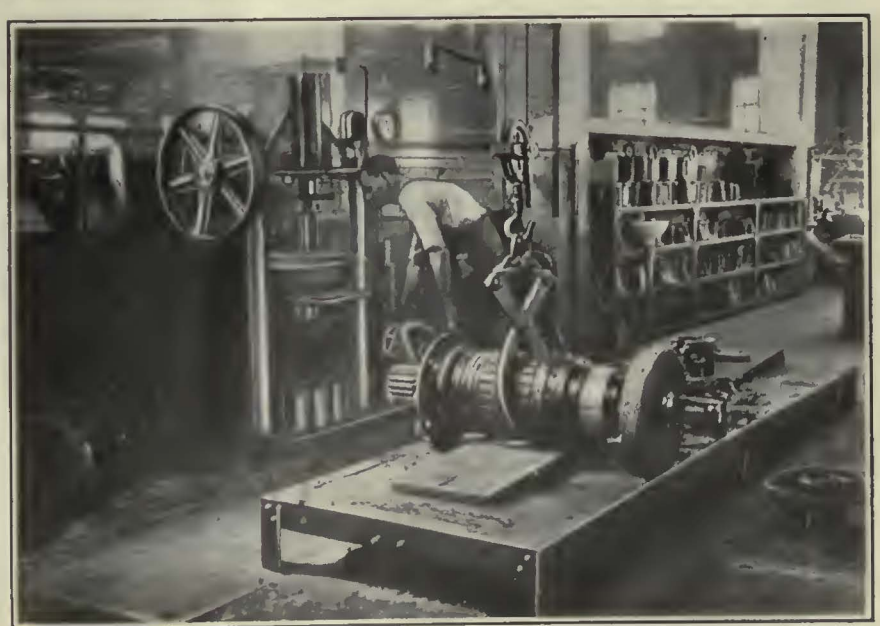
A COMPLETE record of all power equipment is kept by the International Railway, Buffalo, N. Y., on 5-in. x 8-in. cards. A special form was devised for the purpose which is both an index card for files of photographs, bulletins, blueprints, inventory records, etc., as well as an operating record card. Under the various subheads the file number of any data pertaining to the particular piece of equipment is entered.

The card is designed so that one form can be used for various types of equipment, any subhead not applying to it being crossed off. Under remarks, dates when oil was changed or filtered, commutators or rings turned, failures of any kind, painting, etc., are entered. This is continued to the reverse side of card.

A Convenient Arrangement for Changing Bearings

ONE section of the armature room in the Snelling Avenue shops of the Twin City Rapid Transit Company is set aside and is conveniently arranged for making armature bearing changes.

At one side of this section of the shop is located the bearing press, which is a McCall Machine Works 15-ton hydraulic unit. This machine is comparatively small in size and is set up at one side of the bearing section, where it occupies the minimum amount of room and at the same time is very conveniently located relative



Overhead Hoist, Work Bench, Hydraulic Press and Storage Bins Are Conveniently Arranged for Making Bearing Changes

to the work bench and the storage bins. These storage bins allow bearings to be sorted and kept off the floor with a minimum amount of moving around on the part of the workmen. A low, substantial bench raises the armatures to a convenient height.

An electric overhead hoist is arranged so that it serves this entire section of the shop and facilitates the work of handling the armatures from storage racks to the work bench, etc. The general arrangement of the equipment for making bearing changes is shown in the accompanying illustration.

New Equipment Available

Stainless Steel for Third Rail Terminal Bolts

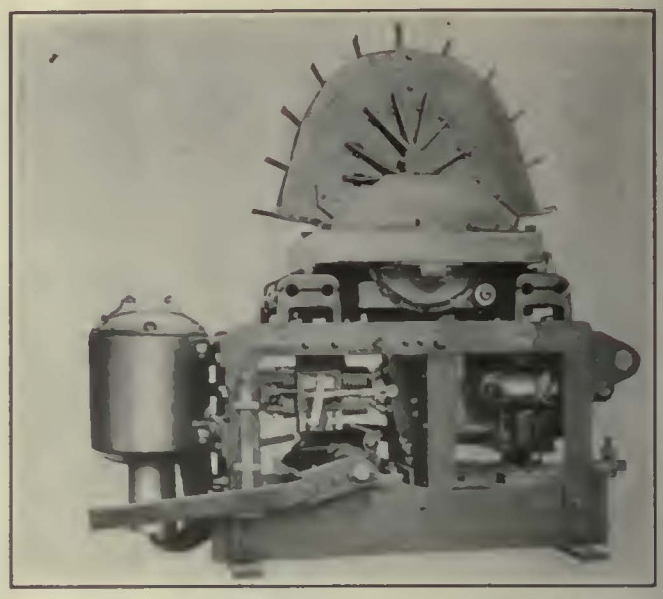
WITH the phosphor bronze and mild steel bolts used by electric railways for connecting terminals to third rails, some difficulities in removal have been found. In case of accident, when it is necessary to unscrew the bolt the threads are sometimes found fixed in the rail due to corrosion, so that considerable trouble and delay take place in removing them. With a view to overcoming this trouble, bolts made from stainless steel have been furnished to the electric railways in London by Thomas Firth & Sons, Ltd., Sheffield, England.

The bolts are used to secure the plate carrying the cable, which conveys the current from one length of the third rail to the next. Two bolts go to each plate, and the current cable is joined to these plates by means of a gunmetal holder. The bolt is threaded through the rail, and the nut is screwed up on the outer side. Threading is used in order to have a firm contact between the rail and the bolt, since the bolt is really a conductor of current. Where gun metal or mild steel bolts are used for this service it has been found that in removing the bolts, the heads are usually twisted off, which necessitates having to tap out the remaining portion.

In the sample stainless steel bolts put in service in London approximately two years ago, satisfactory results have been obtained. Although these are coated on the outside with accumulations of rust from the rail and soot from the atmosphere, this is readily cleaned off with a wire brush, and when unscrewed the bolt threads show bright surfaces.

Welding Electrode for Cast Iron

A WELDING electrode which is recommended particularly for welding cast and galvanized iron has been brought out by the General Electric Company, Schenectady, N. Y. It consists of a central metallic core surrounded by a layer of flux outside of which is a metallic sheath. The flux is thus protected from dissipation, and improved welding results. Since there is no loss of flux in transit and during welding, the correct amount is furnished the arc. On account of its stability, the arc is easy to "strike" and to "hold." Heat is concentrated at the point where it is needed and so hastens the rate of melting. The electrode can be used with alternating or direct current.

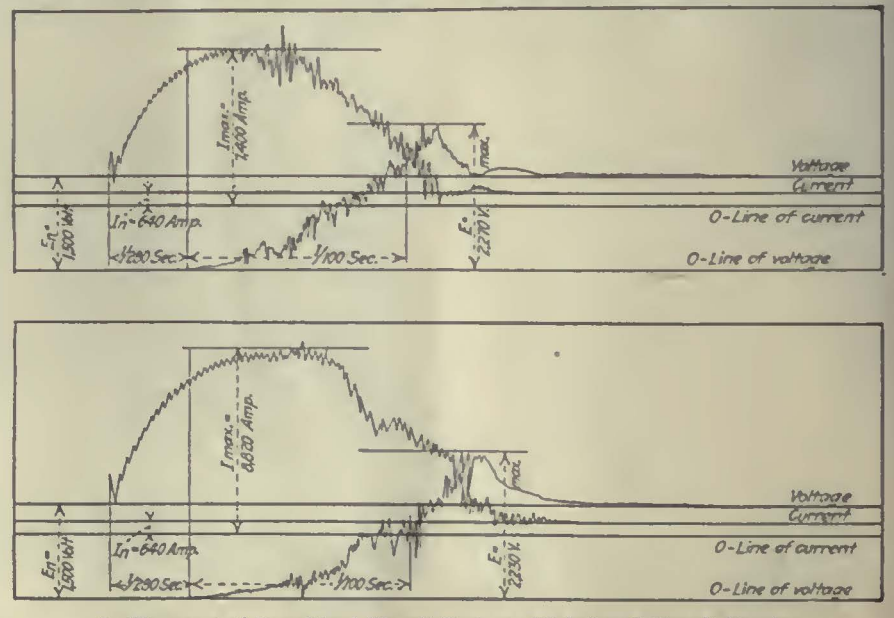


A.E.G. High-Speed Circuit Breaker for Javanese State Railways

German High-Speed Circuit Breaker

A NEW high-speed circuit breaker, which in one-sixtieth of a second will extinguish an arc rising to 9,000 amp. on 1,500-volt railway circuits, has just been manufactured by the Allgemeine Elektricitäts Gesellschaft in Berlin for the State Railways of Java. The breaker contains no specially radical features but is a development and refinement of the regular A.E.G. high-speed breaker. The accompanying illustration shows the particular breaker in question. Two oscilligrams show short-circuit tests made on this breaker.

The breaker operates to open the main circuit, but it is shunted by a resistance which, with the normal 1,500-volt circuit, will draw 640 amp. A second breaker operation then opens the circuit in another place. The breaker is a part of an order for the Javanese State Railways being furnished by the Allgemeine Elektricitäts Gesellschaft.



Oscillograms of Two Short-Circuit Tests on High-Speed Circuit Breaker

The News of the Industry

Traffic Plan Suggested

Engineers Recommend More Street Space and the Elimination of Parking

During the past eight years ownership and use of motor vehicles in Detroit, Mich., and vicinity has increased twelve times faster than the population. This is one of the conclusions contained in a report of the survey of downtown traffic made by Daniel L. Turner and John P. Hallihan, engineers of the Rapid Transit Commission, of which Sidney D. Waldon is chairman. The report was recently submitted by the commission to acting Mayor John C. Lodge.

Their conclusion shows that at the present time 93 per cent of the total vehicular traffic passing in and out of the business district during the 12 hours consists of motor cars; only about 7 per cent are street cars, horse-drawn vehicles and other miscellaneous types. This motor car traffic is 7¼ times what it was 8 years ago.

They concluded that at all times during the day there are approximately 10,000 to 12,000 vehicles moving through the business district. The experts believe that by-pass traffic routes should be developed around the business district in order to relieve the district of the large amount of through traffic now traversing it to no useful business purpose. It was their finding that during rush hours individual automobiles carrying only 25 per cent of all passengers homeward bound utilize, roughly, 91 per cent of the traffic capacity of the streets available for passenger transportation, thereby congesting the streets and delaying 75 per cent of the passengers using the street cars and buses. They claim that the conditions attending safe movement in a congested city street do not permit attaining more than about 50 per cent of the theoretical capacity and that the traffic arteries through the business district of Detroit are rapidly approaching the saturation point. To meet these rapidly increasing traffic requirements they recommend additional street space up to the practical economic limit in order that both individual and collective traffic may be adequately accommodated and that until such relief can be attained, and afterwards to the extent that it can be furnished, collective traffic facilities should be improved, and should be given preference over individual passenger traffic during the rush.

On the subject of parking, the rapid transit engineers agreed that parking should be prohibited on street car streets and motor bus routes and other vehicles on other thoroughfares during rush hour. Parking should also be prohibited along street car and motor bus routes by segregating commercial traffic from passenger traffic during rush hours and providing special routes for such traffic and finally along street car, bus and individual motor car routes, by requiring all crossing traffic to cross at designated cross streets a number of blocks apart instead of at every crossing street, thereby reducing cross interferences, increasing the safe speed and consequently accelerating the traffic movement for both individual and collective traffic.

Bus Issues in New York Deferred

At the regular meeting of the Board of Estimate, New York City, held on Oct. 31 the matter of the bus franchises was put over until the next meeting of the Board. It had already been put over from the meeting Oct. 29, when Mayor Hylan said that he would grant no franchises to the Third Avenue Railway unless it first surrendered its trolley franchises on 42d Street, 125th Street and some other streets. The suggestion of Comptroller Craig that the city could operate buses itself by invoking the home rule law was referred by the board to the committee of the whole and to the Corporation Counsel. Reference was made in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 25 to the bus plan of the New York Railways. At the meeting of the Board of Estimate on Oct. 21 a letter was read from the receiver of the New York Railways to the effect that the company was prepared to accept a bus franchise on terms generally consistent with the report made to the Estimate Board by the Board of Transportation under date of Oct. 14, 1924. The letter stated further that the company was prepared if such borough bus franchise were granted to discuss at once the fair terms for replacement of about 46 miles of existing trolley track in Manhattan with buses.

Seek Injunction Against Bus Line in Kansas City

The receivers for the Kansas City Railways, Kansas City, Mo., have filed a petition for injunction in the federal court against the operators of an intercity bus line to prevent its operating on the streets of Kansas City. The petition recites ordinances in both Kansas Cities, enacted some years ago to control "jitney" traffic, and which specifically bar jitneys from streets having street car tracks. The receivers, however, do not restrict their appeal to the grounds of these ordinances, outlining many other substantial reasons for prohibition of bus line operation under present conditions, without licenses, without payment of adequate or any remuneration to the cities for use of pavements, without protection to the public, with hazards to the street railways and other property.

Traction Message Discussed

Hearings on Chicago's Transportation Issues Consider Insull, Blair and Busby Plans

Mayor Dever's determination to get a comprehensive transportation plan on the February primary ballots in Chicago became increasingly evident in the first week of the public hearings of the city council committee on local transportation, taking up the Mayor's recent traction message.

At the opening session, held on Oct. 27, and a subsequent one on Oct. 30, Alderman Schwartz, chairman of the committee and the Mayor's spokesman, exhibited a desire to brush aside the Insull subway proposal and learn the temper of the other aldermen on the Busby offer, a letter submitted by Leonard A. Busby, president of the South Side street car lines, proposing in effect to sell those lines to the city separately from the unified Chicago Surface Lines system.

Herein, Alderman Schwartz indicated, Mayor Dever hopes to find a wedge to get at the Surface Lines and force them to his terms by a threat to buy the south side lines, though the Busby terms were identical with those from the Surface Lines as a whole which the Mayor declared to be "impossible." Alderman Kostner, a committee member, the first openly to dispute the Mayor's conclusions, declared it would be impossible ever to buy a segment of the lines and that such a threat would be useless.

Forced by Alderman Kostner to make revelations regarding the secret bankers' purchase conferences of last summer, Alderman Schwartz disclosed for the first time just how close to a sale of Surface Lines and the Mayor came. In fact, only a matter of bookkeeping prevented the consummation of the deal. The city, he said, was willing to pay $162,000,000, the capital account of the surface lines, if the company transferred to the city its depreciation, liability and certain other cumulative funds, amounting to upward of $20,000,000. At the Surface Lines offices it was said that the Mayor's system of bookkeeping transfer would have deprived the surface lines certificate holders of anything from the sale.

The Insull plan, agreeing to build $23,000,000 worth of elevated lines into districts now unserved by rapid transportation if the city uses its $40,000,000 traction fund to build a downtown subway for elevated trains, was declared by Alderman Schwartz to be a "palliative" and no real cure for the situation.

The prospects of financing a half-billion dollar transit plant was taken up. The certificates which the city proposes to trade for the elevated and surface lines stock in the event of pur-

chase were explained from the bankers' viewpoint by Alderman Schwartz. He said that the bankers say they may sell around 94 to start but they will go up.

He said the city would pay $162,000,000 to the surface lines, $90,000,000 to the elevated and spend $217,000,000 in the first of the three construction periods for new lines. The first period of construction calls for the subway.

The Blair unification plan, a merger of elevated, surface and subway transportation into either a private or municipal corporation proposed by Henry A. Blair, president of the surface lines, will be touched upon at hearings to be held after the election.

Seeks Operating Rights on Chicago Streets

A request for franchises from the Chicago Motor Coach Company, which has confined its operation heretofore chiefly to boulevards and parks, has been submitted to the city of Chicago providing for routes on city streets largely serving territory now exclusively held by the Surface Lines. The proposal offers the city the right to purchase nearly all the lines not included in its present boulevard system.

The coach company operates on grants from the park boards which are separate taxing bodies with powers quite different from those possessed by the city. Although disclaiming any right of the city to tax or regulate bus operation, the company recognizes the potentialities of a suit now pending between the two, and suggests that such time and expense be saved.

The coach company arranged terms satisfactory to the park boards to cover the wear on their boulevards, and now proposes to pay the city 2 per cent of its gross annual receipts from the mileage operating on the city streets, less any future taxes or fees imposed by the city on the company.

Streets are divided into lists A and B. The first is said to cover streets needed mostly for terminal turns for the boulevard lines, and a 20-year franchise for these is requested. For list B there are alternative proposals: a 20-year franchise with purchase right on three years' notice in writing, or a 10-year franchise, renewable for five years, with a purchase right on one year notice in writing at any time after the franchises have run six years.

"It is possible for the city, within a reasonable time under this plan, to enter into the business of bus or motor coach transportation as to the streets included in list B without being required to pay anything other than a fair valuation for the equipment in use on the thoroughfares covered," said James J. Condon, counsel for the motor coach company.

When the company recently began sending its buses over city streets the corporation counsel on advice of the Mayor threatened to arrest the drivers for using the city streets without a license. The company instituted suit for an injunction, which is still pending. In its proposal it now specifies that any franchises shall state that neither side surrender any of its contentions but that at the expiration of the grants the status quo be preserved.

Bus Ordinance Proposed

St. Louis Buses Would Pay 12 per Cent of Gross Receipts—Maximum Fare 10 Cents

A proposed ordinance providing for rigid regulation by the city of bus operation in St. Louis, Mo., was presented to the Board of Aldermen by the chairman of the legislative committee. It provides for co-ordination of the buses and street cars and has been attacked by Richard W. Meade, president and general manager of the People's Motorbus Company, now operating extensively in the city, as a sure way of preventing the people from obtaining the sort of service his company offers. The measure was prepared by C. E. Smith, consulting engineer for the city. He and E. R. Kinsey, president of the Board of Public Service, opposed bus permits recently granted to the People's Motorbus Company giving that company the right to operate their buses over 43 miles of additional streets.

Salient features of the new bill are: Payment by bus companies of 12 per cent of their gross receipts annually to the city as the aggregate of an operating tax, licenses and all other city taxes, approval by the Board of Aldermen as well as of the Board of Public Service of bus route permit, strict regulation of service and transfers from all bus lines to street cars and between all bus companies.

The present bus ordinance provides for payment of 3 per cent of the gross receipts to the city and for an annual license fee of $25 per bus.

The transfer plan is subject to approval by the State Public Service Commission. No extra fare for a transfer from a bus to the street cars will be permitted, and the bill provides: "The fare collected for each transfer ride shall be apportioned between the two portions of the ride as may be agreed to by those who furnish the rides, subject to the approval or order of lawful agencies having jurisdiction."

Another provision of the new bill is that the maximum fare of 10 cents shall be reduced if the operating income shall yield more than a reasonable return on the bone fide investment in physical property after all expenses have been paid, and that no allowance shall be made in computing investment for promotion, good will, going value or permits.

An important provision says: "It is the express purpose of the city to grant revocable permits for operation of buses to supplement street railway service, and not to duplicate or compete with such service."

Another portion of the bill declares that no permits shall be granted to a company whose principal place of business is not located in the city of St. Louis and whose property to be used in the business is taxable in some other city. The headquarters of the People's Motorbus Company are located at 585 Adelaide Avenue, University City, Mo.

The proposed ordinance provides, further, that the existing bus companies must comply with its provisions immediately if they wish to preserve the permits granted by the Board of Public Service. No permits shall be for exclusive use of any streets. This feature may become the matter for much litigation as the People's Motorbus Company contends that the permits granted it hy the Board of Public Service are exclusive and constitute perpetual franchises.

Investigation Completed—International Rejects Contributions

Representatives of the Interstate Commerce Commission and the New York State Public Service Commission have closed their joint investigation into the cause of the fatal accident on the Buffalo-Niagara Falls high-speed line at Ellicott Creek crossing Oct. 19. Four passengers were killed and upward of 450 others were injured in the rear-end collision between two three-car high-speed line interurban trains. Many are still in hospitals in Buffalo, Tonawanda and North Tonawanda with arms and legs off. Most of the passengers were from Philadelphia. They had through tickets over the Pennsylvania and International railroads.

B. C. Craig and Clyde Waldo conducted the investigation for the Interstate Commerce Commission. Representatives of both commissions refused to indicate what their reports would be, but it was intimated in the newspapers that one of the recommendations will be the installation of an electric automatic block signal system on the Buffalo-Niagara Falls high-speed line. It was stated that the cars operate under very close headway when traffic is heavy and the need for such signal system was said to have been disclosed by the investigators.

Conflicting statements were made by witnesses regarding the action of the motorman who ran the second of the wrecked trains. Several witnesses are reported to have testified that he left his post and rushed back into the first car of the second section with his hands over his head. Other witnesses are reported to have testified the motorman stuck to his post. The motorman is in a Buffalo hospital in a critical condition. The investigation was held behind closed doors and it was not revealed whether or not flagmen from the stalled first section went back to signal the onrushing second section.

President Herbert G. Tulley of the International Railway rejected a proposal made by members of the I. R. C. Co-operative Association of employees to contribute one day's pay to the company to aid in the settlement of the damage claims. Several petitions have been circulated among the employees offering to raise a fund for the company and hundreds of employees signed.

The International Railway offered to pay the expenses of friends and relative of injured passengers from Philadelphia to Buffalo and North Tonawanda hospitals in instances where friends and relatives were too poor to pay their own expenses. Many took advantage of this opportunity to come to Buffalo to visit the injured passengers. One of the passengers who died of injuries sustained in the collision was buried in Tonadanda by the International Railway.

Weekly Pass in Oklahoma City

An unlimited number of rides may be taken by passengers on the lines of the Oklahoma Railway, Oklahoma City, who purchase a weekly pass for $1.25. The Oklahoma Corporation Commission has approved an application of the railway for permission to issue these passes as a means of increasing patronage and revenues of the company. The 8-cent fare, or two fares for 15 cents, still remains in force. The company began issuing these passes on Sunday, Oct. 26. They are good for only one passenger a trip, but are transferable. Company officials state that the passes will be more economical than the regular fare if street car patrons ride frequently.

A short trial under the recent increased fare showed that revenues of the company were only slightly increased and that patronage had fallen off as compared with the same period last year. John W. Shartel, president of the company, hopes, through the weekly pass system, to increase the number of riders and at the same time benefit people who desire to use street cars frequently. Reference to the recent fare increase was made in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 11.

Cleveland Wage Question to Go to Higher Court

Members of the street car men's union in Cleveland, Ohio, voted to appeal the decision of the Common Pleas Court, which recently ordered a rearbitration of the union's demand for a wage increase for platform employees of the Cleveland Railway. The vote of the union to carry its case to a higher court was announced as being 1,976 for the appeal and 427 against. The decision of the union to appeal the case to a higher court and not to submit to a rearbitration until the higher court has ruled on the decision of the Common Pleas Court means that the Cleveland Railway will also likely appeal that part of the decision which held that the closed shop agreement between the company and union was binding upon the company. A decision by the company on this question is expected shortly.

The Common Pleas Court nullified the first arbitration, which granted the men an increase of 12 cents an hour, on the ground of fraud. The court held that the supposedly neutral member of the arbitration board which sat last May was biased and prejudiced in favor of the union and against the Cleveland Railway.

Bus Service in Buffalo Scheduled

Bus service in Buffalo is scheduled to start on the Delaware Avenue line Nov. 2, it was announced by R. H. Horton, vice-president of the International Bus Corporation, a subsidiary of the International Railway. The Public Service Commission granted the necessary permit to the new bus company after the City Council had voted four to one to approve the franchises on the Delaware Avenue and East-West Delavan Avenue lines. Initial service is to start with 10 double-deck buses of the Fifth Avenue type between the Terrace and Delaware Park on Delaware Avenue. As soon as additional buses are received, the International Bus Corporation will extend the service to the Buffalo-Kenmore city line, and later service will be started on the Delavan Avenue line between Niagara Street and Bailey Avenue.

A 10-cent fare will be charged on the bus lines with free transfers to connecting trolley lines. Trolley passengers receiving transfers to connecting bus lines will be charged 3 cents extra, the trolley fare being 7 cents or four tokens for 25 cents.

With buses in service on Delaware and Delavan Avenues, the International Bus Corporation will give bus service on three routes in Buffalo. The Bailey Avenue bus line has been in successful operation since last spring. The company will spend $282,000 for new single and double deck buses.

Compromise Proposals Offered in Cincinnati

Settlement of Cincinnati's traction problem appears more likely since alternative compromise proposals respecting street paving and the guarantee clause in the proposed new franchise have been submitted by representatives of the Cincinnati Traction Company and Cincinnati Street Railway Company on one side and the city of Cincinnati, Ohio, on the other. The Mayor's traction committee will meet shortly after the election to be informed of the status of the negotiations for agreement on a new franchise. The city has been insisting that the operating company shall pay one-half the cost of repairs of the streets between the rails and 18 in. to each side. Representatives of the traction and railway companies have felt that it was too heavy a burden to place on the operating company and eventually on the car riders, since fares are the only revenue.

In the matter of the guarantee clause the company representatives have said they would sacrifice, if necessary, one-sixth of the dividend of 6 per cent on the capitalization in the effort to keep for three years initial the fare at 7½ cents or less, provided a rise in fare was not caused by an increase in wages. This was not acceptable to the city representatives. Suggested compromises states that the wages clause in the 7½-cent fare guarantee be eliminated in consideration of a modification to be made in the paving clause. Alternative proposals for a modification of the paving clause include the operating company assuming one-half the cost of repairs on streets improved during or since 1920 and the company being charged with not to exceed $25,000 in any one year for street repair.

A statement has been drawn up setting forth conditions prevailing now and for some time past and what is expected to result if a new franchise is granted; in brief, that lower fares and better service should and would supplant high fares and the present service. There would also be the substitution of one company for several.

Sunday Pass in Pittsburgh

The Pittsburgh Railways, Pittsburgh, Pa., started the sale on Oct. 26 of a Sunday street car pass for a two months trial period which will permit of an unlimited number of rides within the first fare zone, or that area covered ordinarily by a one-token ride from the center of the city. The pass sells for 25 cents and from it any number of rides may be had. The special Sunday transfer now in use covers the same area and will not be withdrawn, but will be available for those who do not make use of the new Sunday pass.

The Sunday pass is an outgrowth of the weekly pass which the Pittsburgh Railways recently installed in Washington and McKeesport. The user on Sunday will have the same privilege for riding as is enjoyed by residents of those two communities during the week. No transfers are issued on the passes and they are not good on night cars or on interurban cars.

Under the slogan "Ride all day Sunday for 25 cents," the Pittsburgh Railways, through its commercial department, advertised its scheme broadly. The transportation department got out a special circular addressed to trainmen explaining to them how the passes would be supplied to the men on Friday of each week and that each man would be charged with ten of these passes bound in a pad. With the proceeds from the sale of these the men were to purchase additional passes, if necessary.

For the first Sunday, Oct. 26, approximately 20,000 of the 25-cent passes were sold. It is said that the 17,500 originally printed for use on that day were exhausted before noon, and 9,500 of the ones that had been printed for the following Sunday were restamped and rushed to the various carhouses to meet the demands of the patrons. William H. Boyce, commercial manager of the railways, said that the sale exceeded the company's expectations; that while the token fare receipts fell off about 40,000 during the day, travel was heavier than on the previous Sunday. According to a check-up, each buyer of a pass used the ticket for about 5 rides.

In its announcement of the installation of the pass the commercial department of the company stated that the success of the pass in the next ten Sundays would determine its adoption for future use. This is another proof of the company's efforts to improve service.

Alleged Fraud in Seattle

Events in connection with the purchase of the Seattle Municipal Railway System, Seattle, Wash., and later probing of that transaction were testified to before the City Council's department efficiency investigating committee on Oct. 21 and Oct. 22. Witnesses went into detail in accusing prominent officials connected with the railway interests and the city of trickery, bribery, conspiracy and double dealing in their efforts to have the $15,000,000 purchase contract of the street railway lines rescinded. The Seattle papers characterized the story as a sordid one and the evidence as sensational.

News Notes

Will Seek Bus Charter.—The Lehigh Valley Transit Company, Allentown, Pa., will apply on Nov. 17 for a charter for the Lehigh Valley Transportation Company, a subsidiary, for permission to operate a bus line in Northampton, Bucks and Montgomery Counties.

Buses Barred.—The Interstate Public Service Company, New Albany, Ind., has won its fight for elimination of bus competition. It has refused to relay tracks in connection with the rebuilding of Charlestown Avenue from Silver to Vincennes Street, alleging that it preferred giving up the franchise to going to the expense of rebuilding the trackage, in face of the bus competition, which was making the line unprofitable. Efforts to pass an ordinance to eliminate bus competition failed at first. The Indiana Public Service Commission was asked to take a hand and force the company, but the commission had no power in the matter. Later an ordinance was passed barring buses on Main, Market, Spring, Vincennes, State and Pearl Streets and on intersecting streets within a distance of 300 ft. in any direction from street railway lines.

Franchise Rights Bought. — The Northern Ohio Traction & Light Company, Akron, Ohio, has purchased the franchise rights of the Cleveland-Akron Bus Company for $500,000, according to dispatches from Kansas City. This purchase was referred to in the ELECTRIC RAILWAY JOURNAL of Oct. 18 in connection with the rejection by the City Commissioners of Kansas City, Kan., of the petition of the H. H. Moore Company to buy the bus line, already operated by P. H. Kennedy. The Akron purchase price does not include bus equipment. Bus rates between the two cities recently have been raised to $1.40 for a one-way trip, while the traction fare is only $1.

Will Sell Token Carriers.—To facilitate the handling of passengers and as an insurance against the loss of tokens the Philadelphia Rapid Transit Company's conductors will sell token carriers. The plan is for the passengers to give the conductor $1 for which they will get the current ride and the nickeled carrier containing twelve 7½-cent tokens, making thirteen rides and the carrier. The carrier is about the shape of a small pocket knife, with three spring-protected openings to accommodate four tokens each.

Working Out Bus-Railway Problem.—Marlboro, Mass., city officials are endeavoring to work out an arrangement so that bus lines and trolleys, even though the former are privately owned, can operate to the mutual satisfaction of both. A conference was brought about as a result of a letter sent to the Mayor of Marlboro by General Manager Henry C. Page of the Worcester Consolidated Street Railway protesting against the bus line between Marlboro and Westboro taking on passengers along the line of the street railway on the West Main Street in Marlboro. Manager Page explained to the city officials that the bus activities were affecting the business of the railway, and if it could not get the full benefit of the passenger traffic along its line it would be unable to continue operation in Marlboro.

Council Meets, but Takes No Action.—The City Council of Omaha, Neb., closed its recent conference, at which the Mayor and Commissioners were present, without formal action on the request of the Omaha & Council Bluffs Street Railway to be relieved of its occupation tax and paving requirement. The Council will meet again to take formal action and prepare an answer to the question of the street railway. The alternative for the traction company, if Mayor Dahlman's recommendation prevails in declining to lift occupation tax and paving requirement for 1925, will be to apply to the Nebraska Railway Commission for an increase in street railway fare. General Manager Leussler stated that total revenue passengers of the Omaha lines during the first eight months of this year were 1,811,143 fewer than in the corresponding period of last year. The ultimatum of the railway submitted to the City Council of Omaha on Sept. 17 was reviewed in the ELECTRIC RAILWAY JOURNAL of Oct. 4.

Awaits Company's Decision.—Union employees of the Rochester, Lockport & Buffalo Electric Railway, Rochester, N. Y., are demanding an increase of 4 cents an hour, from 53 to 57 cents, for trainmen, with proportionate increases for all other employees. The demand has been before a board of arbitration since last May. On Oct. 9 the board announced that it could reach no agreement with the two factions and was dissolved. Following the failure of arbitration, the men renewed their direct demand on the company and a conference followed, after which it was announced that General Manager Foster had taken the demands of the men under advisement and would announce his decision shortly. This action postponed a threatened tie-up.

Studies New Type of Car.—The Wisconsin Railroad Commission is making an investigation of a new type of one-man car, which calls for exit of passengers at the rear door. One of the commission's engineers has been sent to Washington, D. C., where two such cars have been placed in operation for experimental purposes. It is said that if the engineer's report is favorable it is likely that the commission will ask the Wisconsin electric railway companies to provide their new one-man cars with the rear-exit device.

Proposed Fare Increase Suspended.—The Board of Public Utility Commissioners of New Jersey issued an order on Oct. 21 suspending until Jan. 22, 1925, the proposed increase in fares on the Shore Fast Line and the Atlantic City & Suburban Railway, the two trolley systems operating between Atlantic City and points on the mainland. Both railways contend that they are not earning a fair profit on their investments.

Will Protest Fare Petition.—S. V. Stewart, city attorney, was instructed formally by the Helena, Mont., City Council recently to protest the action of the Helena Light & Railway Company, which seeks authority from the State Railroad and Public Service Commission to raise its fare and to avoid payment of royalty alleged to be due the city under the original franchise. The royalty, which formerly amounted to some $7,000 a year, according to city officials, has not been paid for about four years. Litigation in this connection has been pending for a long time.

Abandoned Line to Be Revived.—The North Hornell division of the Hornell Traction Company, Hornell, N. Y., which was abandoned last summer because the company was unable to operate the line at a profit, will be revived by the traction company under a ruling of the Public Service Commission. After a hearing held by Commissioner VanNamee, the company was granted an order to restore service temporarily, and this will be done at once. It is proposed to operate one-man cars on the line by the Hornell Traction Company.

May End Franchise.—As the result of a resolution sponsored at the recent meeting of the City Council of Windsor, Ont., Windsor is likely to terminate the present franchise of the Windsor, Essex & Lake Shore Railway, Kingsville. It will probably insist upon the road operating under a 5-year franchise in the future. Alderman Howell, who introduced the resolution, claimed the city was deriving no income under the present franchise, issued in 1906. The city solicitor will be asked to make a ruling in the matter.

Allowed to Operate One-Man Cars.—The Railroad Commission of Wisconsin has granted permission to the Northern States Power Company, Eau Claire, to operate one-man cars on its interurban line between Eau Claire and Chippewa Falls, Wis. The provision is made that two-men crews must be used when heavy traffic is anticipated as during the times of fairs and conventions.

Will Reopen Stations. — Following protests from residents of the affected sections, the Philadelphia Rapid Transit Company will reopen the northbound Frankford elevated stations at Berks Street, Church Street and Torresdale Avenue, closed some three weeks ago because of their poor patronage. In its Oct. 27 issue of "Service Talks," the company points out that in 1923, to pay operating costs and city rental, the average carload per trip on the "L" should have been 86 passengers, but the actual records show that there were only 56. The car-riding population of Frankford has increased but slightly since 1922 and this increase has been largely drawn from other sections of the city served by the Philadelphia Rapid Transit lines. The company now operates almost as many street cars to the Frankford district as it did before the elevated line was built. In spite of the new high-speed service, the company states, the public demands the same street car service.

Foreign News

The First Electrification of the French P.L.M. Railway

The first electrification project of the Paris - Lyons - Mediterranean Railway, will go into effect on the international line between Culoz and Modane, en route for Italy via the Mont Cenis tunnel. There are grades as high as 3 per cent, and sharp curves. With the heavy international traffic of passengers and freight this will be the most severe try-out of long-distance electrified trains possible in France.

The railway will purchase power for this section from the Paul Girod electric steel plant, a privately owned and operated plant, which was erected during the war and planned on lines which would enable it to supply an almost unlimited amount of excess current to meet any possible needs in these parts. This plant now has in operation seven separate hydro-electric stations.

Trackless Trolleys for Ipswich and Darlington, England

Substitution of trackless trolleys for tramways has been decided upon by the Ipswich Town Council. An experimental trackless trolley route was very satisfactory. While traffic in Ipswich is not heavy, some of the streets are so narrow that there is not sufficient space between the track and the curb for other traffic.

Darlington Town Council has also definitely decided to substitute trackless trolleys for their tramways.

Parliamentary powers will be necessary in both cases.

Station Improvements in London

Trafalgar Square station of the Baker Street & Waterloo Railway, London, England, is being completely reconstructed. Pedestrian subways will be constructed to provide safe crossings at one of the most dangerous points in London where several main thoroughfares converge at Charing Cross. The underground railways will make a large contribution toward the cost of these subways.

In 1906, when this station was opened, it was used by less than 1,000,000 passengers. In 1923 there were 5,500,000. Four lifts formerly in use will be replaced by escalators, increasing the passenger-carrying accommodation and allowing enlargement of the booking hall. The escalator tunnel will be 90 ft. long by 22 ft. 4 in. in diameter and will have to be cut through an existing subway.

To speed up reconstruction of Oxford Circus station, work is being carried on night and day. The escalator shaft, 100 ft. long by 17 ft. in diameter, is constructed at an angle of 30 deg. The bottom end joins a chamber which rests on the westbound tunnel of the Central London Railway. The top of this tunnel had to be cut away and roofed with steel girders to take the weight of the new chamber. In order to roof over the top of the escalator shaft, which is only 4 ft. below the street surface level, and to construct the adjoining section of the new station, a network of gas, water and hydraulic power mains and high-tension electric cables had to be removed and relaid in different positions. Some of the mains are of 21, 24 and 30-in. diameter.

New Tramway Track to Be Constructed in Edinburgh

More than a mile of tramway track is to be constructed by the Edinburgh Town Council at an estimated cost of £29,400. At present 16 of the 24 routes of the Edinburgh system operate through Princes Street, which means a car every 15 seconds in each direction during the busy periods of the day. The new track is to be constructed on George Street, a short distance north of Princes Street, and it is expected that the new track will greatly accelerate traffic.

Construction of two suburban extensions aggregating about 2 miles in length, at an estimated cost of £47,460, has also been recommended by R. S. Filcher, general manager of the tramways.

Zürich Shows Higher Receipts

The annual report of the Zürich Municipal Railway shows an increase during 1923, as compared with 1922, of 2,195,646 passengers, or about 4½ per cent. The line was extended last year about 2½ km., and the length of track in the street now is 85.047 km., and 7.872 km. in carhouses and shops. In 1923 the system had 241 motor cars and 87 trailers. The principal operating statistics follow:

	1923	1922
Car-kilometers	11,550,356	11,400,343
Car-miles	7,218,972	7,125,214
Passengers carried	48,469,502	46,273,856
	Francs	Francs
Passenger operating rev.	11,774,656	11,577,076
Receipts per passenger	0.243	0.250
Rev. from other sources	205,231	197,732
Gross rev. per km. of track	275,706	287,896

Paris Subway Power Contracts Revised

The Paris Metropolitan subway has had, ever since its inception, a contract for a portion of its electric power with the Société d'Electricité de Paris. The price was based on production costs at the central station owned by the Metropolitan Company. This station being out of date, the cost of current is admittedly higher than it should be. For this reason the Société d'Electricité, with its modern equipment, has been profiting from an arrangement which was clearly to the detriment of the subway company.

A new agreement just made will assure the subway company current from the electric company on an entirely new basis which will result in a reduced price to the municipality of Paris, which now owns the subway. The agreement is retroactive from Jan. 1, 1924. The subway company agrees to spend the saving on the current it takes from the Société d'Electricité in renewing the equipment of its own plant. The new arrangement extends until 1955.

Saving through Electric Operation.—Electrification of the main line railways of Great Britain would mean a saving in locomotive costs of £21,000,000 a year, was stated by Lieut.-Col. E. O'Brien, electrical engineer of the London, Midland & Scottish Railway, at a meeting of the Institution of Locomotive Engineers. He said this saving would result because the electric locomotive is capable of double the mileage of the steam locomotive and the cost of repairs is from one-third to one-seventh that of steam engines.

Glasgow Officials Confer on Traffic Problem.—In reply to the suggestion that the tramway routes in Glasgow, Scotland, be discontinued in the congested area and buses be used to connect the different tramway routes, a report was prepared by James Dalrymple, tramway manager. In the report he expressed the opinion that this should not be done until the results on congestion of the two new bridges erected over the River Clyde can be ascertained. These are expected to relieve congestion in a large measure. The joint committees of magistrates and the tramway department, at a meeting on Oct. 8, decided to adopt this recommendation.

Buses Confined to Tramway Lines in Aberdeen, Scotland.—That the tramway company was not entitled to operate motor buses beyond the limits of the tramway system was the decision in a suit brought in the Aberdeen Sheriff Court against the Aberdeen Suburban Tramways. This company was operating a number of buses, running far out into the country. Such operation was held to be illegal, as Parliament only gave them power to build, work and maintain their tramway undertaking.

Owl Cars in Liverpool Unprofitable.—All-night tramway service on the municipal lines of Liverpool, England, has proved so unprofitable that it is to be discontinued. Statistics furnished by the manager showed that on most trips there were no passengers or only one or two. All-night cars are operated in only a few towns in Great Britain and only by the municipalities.

Tramway Funds Used to Relieve Tax Burden.—£12,000 of an income tax rebate of £18,000 was transferred from the tramways department to the relief of local taxes by the Cardiff, England, Town Council. This action was taken in spite of the fact that the chairman of the Tramways committee advised the Council that the tramways department required about £145,000 for improvements, £45,000 for purchase of 25 additional cars and £100,000 for various other tramway and bus requirements.

Financial and Corporate

Award Increased

Privy Council Adds $838,500 to Arbitration Price of Toronto Railway —City Cost Placed at $13,650,000

The city of Toronto will have to pay the Toronto Railway a sum of approximately $300,000 in excess of the amount awarded by the arbitrators, is the substance of the recently announced decision of the judicial committee of the Privy Council at London, England, in the Toronto Railway arbitration dispute. The appeal of the city was to decide what amount the city should pay the Toronto Railway for its property. The judgment forces the city of Toronto to pay $11,483,500 for the Toronto Railway, an increase of $838,500 over the amount as it stood before the appeal went to London, and an increase of $295,000 over the original award. In addition, the city will very likely have to pay interest at 5 per cent from Sept. 1, 1921, the date of taking over the railway.

CITY MUST TAKE OVER MAIN OFFICE

The final cost of the property to the city, including the award proper, the interest and city's costs will approximate $13,650,000. The Privy Council added the sum of $140,000 for the steam plant, $338,500 for batteries, $65,000 for the Sherbourne property, $170,000 for the head office building and $125,000 for the share of the cost of Don Bridge and Avenue Road subway. This made the total award, excluding interest, $11,483,500.

The judgment states that the city should take over and pay for the company's main office, and that the city should reimburse the company for the amount it was taxed on the Avenue Road subway and Don Bridge up to the date of taking over the railway plant. The properties which the company contended the city should pay for and which the city rejected totaled in value, according to the arbitrators' award, $543,500.

The Privy Council entered into the history of the arbitration and referred especially to two points raised in support of the city's appeal. First, the city contended that while in valuing certain property, particularly the rolling stock, buildings and tracks, the arbitrators had proceeded on the theory that in every case the cost of reproduction, less depreciation, must be taken, no such method should have been applied in the present case. The proper course, it had been urged on behalf of the city, was first to consider whether, having regard to the size, suitability of location and other factors, a reasonable person would reproduce these assets as part of the Toronto Railway Company's system in 1921, and if not to value them on the basis of what they would bring at a sale or in case that were impossible on a scrap basis. In the opinion of the Privy Council, this argument was wrong, the arbitrators being justified in taking reproduction cost less depreciation as a reasonable guide in valuing track and rolling stock. But it was made clear that by no means were reproduction cost, less depreciation, adopted as the only and sufficient test of value.

It was also contended on behalf of the city that the theory of reproduction at current prices could not be applied at a time when, with abnormal prices actually being present, no reasonable man would reproduce the parts. The Privy Council agreed with the arbitrators in holding that they were under no obligation to proceed on any such imaginary basis. The judgment said that at the time the valuation was made the arbitrators said prices had become fairly stabilized and in determining the actual value at that time they were entitled to have regard to prices then generally current.

On the cross-appeal of the company, the judgment disagreed with the Canadian Supreme Court concerning the arbitrators' jurisdiction regarding the valuation of certain items. It was impossible for them, the judgment says, to fix a sum without incidentally determining what items were to be included.

The judgment said that the value of the items allowed by the arbitrators, amounting to $543,500, should be restored to the award. As to the particular items ruled out by the arbitrators and which were in question in the cross-appeal, the above-mentioned money considerations were added. The cost of both appeals will have to be borne by the respective parties, according to the judicial committee.

INTEREST ISSUE TO GO TO OTHER COURTS

Disappointment was felt on the question of interest not being cleared up by the Privy Council. It is figured that the company will be granted this by the local courts, but it may again be the means of opening a lengthy discussion. The council agreed with the view taken by the appeal court that the general rule under which a purchaser who takes possession is charged with interest on the purchase price from that time until it is paid was well established, and had on many occasions been applied to compulsory purchases, but stated that the matter lay outside of arbitration for its enforcement.

The decision reviewed by the Privy Council was rendered on Jan. 31, 1923 by a majority of three members of the Toronto Railway board of arbitration in the long-drawn valuation case valuing the system at $12,000,000. The sessions had been held on 158 days and evidence taken totaled 5,000,000 words. Sir Adam Beck, the minority member, filed a brief dissenting report saying that he was unable to concur in the conclusion as to the method which should be adopted in ascertaining the value of the railway plant and equipment, and also dissenting from the statement of the majority as to certain of the property which the railway claimed should be valued as property required for the operation of the railway. Among the prominent engineers engaged in the case for the company were Hagenah & Ericson of Chicago, A. L. Drum of Chicago and M. E. Cooley of Ann Arbor, Mich. Jackson & Moreland of Boston were in charge of the case for the city assisted by Prof. A. S. Richey of Worcester, Mass., who valued the rolling stock. Following the appeal of the city to the first divisions court against the amount and the subsequent reduction by $543,500 the city announced its dissatisfaction again and in the fall of last year announced its intention of appealing to the Privy Council.

Since the decision of the Privy Council Toronto Railway shares have advanced to 108, an increase of 4 points. When the arbitration began the stock was sold at 70½ and after the decision was announced it went up to 94½.

It was reported after the announcement of the award that the City of Toronto will soon float an $8,000,000 loan to finance the purchase of the Toronto Railway. It was stated in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 11 that a loan of about $7,000,000 was expected, to be on a competitive basis.

New Plan of Settlement for Suburban in St. Louis

Members of the bondholders' committee of the Suburban System of the United Railways, St. Louis, Mo., have stated that a new plan of settlement for them in the reorganization has been submitted. While the details of the new plan for the Suburban has not been revealed, it is said to provide for payment in full at par and interest of the $2,000,000 consolidated first mortgage Suburban bonds, while the $4,500,000 Suburban 5s would be extended under an agreement whereby $1,000,000 of the bonds would be retired in ten years at the rate of $100,000 annually and at the end of ten years the balance of the issue would be retired at par and accrued interest. The bonds would be first lien against the Suburban properties, but would not be guaranteed by the new company.

Judge Faris in the United States District Court on Oct. 25 declined to dismiss the suit of the Suburban bondholders for a separate receivership for that property and granted the request of the city of St. Louis to be permitted to intervene in the Suburban suit. He then continued further hearing of the case until Nov. 8.

Sam B. Jeffries, counsel for the Suburban interests, at the hearing asked Judge Faris not to make any further rulings in the United Railways case. Judge Faris said he would postpone further action on the petition to consolidate all of the United Railways cases which had been set for Oct. 25.

Files Abandonment Intention.—The New York & Long Island Traction Company has filed a certificate in the office of the Secretary of State declaring its intention to abandon a portion of its line at Ozone Park and on Rockaway Road, Long Island.

Portsmouth Property Cannot Share Traffic

If a proposed bus line in Portsmouth, N. H., is permitted to operate, the discontinuance of the Portsmouth Electric Railway is very likely. This was brought out at the hearing before the Public Service Commission by counsel for the Boston & Maine Railroad, owner of the Portsmouth Electric Railway on the petition of Joseph Cavarette to operate a bus line in the city of Portsmouth and between Portsmouth and Rye Center, paralleling and competing with the lines of the Portsmouth Electric Railway.

The attorney presented figures to show that the number of passengers using the cars had decreased nearly 50 per cent from 1916 to 1923, while the cost of operation in the same period, even with great economy, had increased 50 per cent, and although passenger fares in the same period increased 89 per cent, passenger revenues diminished 3 per cent, so that the operating expense per car-mile in 1923 was more than 35 cents, while the operating revenue per car-mile was only 27½ cents. He stated further that the great increase in the number of people using automobiles made it improbable that the electric line could ever be made to pay its operating expenses.

Revision of the Richey Wage Index

The Street Railway Wage Index which is compiled monthly by Albert S. Richey will be revised in succeeding issues of this paper by a change in the weighting employed in its construction. Heretofore, the index has been weighted in accordance with the number of passenger cars operated by the various companies. In the revision, the weighting is in accordance with the number of trainmen (conductors, motormen and one-man car operators) employed by the various companies. The revised index will represent more correctly the trend of electric railway trainmen's wages, although the change is but slight, as will be noted in the following table, where the former and revised wage index numbers are shown in parallel columns for 1923 and 1924 to date:

	1923		1924	
	Former	Revised	Former	Revised
January	207.4	207.1	218.9	217.4
February	207.3	207.1	219.0	217.4
March	207.3	206.8	219.0	217.5
April	207.3	207.0	219.1	217.7
May	208.2	209.0	219.3	217.8
June	209.6	212.6	220.4	220.0
July	211.8	213.5	221.4	220.0
August	213.7	216.2	221.4	220.0
September	214.7	216.4	221.4	220.1
October	217.5	216.4	221.9	220.6
November	218.2	216.4		
December	218.2	216.4		

The wage index, as revised in succeeding issues, represents, on the base of 1923 = 100, the trend of maximum hourly wages of street and interurban railway platform men of about 100 of the largest companies in the United States, weighted according to the number of men so employed. It is a part of the "Conspectus of Indexes" issued monthly by Mr. Richey, and published regularly in the Corporate and Finance Section of the fourth issue each month of the ELECTRIC RAILWAY JOURNAL.

Purchase Negotiations Started.—Dispatches to Toronto from New Orleans, La., state that negotiations for the purchase of the South New Orleans Railway & Light Company have been opened up with financial interests in New Orleans and New York. The price is understood to be in excess of $800,000. The line, the successor to the South New Orleans Light & Traction Company, is 6.5 miles long and connects Algiers and Gretna. E. W. Burgis is president and general manager. It is said that an agreement to take over the property will be executed as speedily as possible.

Allowed to Destroy Cars.—Permission was granted recently to the Trenton & Mercer County Traction Corporation by the New Jersey Board of Public Utility Commissioners to abandon four of its double-truck and nine single-truck passenger cars and to charge against the company's depreciation fund $55,000 less any salvage which may be secured in the destruction of the cars.

Wants to Abandon Line.—The Mauch Chunk & Lehighton Transit Corporation, Mauch Chunk, Pa., has asked permission to abandon its service between Flagstaff and Lehighton, Pa., a 12½-mile route. The company plans to substitute a bus service.

Action on Security Issue Withheld.—The New Jersey Board of Public Utility Commissioners has withheld action on approval of an issue of securities by the Red Bank & Keyport Railway, to be used as capital stock, until the company has obtained proper franchises to operate through all municipalities on its line. The tracks and other physical property of the applicant were purchased by Herman C. Schlicting from the Jersey Central Traction Company, which the commission authorized to discontinue operations in an order of July 12, 1923. Mr. Schlicting organized the Red Bank & Keyport Railway for the purpose of taking over the old concern's existing property, providing new cars and furnishing street railway transportation over a portion of the lines of the Jersey Central Traction Company in the northern part of Monmouth County. The application dismissed recently was for an approval of certain securities to complete the financing of the new company.

Seeks to Discontinue Line. — The Lykens Valley Railway, Williamstown, Pa., has petitioned the Public Service Commission to discontinue its line between Williamstown and Reinerton via Tower City because it was unable to operate profitably. At the same time an application was received from stockholders of the railway company, organized as the Williams Valley Transportation Company, seeking authority to operate buses as common carriers to replace the trolley service. The Lykens Valley Railway, which is the reorganized Lykens & Williams Valley Street Railway, is 10 miles long. The company owns 7 motor passenger cars, 3 motor service and 1 trail service car.

Hearing on Abandonment Set.—Hearing will be held before Public Service Commissioner Oliver C. Semple at New York Nov. 10 on the petition of the Yonkers Railroad for permission to abandon a portion of its routes and franchises in the city of Yonkers. The routes proposed to be abandoned are the Nepera Park, Elm and Walnut Street, Tuckahoe, Bronx River Road and Central Park Avenue lines.

Hotel on Carhouse Site. — Realty Associates and Bing & Bing, Inc., have sold the old carhouse block front on the east side of Seventh Avenue between Fiftieth and Fifty-first Streets, New York, to William and Julius Manger, owners of the Manger chain of hotels, for a twenty-story hotel building. The site of the new Manger hotel is a part of the old New York Railways carhouse block, 200x800 ft., between Sixth and Seventh Avenues, acquired last August by Realty Associates and Bing & Bing, Inc., from the Broadway & Seventh Avenue Railway.

Preferred Stock Offered to Customers and Employees.—The West Penn Company, Pittsburgh, Pa., through the West Penn Securities Department, Inc., is offering to its customers and employees 7 per cent cumulative preferred stock, at $94 per share. Payment may be made either in cash or on the partial-payment plan. Under this plan from 1 to 100 shares may be subscribed for by an initial payment of $6 a share and a monthly payment of $8 a share.

Names Director. — Benjamin H. Namm has been designated by the New York Transit Commission as a director to represent the public on the board of directors of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y. Major Namm's appointment fills the vacancy caused by the resignation of Travis H. Whitney, now vice-president of the corporation.

Seeks to Purchase Railway Stock.—The Niagara, Lockport & Ontario Power Company presented a petition to the New York Public Service Commission on Oct. 27 asking for consent to purchase all of the issued and outstanding capital stock of the Warren & Jamestown Street Railway, which runs between the Borough of Warren, Warren County, Pennsylvania, and the city of Jamestown. The stock of the railroad is owned by the Venango Public Service Corporation of Pennsylvania. The petition states that the company could furnish motive power to the railroad either directly or through its subsidiary, the Western New York Electric Company, and could effect economies by using the existing transmission lines of the railroad for the distribution of electricity for light, heat and power.

Income Increases.—For the first nine months of the present year the Washington Railway & Electric Company, Washington, D. C., had net income of $743,487, while during the same period in 1923 the income was $588,456. Operating revenues declined from $3,726,794 in the period of 1923 to $3,550,968 for the nine months' period of the current year. Expenses also decreased from $3,075,664 in 1923 to $2,840,772 in the nine months of the current year.

Vote to Sell Power Plant.—Directors of the Holyoke Street Railway, Holyoke, Mass., voted unanimously Oct. 28 to sell its power plant on the Connecticut River bank to the Turners Falls Power & Electric Company and make contracts for energy for operating the electric railway system. The sale price is said to be $400,000. The stockholders will meet Nov. 18 to take action on the plan. The reported sale of the power house was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 25.

Orders Properties Sold to Cities.—Municipal ownership of car lines in De Kalb and Sycamore, Ill., is assured by an order entered by Judge Fulton in the De Kalb County Circuit Court authorizing A. D. Mackie, receiver for the De Kalb-Sycamore & Interurban Traction Company, to sell the properties to each city. The line between the two cities will be abandoned, being unprofitable.

Legal Notes

CALIFORNIA.—*Instruction on Last Clear Chance Doctrine.*

Instruction by the court in a "last clear chance" case that the company was liable if the motorman knew or should have known, by facts which would ordinarily come within the observation of an ordinary, reasonably careful man, that the plaintiff was lying on the track, when actually the motorman had his head to one side and was looking over his right shoulder, was held erroneous. (Alcamizi vs. Market Street Railway. 228 Pacific Rep., 410.)

CALIFORNIA. — *Land Conveyed for a Public Highway May Be Used for that Purpose to the Extent that the Convenience and Welfare of the Public May Demand.*

The State Highway Commission of California purchased a strip of land for a public highway and later instructed an interurban railway to relocate its tracks so that they would occupy the strip thus purchased. The seller of the land then brought suit against the railway for the wrongful taking of his property, making several complaints. The court held, however, that where land is conveyed for a public highway, the implication must be that it will be used as the convenience and welfare of the public may demand, and that the kind of use may change as the demand is augmented by the increase of population. An abutting property owner is not entitled to compensation anew for every improvement in the street or type of vehicle used on it or with every change made imperative with such an improvement, especially where, as in this case, the conveyance with knowledge that such a change would probably be made. [Callopy vs. United Railroads of San Francisco, 228 Pacific Rep., 59.]

FEDERAL COURT. — *Powers of City in Contracting the Purchase of Street Railway Limited by Enabling Statute.*

The city of Seattle agreed to take over the railway system in that city on Feb. 10, 1919, free and clear of every incumbrance for the sum of $15,000,000, to be paid in the way specified in the contract and this contract was ratified by the City Council. The actual transfer was not made until March 31, 1919, owing, at least in part, to the suit of a taxpayer to enjoin the sale, but this plea was denied. In the meantime, state, county and municipal taxes, amounting to $401,017, became a lien on the property on March 15. In view of this fact, the company and city agreed that the former would assume one-quarter of these taxes and the latter the remaining three-quarters. The court held, however, that the power of the city in making the purchase was limited by the statute to the plan adopted, which did not provide for payment of any taxes by the city, and that whatever legal rights the company might have against the city on the contract for repayment of taxes do not permit it to impose a lien on the property for this payment. Its payment of the tax, to avoid a sale of other property, did not entitle it to subrogation of the tax lien on the property conveyed. [Puget Sound Power & Light Co. vs. City of Seattle, 300 Federal Rep., 441 and 443 (two cases).]

LOUISIANA.—*Grant of Land on Condition of Construction of Railroad Not Defeated When Railroad Is Discontinued.*

A property owner sold certain land to another on condition that an electric railway should be built alongside the property within 16 months. The road was built, operated continuously for about four years and intermittently for another year, and was then discontinued and the rails taken up. A suit was brought to determine whether the heirs of the original owner had a reversionary interest in the property. The court held that the agreement required the construction of the line, not its operation for any definite length of time, and that the title was valid in spite of the abandonment of the line. [Bush vs. Bolton et al., 100 Southern Rep., 692.]

NEW JERSEY.—*Street Car Lines Asking Protection Against Unjust Competition and Municipal Authorities Giving that Protection Not Liable for Damages Unless Actuated by Improper Motives.*

Two suits for damages were brought by jitney operators on the charge that the defendant railway company conspired with public officials and carried on a campaign of libel, malicious prosecution and conspiracy to destroy the plaintiffs' business. The court pointed out, however, that the railway owed to its stockholders the duty of securing all legal protection against unjust and unlawful competition. It also said that the public authorities are the custodians of the public highways in many respects and must stand for the protection of the rights of the public therein. The public is interested to see that transportation on these highways is efficient, responsible and supplied at the lowest cost. The public authorities are also interested in the protection of the highways against unreasonable use. There was nothing, in the opinion of the court, to indicate that the authorities had improper motives in enforcing the ordinances complained of, and a new trial was denied. [Kelly vs. Morris County Traction Co. et. al., also Seldney vs. same 126 Atlantic Rep., 24.]

OHIO.—*Waiver of Stockholders' Liability for Corporate Debts Valid and Effective as to Stockholders in a Successor Consolidated Company.*

Up to 1903 stockholders in Ohio companies were liable for the debts of the corporation to the extent of their stock and also for an amount equal to the stock held. In 1900 the Southern Ohio Traction Company issued bonds containing a waiver of such individual liability, and in 1902 the company was consolidated with another to constitute a third corporation. In 1916 the company became insolvent, and the bondholders of the Southern Ohio Traction Company brought suit against the stockholders of the consolidated company for their interest and principal. The court held, however, that the waiver was valid and applied also to the stockholders in the successor consolidated company. [Marfield vs. Cincinnati, D. & T. Traction Co., et al., 144 Northeast Rep., 689.]

RHODE ISLAND.—*Status of Attorney for Minor Claimant.*

A claimant, eighteen years old, had an agreement with an attorney to pay him one-third of damages recovered from a railway company but later made a direct settlement with the company, and the attorney sued the railway under the "attorney's lien law." A defense was that contracts with minors are voidable, but the court held that the question whether the attorney had a contract, whether his services were necessary and the value of his services before they were repudiated, should be determined by a jury. (Jacobs vs. United Electric Railways, 125 Atlantic Rep., 286.)

WASHINGTON. — *Overhang of Cars on Curves. Last Clear Chance.*

While a pedestrian is guilty of contributory negligence if he places himself in danger from the overhang of an ordinary street car as it rounds a curve, he is not thus guilty if the car extends over the sidewalk to a much greater extent than an ordinary car. The "last clear chance" doctrine applies where plaintiff's negligence continues up to the time of injury, if the defendant actually sees the peril, or if the plaintiff's negligence has terminated and the defendant did not actually see the peril but by exercise of reasonable care should have seen it. (Leftridge, et al vs. City of Seattle. 228 Pacific Rep., 302.)

Personal Items

Celebrate Subway Birthday

Twentieth Anniversary Commemorated by a Dinner to Honor President Hedley

The New York subway has so passed into the realm of accepted things that it is hard to realize the system is only 20 years old. Yet passengers were carried for the first time on Oct. 27, 1904. Trains began running at 7 p.m. on that day, and up to midnight 111,881 tickets were sold. The proceeds, $5,594.05, were turned over by the Interborough to charity the next day.

These and other facts relating to the early history of the Interborough Rapid Transit Company were recalled on Oct. 27, when a complimentary dinner to honor Frank Hedley, president of the company, and commemorate the twentieth anniversary of the subway was given at the Hotel Commodore. About 600 men prominent in railroad, financial and business circles were present.

Frank Hedley

The fittings of the dining room were appropriate to the railroad aspects of the meeting. The waiters wore the standard caps of Interborough guards. Every table carried a railroad lantern, either red or green, and over the speakers' table was a full-sized front vestibule of a standard car with markers and destination signs. Entrance to the dining room was possible only through one of four standard turnstiles of the Interborough, in which a nickel had to be dropped. Later this nickel was returned with a German 1,000-mark bill inside a souvenir bill case with the statement: "The New York Subways always have returned to every customer more than full value for every nickel received."

In the reception room were shown the spade with which the first dirt was removed for the building of the subway, the pick and crowbar probably used when ground was officially opened, and a silvered spike driven in the early days to commemorate the completion of the subway.

William G. Besler, president Central Railroad of New Jersey, officiated as toastmaster at the dinner, and after the repast August Belmont, long president of the Interborough, told about the early trials of the undertaking and how Mr. Hedley was selected for his job. Mr. Belmont said in part:

> Thirty-four years ago I became interested in the ownership of the Kings County Elevated road, which was subsequently sold to the B. R. T., and while we owned it Mr. Hedley was in our employ. He then went to Chicago and was doing good work out there in rapid transit when we needed him here to run our subways. He has been with the company ever since. Even London, whose transit system needed badly somebody to untangle it, could not induce Mr. Hedley to desert his task of perfecting New York's subway system. On Sept 7 of next year I shall have been fifty years in the financial world as a director of various enterprises. In that length of time one gets to know men. In all my career I have never known a man more devoted to his work than Mr. Hedley. The operation of the subway is his sole work and great ambition. The day will come when New York will realize the debt of gratitude it owes to Frank Hedley.

Dr. J. Duncan Spaeth, professor of English at Princeton University, cited the guest of the evening as one who had been able to transform promise into performance and spoke of the benefit of rapid transit by which workmen were able to have more time at home instead of spending it in transportation. He referred humorously to the crowds during the rush hour, but said that it was the greatest tribute to the popularity of anything that more was wanted than could be given. He referred to Mr. Hedley as coming from a family prominent in past years in transportation and paid a marked tribute to the engineering type of mind because of its ability to control the forces of nature. In his opinion, the greatest need today is a reconciliation and coordination of technical power, financial power and political power.

Neal O'Hara of the editorial staff of the New York *Evening World* gave a humorous talk on "Styles and Turnstiles," and there were recitations and singing, led from the platform of the model car over the speakers' table.

The evening concluded with the presentation of a reel of moving pictures showing Mr. Hedley on his "farm" at Green's Farms in Connecticut, where he gets rest by performing the manifold duties of farm life.

Mr. Hedley said that when the subway was opened many people, even many railway men, doubted the practical possibility of transporting people underground. He said that Mr. Belmont was the real father of subway construction and operation in New York and deserved the largest share of credit for making the subway possible. He also spoke of Mr. Bryan, Mr. Shonts, his own assistants and the loyalty of the employees, which had made the undertaking possible. He said that his work in connection with the subways had been a great pleasure to him. He hoped he had given service to the public. This had been his intention in the past and would be in the future.

President Robert Resigns

Head of Montreal Property Resigns After Fourteen Years to Look After Other Interests

E. A. Robert, president of the Montreal Tramways since 1910, has resigned. When Mr. Robert took office the old franchise of the Montreal Street Railway with the city of Montreal was drawing to a close. It became necessary to draw up a new contract. After prolonged negotiations with the civic and provincial authorities, he finally secured a franchise by which the company was guaranteed a reasonable return on its investment while the development of the system was assured. Under this agreement a Tramways Commission was appointed, to fix the fares so as to give the necessary income to the company and protect the public. At the same time the commission has to decide on the extensions that are necessary and whether or not the demands of the city are commercially practicable. In other words, while the company is still a privately owned one, the system is practically under municipal control, with the important provision that the city practically assumes responsibility for the financial success of the system. This franchise has worked to the satisfaction of both the public and the company and has been one of the models for study by street railways elsewhere that were beset in a similar manner.

E. A. Robert

The growth of the Montreal Tramways system under the presidency of Mr. Robert is shown by the fact that when he assumed control fourteen years ago the company was then operating less than 600 cars, nearly all of which were single-truck cars. Today more than 1,200 of the latest model double-truck cars are in use, including many trailers, while the trackage has been increased 50 per cent. In 1912 the number of passengers carried was 210,000,000, while last year the number was 290,000,000. The gross earnings

under Mr. Robert's management increased from around $6,500,000 in 1912 to more than $12,500,000 last year.

In addition Mr. Robert authorized the construction of several new carhouses and installed an emergency steam plant, which has proved of great benefit when there have been temporary dislocations of the regular supply of electric power for operating the cars.

The system is now reaching out to every part of the island of Montreal, and today in many parts of the city improvements are being carried out which were authorized by Mr. Robert previous to his retirement.

Mr. Robert came into prominence in Montreal about 1904 by his application to the Quebec Legislature for a charter to develop a small water power at St. Timothee, near Montreal. This charter he secured after an able and energetic fight. Despite opposition, Mr. Robert was able to finance the project, and he successfully developed the plant, which began to generate power in the latter part of 1911. This was followed by the absorption of several small power companies on the island. He extended his operations in the suburbs of Montreal, and so successful was this undertaking that he was granted rights to enter Montreal proper and thus establish a competitive source of supply.

While Mr. Robert has retired from the traction and power companies he built up, he has not retired from active business life, as his numerous personal interests are sufficient to keep him busy. Furthermore, according to reports he is working on a power proposition which will entail the development of a power plant of at least 200,000 hp., situated within 35 miles of Montreal.

This is only part of the whole story. Moreover, it is only part of the story of his achievement at Montreal. His career was reviewed in the ELECTRIC RAILWAY JOURNAL, issue of April 29, 1922. At that time Mr. Robert had just been elected president of the Quebec Railway, Light, Heat & Power Company in addition to the Montreal post and his other affiliations.

T. F. Mueller, formerly assistant business manager of ELECTRIC RAILWAY JOURNAL and *Bus Transportation*, has been made district manager for the states of Michigan and Indiana, effective Nov. 1, with headquarters in Detroit. Mr. Mueller has been connected with the business department of this paper since January, 1917.

Gen. W. W. Atterbury vice-president of the Pennsylvania Railroad, will become president of the road when President Samuel Rea retires next year. In preparation for this change General Atterbury was moved up on Oct. 29 from his position of vice-president in charge of operation to that of vice-president. It is said among shippers that he knows their business requirements almost as well as he knows the needs of the railroad. He worked himself up from his first job as an apprentice in the Altoona shops of the Pennsylvania Railroad to the president of the American Railway Association in 1916. From August, 1917, to May, 1919, he was director general of transportation of the A. E. F. in France with the rank of Brigadier-General.

Posts of Superintendent of Personnel and of Instruction Filled at Detroit

Two new positions were created on Oct. 1 in the general staff of the transportation division of the Department of Street Railways at Detroit.

Richard Dawson was appointed superintendent of personnel and Herman B. Kirchoff was made superintendent of instruction. Both have been division superintendents for several years. They are directly under E. S. Rider, superintendent of transportation. Their headquarters are at the general offices.

Mr. Dawson will be in charge of matters pertaining to the welfare and conduct of the trainmen. He will relieve Mr. Rider and D. A. Smith, assistant superintendent of transportation, of considerable detail in connection with employees called to the main office as he will sit as chairman of the trial board which hears cases involving the platform men.

Mr. Kirchoff will supervise the work of instruction of new trainmen and of those others who require special instructions.

Of the two men, Mr. Kirchoff has been with the Detroit system the longer. His connection dates back to Sept. 14, 1895, when he started as conductor on the Fourteenth line. Mr. Dawson began as a conductor on the Fourteenth line on July 11, 1899.

Mr. Dawson has been succeeded as division superintendent of the Baker Division by Paul W. Leeson, assistant division superintendent of the Fort Division. B. L. Vail, station master at the Fort carhouse, will succeed Mr. Leeson.

Mr. Kirchoff's position as division superintendent of the Jefferson Division has been filled by promoting Charles Lighthammer, who was assistant division superintendent of that division. John Branigan, service inspector, has been appointed assistant division superintendent in Mr. Lighthammer's place.

Obituary

Henry J. Crowley

Henry J. Crowley, a prominent electrical engineer and general manager of the American Electric Power Company and its successor, the American Railways, since 1899, died Oct. 27 after an illness of two years. Mr. Crowley entered the employ of the Pratt & Whitney Company of Hartford, Conn., following his graduation from high school and served an apprenticeship in mechanical engineering. After completing his apprenticeship, he entered the locomotive shops of the New York, New Haven & Hartford Railroad in Hartford.

Following services with the Schuyler Electric Light Company, he entered the employ of the Thomson-Houston Electric Company and from 1890 to 1893 was manager of the railway department of the company's Southern office at Atlanta, Ga. During this period he was in charge of a number of early electric railway installations, including roads in Atlanta, Macon, Augusta and Savannah, Ga.; Birmingham and Mobile, Ala., and Chattanooga and Memphis, Tenn.

From 1893 to 1899 he was engineer and manager of the General Electric Company's railway department in the Eastern district. During this time he was actively engaged in a number of railway installations, among the more important being Philadelphia, Harrisburgh, Washington, and Richmond. When the American Railways Company was organized in 1899 Mr. Crowley was elected general manager.

Mr. Crowley was a fellow of the American Institute of Electrical Engineers and the American Society of Mechanical Engineers. He was born at Unionville, Conn., 59 years ago.

C. M. Holland

On the eve of the "holing through" of the vehicular tunnel under the Hudson River between New York and Jersey City, Clifford M. Holland, chief engineer, died Oct. 27 at Battle Creek, Mich., where he had gone to recover from a nervous breakdown. He had served the city and the state of New York continuously for 18 years in designing and constructing tunnels for New York city's rapid transit subway system.

Mr. Holland was born in Somerset, Mass., in 1883. After graduation from Harvard University, with both an A.B. and a civil engineering degree in 1906, he went to New York as assistant engineer with the Rapid Transit (later the Public Service) Commission, which was then engaged on the construction of New York's subways. He remained continuously on the city's subway and tunnel work until his appointment in 1919 as chief engineer of the New York-New Jersey Bridge & Tunnel Commission, which was created to construct the great vehicular tunnel under the Hudson.

Among the important New York Subway tunnels to which he was assigned for duty were the Battery-Joralemon Street tunnel under the East River, the Fourth Avenue subway in Brooklyn, the Whitehall-Montague Street tunnel, the Willoughby-Montague Street tunnel, the Fulton Street subway, the Old Slip-Clark Street tunnel, the Fourteenth Street-North Seventh Street tunnel, and also the Sixtieth Street tunnel.

He took a keen interest in engineering affairs and at the time of his death was a director of the American Society of Civil Engineers and president of the Harvard Engineering Society.

Austin H. Pease, vice-president and assistant treasurer of the Wason Manufacturing Company, Springfield, Mass., died in Springfield Hospital on Oct. 21, after a short illness. He was a son-in-law of the late Henry Pearson, who was president of the company under the old régime and had held the office of vice-president following its absorption by the J. G. Brill Company. After Mr. Pearson's death, about a year ago, Mr. Pease, who had been secretary, was made vice-president. He was 58 years old.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Small Coal Consumption Reflects Business Inactivity

Correspondence reaching Washington shows that there was general surprise in the coal trade and among consumers that the country's stocks should have been 47,000,000 tons on Sept. 1, as shown by the report issued jointly by the United States Geological Survey and the Bureau of the Census. In some quarters there is a disposition to doubt the returns. Those who hesitate to accept the figures in the stock report base their attitude on the fact that production was low during April, May and June—lower than in those months of 1921—yet the stock report shows a reduction of only 15,000,000 tons since Jan. 1 and only 4,000,000 tons since June 1.

The explanation of the apparent contradiction between the production and stock figures is that consumption of coal has been at a low ebb. In fact, it had fallen to a lower point than had been realized.

The stock report presents conclusive evidence that the country has been going through a period of dull business, which almost could be characterized as a depression. In the iron and steel industry, for instance, which affects coal more than do many lighter industries, the depression has been severe. The output of pig iron in July was the lowest in any month since February, 1922. To be specific, production of pig iron in July was 1,785,000 tons. This was barely half the rate of production in July, 1923, when it was 3,678,000 tons. Even the July, 1922, production was 2,403,000 tons.

In the first quarter of the year the output of iron and steel was well up around the level of 1923, a very prosperous year, but beginning in April it began to tumble. In so far as the iron and steel industry is concerned it certainly sunk to depression levels in midsummer. It is now moving upward at an encouraging rate, but has not recovered to the point where its consumption of coal is heavy.

One of the reasons why the present period of sluggishness in business has passed without much comment is that business has been spotty. Building and certain other activities have been brisk, but the heavy industries that are the large consumers of coal have been in the doldrums. They have been conspicuously absent for some time from the coal market.

It is noticeable that the changes in coal stocks since Jan. 1 reflect closely the trend of general business. From Jan. 1 to June 1 the liquidation of stocks went on rapidly, but from June 1 to Sept. 1 it was very slow. The fact that there is a heavy reserve still to liquidate is discouraging to the producers of coal and some are counseling curtailment of production, which has been rising sharply for six weeks. There can be no doubt that this would be good business from the standpoint of the coal operator, but from the consumers' point of view it is regarded apparently as good business to continue to buy coal at present prices so as to maintain the reserve.

The stock report shows that the country's reserve of coal is comfortably large. There is no prospect of a shortage this winter unless something unforeseen should occur. It would not be in the public interest for consumers to be lulled into a false sense of security and allow their stocks to fall below the danger line. There is increasing evidence, however, that American consumers at last have learned that ample reserves above ground constitute the best insurance they can have against high prices.

The appearance of the stock report, carrying with it a great surprise for the entire trade, emphasizes anew the need for distribution statistics that are comparable, at least, with those covering production. That the demand for such figures is becoming more and more insistent is indicated by the great amount of attention given the problem as applied to all commodities at the meeting of the Eastern division of the Chamber of Commerce of the United States in Washington.

Interstate Company Spends $586,500 for Equipment

During the twelve months ended Aug. 1, 1924, the Interstate Public Service Company, Indianapolis, Ind., expended for new equipment the sum of $586,500. Of this amount $83,500 was used for the purchase of 11 buses which have been put into operation between Indianapolis and Franklin. Ten new gondolas were purchased for $20,000. The remaining $483,000 was used for the purchase of new sleeping cars, parlor buffet dining cars, express motor trail cars, stock cars, a locomotive, box and ballast cars. References to these purchases were made in the ELECTRIC RAILWAY JOURNAL, issues of Dec. 22, 1923; June 14, July 12 and Oct. 11, 1924.

Important Extensions at Memphis

The Memphis Street Railway, Memphis, Tenn., has spent approximately $300,000 in new construction work in addition to about $210,000 in improving existing trackage for the growth of the city during the present year. About 5,800 ft. of double track is being laid now for making the connections for the crosstown line. An additional 2,000 ft. of double track is being laid on McLemore Avenue. Another important extension to the system is that of the 5,000 ft. of double track laid along Overton Park Avenue at a cost of approximately $90,000. The company has also constructed about 4,500 ft. of storage track along Front Street. Lead tracks from Main to Front Street were laid for the expeditious handling of cars to and from the storage tracks. This project, completed during the

ELECTRIC RAILWAY MATERIAL PRICES—OCT. 28, 1924

Metals—New York

Copper, electrolytic, cents per lb.	13.55
Lead, cents per lb.	8.65
Nickel, cents per lb.	29.50
Zinc, cents per lb.	6.85
Tin, Straits, cents per lb.	52.75
Aluminum, 98 to 99 per cent, cents per lb.	27.10
Babbitt metal, warehouse, cents per lb.:	
Fair grade	60.00
Commercial	28.00

Bituminous Coal

Smokeless mine run, f.o.b vessel, Hampton Roads	$4.45
Somerset mine run, Boston	2.15
Pittsburgh mine run, Pittsburgh	1.875
Franklin, Ill., screenings, Chicago	1.375
Central, Ill., screenings, Chicago	1.175
Kansas screenings, Kansas City	2.00

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.85
Tie plates (flat type), cents per lb.	2.45
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents per lb.	8.75
Steel bars, cents per lb.	2.00
Ties, white oak, Chicago, 6 in. x 8 in. x 8½ ft.	$1.45

Hardware—Pittsburgh

Wire nails, base per keg	2.75
Sheet iron (28 gage), cents per lb.	3.50
Sheet iron, galvanized (28 gage), cents per lb.	4.60
Galvanized barbed wire, cents per lb.	3.45
Galvanized wire, ordinary, cents per lb.	2.50

Waste—New York

Waste, wool, cents per lb.	15
Waste, cotton (100 lb. bale), cents per lb.:	
White	12–18
Colored	9–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$1.03
White lead (100 lb. keg), cents per lb.	12.00
Turpentine (bbl. lots), per gal.	$0.87
Car window glass (single strength), first three brackets, A quality, discount*	84.0%
Car window glass (single strength), first three brackets, B quality, discount*	86.0%
Car window glass (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

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

Wire—New York

Copper wire base, cents per lb.	15.625
Rubber-covered wire, No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, cents per lb.	17.75

Paving Materials

Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq.yd.	$3.60
Common, per sq.yd.	2.95
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.67
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots f.o.b.	$51.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	2.00
Sand, cu.yd., N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	10.75
Light copper, cents per lb.	9.25
Heavy brass, cents per lb.	7.00
Zinc, old scrap, cents per lb.	3.875
Light brass, cents per lb.	5.50
Lead, cents per lb. (heavy)	7.50
Steel car axles, Chicago, net ton	$17.25
Cast iron car wheels, Chicago, gross ton	17.75
Rails (short), Chicago, gross ton	18.25
Rails (relaying), Chicago, gross ton	26.50
Machine turnings, Chicago, gross ton	9.25

early part of the past summer, cost approximately $50,000. The loops on both the north and south ends of the Thomas-Florida line cost approximately $11,000, and the extension of the Florida line 1,900 ft. beyond its former terminus cost $7,000. The company also made numerous repairs on the existing tracks.

Rolling Stock

United Railways & Electric Company, Baltimore, Md., has put several additional one-man cars in operation. They are being used on the Preston and Carolina Streets line and probably will gradually replace the cars now in use on this line. The line has been operated with 15 two-man cars with seating capacity for 44 passengers each. Under the plan being worked out these will be replaced by 20 one-man cars with a seating capacity of 40 each.

Track and Line

Philadelphia, Pa.—Bids were opened on Oct. 21 in the office of Director Ehlers for the second section of the Broad Street subway, 8,600 ft. in length. Patrick McGovern of New York submitted the low bid of $13,485,414, and the prices submitted were found to be about the same proportionately as for the section now under construction between Girard Avenue and Clearfield Street, 10,000 ft. in length.

Terrell, Texas.—Surveys have been made and right-of-way for most of the distance obtained for the proposed interurban electric railway that is to be constructed between Terrell and Tyler, about 60 miles. The projected line is being promoted by Morris Mayfield, Terrell, and associates. The route of the line is through a rich agricultural section, including a number of towns that are now remotely situated from railroad transportation. Along the route are some of the largest deposits of lignite coal to be found in Texas.

Public Service Railway, Newark, N. J., has received permission from the Board of Public Utility Commissioners to relocate a portion of its road in Burlington, N. J., to conform to the proposed change in a section of Pearl Street in that city.

Dallas Railway, Dallas, Tex., will extend its Belmont line four blocks over the Dallas-Denison interurban tracks and will lay a passing switch and turning track. The railway will bear half of the expense, which is estimated at about $4,000.

Miami Beach Electric Company, Miami Beach, Fla., will extend the Flagler Street double-track extension to Twelfth Avenue.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has started construction of the extension of the Center Street line, which will cost approximately $100,000. The extension includes 2,440 ft. of double track and 260 ft. of single track. Heat treated cast chrome nickel steel rail, developed and produced under the formula and supervision of the company's engineering department, will be laid.

Market Street Railway, San Francisco, Cal., is reconstructing the track on lower Sutter Street, Third Street and Lincoln Way at a cost of $400,000. This will be followed by the rebuilding of practically the entire San José Avenue line.

Community Traction Company, Toledo, Ohio, has reached an agreement whereby Sylvania Avenue will be paved as soon as possible. The company will install a concrete base into which steel ties will be set.

Buffalo & Erie Railway, Buffalo, N. Y., plans to install an automatic electric block signal system on its line between Buffalo, N. Y., and Erie, Pa.

Pacific Electric Railway, Los Angeles, Cal., has been granted permission to build a short line freight track connecting San Pedro, Wilmington and Long Beach. This is the second step which has been taken recently toward unifying the railroad services of the harbor. Recently the commission granted the Union Pacific System permission to enter the harbor under the consolidated railroad plan. At the intersection of the Union Pacific line and the Pacific Electric tracks an overhead crossing will be built. The expenses will be equally divided. Fourteen street crossings are to be made at grade, the entire expense to be borne by the Pacific Electric. The new line will cost an estimated amount of $163,899.

Power Houses, Shops and Buildings

Memphis Street Railway, Memphis, Tenn., and the Memphis Power & Light Company are having plans prepared for a large reinforced concrete warehouse to be located just north of the present carhouse.

Detroit United Railway, Detroit, Mich., closed down its power houses recently, thereby releasing all of the power house equipment located at Farmington, Monroe, New Baltimore and Rochester, Mich. These four power stations were replaced by 19 1,000-kw. full automatic substations. The company is offering all of these power house equipments for sale. This is in line with the agreement which the company entered into in 1923 with the Consumers Power Company and the Detroit Edison Company for the purchase of all power necessary to operate their 600 miles of city and interurban service.

Trade Notes

Detroit Stoker Company, Detroit, Mich., will show full-sized underfeed stokers in operation at the Mechanical Engineering Power Show, Grand Central Palace, New York City, Dec. 1 to 6, 1924.

Roller-Smith Company, New York, N. Y., announces the appointment of Charles R. Speaker, Evening Star Building, Washington, D. C., as its representative in the District of Columbia. Mr. Speaker will also handle the Roller-Smith Company's government business in the States of Maryland, Virginia, North Carolina and South Carolina.

D. B. Dean, after nearly 25 years service with the J. G. Brill Company, has decided to withdraw from his active duties. With this in view he has resigned as sales manager and director of the G. C. Kuhlman Car Company, to take effect about Nov. 1.

Ohio Brass Company, Mansfield, Ohio, has moved its Philadelphia office from the Witherspoon Building to 1404 Packard Building, Fifteenth and Chestnut Streets.

Nichols-Lintern Company, Cleveland, Ohio, announces the rearrangement of selling territories and appointment of the following sales representatives: A. C. Burleigh, Boston, Mass.; Pharo Engineering Company, Pittsburgh, Pa.; Jameson-Ross Company, Chicago, Ill.; F. F. Bodler, San Francisco, Cal., and A. W. Arlin, Los Angeles, Cal.

New Advertising Literature

Electric Machinery Manufacturing Company, Minneapolis, Minn., has issued bulletin No. 854 describing, with illustrations, synchronous motors for compressors.

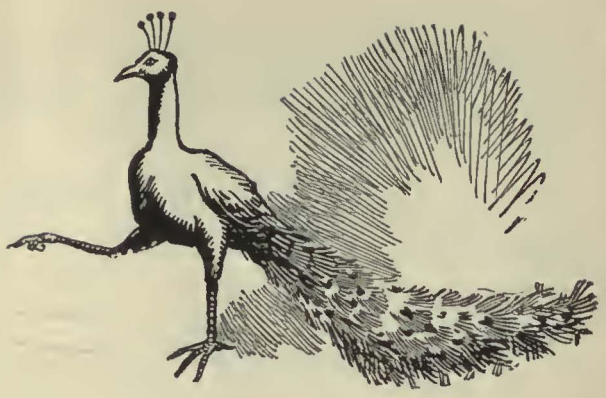
General Electric Company, Schenectady, N. Y., has issued a 12-page booklet bearing the designation Y-2019, describing the new type A General Electric welding electrode. Details are given on electrode construction and characteristics. Results of tests on welded cast iron specimens and deposited metal specimens are described, and oscillograms demonstrating arc stability are reproduced. Instructions for use of the electrode are supplied and specifications of the standard sizes given.

The Travelers Insurance Company, Hartford, Conn., has issued a 25-page booklet on the value of group insurance. The pamphlet gives the history of group insurance, some facts about those it serves and enumerates its many rewards. How the field service men on the Travelers Insurance serve the 2,400 corporations and firms on the list of group policyholders is included in the story. The value of group insurance is summarized thus: "Group insurance benefits him who gives and him who receives! You will never cease to be gratified with its adoption."

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued special publication 1707, Westinghouse Railroad Data. This pamphlet contains definite information on electrical applications on steam railroads.

Wagner Electric Corporation, St. Louis, Mo., has issued Bulletin No. 140, on power transformers.

Crouse-Hinds Company, Syracuse, N. Y., has issued folder No. 18 on "Imperial Floodlights and Projectors" and folder No. 19 entitled "A New Highway Law."



It always stops the car!

The Brake that Makes Every Car Safe in Every Emergency

There is a mighty big percentage in favor of the motorman who operates a car equipped with Peacock Staffless Brakes. He is always sure he can stop his car in an emergency no matter how adverse the conditions.

No load too heavy, no grade too steep for these powerful, quick-acting hand brakes. You can stop a car in the minimum distance by a turn or two of the hand wheel. It never fails, no matter how worn the brake shoes or how slack the chain. It is the most dependable hand brake made.

Yet Peacock Staffless Brakes are not expensive. First cost is small and maintenance cost practically nil. Some of these brakes have been on cars for five years and more without repairs.

We will be glad to furnish without obligation estimate of cost of installing Peacock Brakes on either new or old cars.

The Peacock Staffless

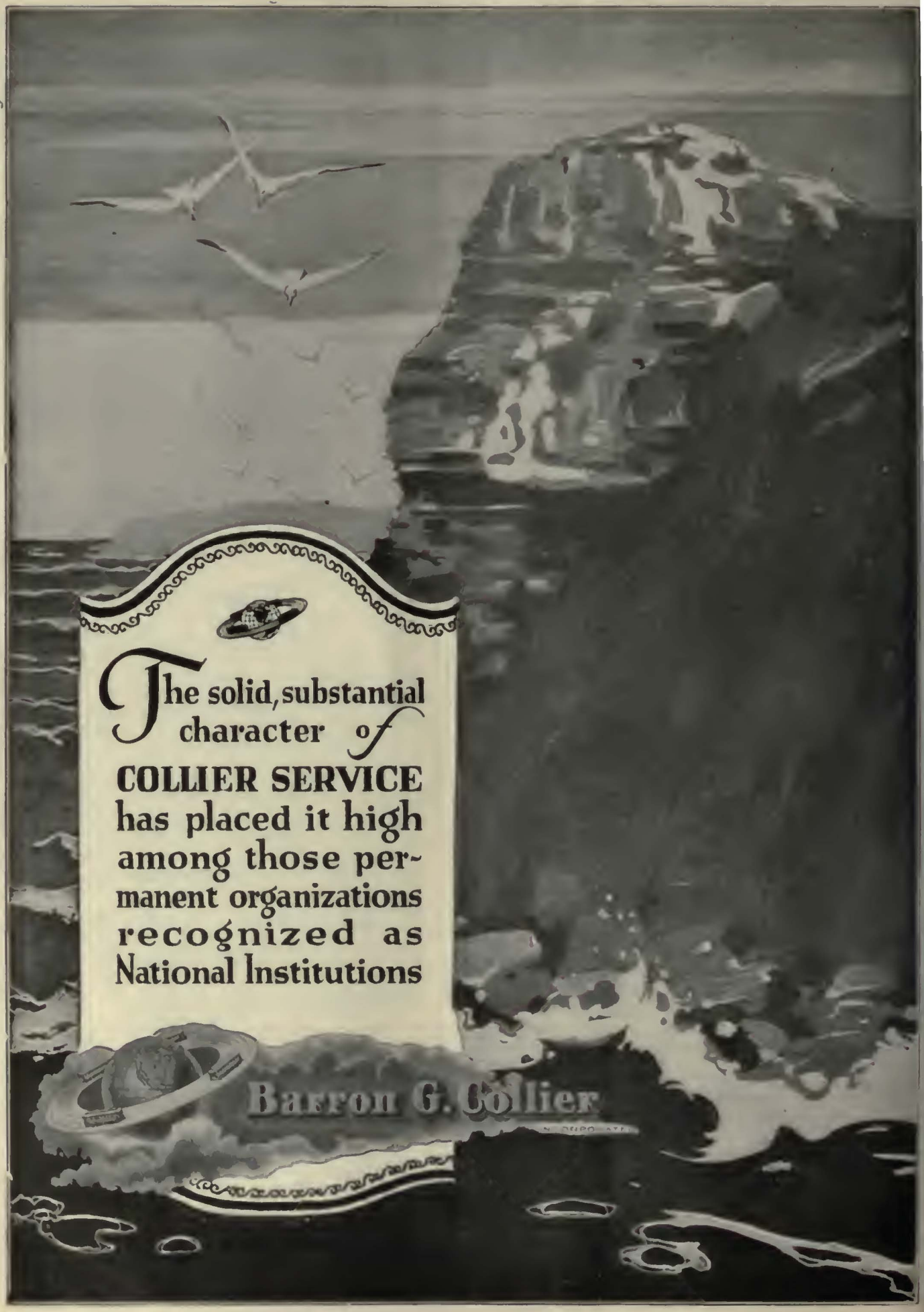
National Brake Co., Inc.

890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative:

Lyman Tube & Supply Company, Limited, Montreal, Canada

Bankers and Engineers


The solid, substantial character of
COLLIER SERVICE
has placed it high among those permanent organizations recognized as National Institutions
Barron G. Collier

Superior Parlor Car, mounted on Garford Chassis. This body has all the beauty and comfortable seating and riding qualities of the finest De Luxe Coach. Being of the pay-enter type it permits of profitable one man operation without lost time as the operator need never leave his seat at stops to manipulate doors or collect fares.

Bodies Produced By Superior

Acme, Garford, International, Pierce-Arrow, Republic, White, Yellow Coach! Superior has produced bodies for all of these better known chassis during the past year. For each of them Superior has produced bodies, beautifully designed; bodies properly suited to the chassis, resulting in fine appearance.

Superior bodies have gone into all classes of service. Long haul, short haul, street car, sightseeing service. For each type of service there is a Superior body that adequately meets the demands upon it.

Superior gives to the Chassis Builder a body that is a complement to his equipment. To the Motor Coach operator, Superior gives a sturdy, safe body. A body that attracts patronage by its fine appearance and holds that patronage by giving comfortable transportation. Superior bodies, because of their sound construction, earn further good will by keeping out of the repair shop.

When thinking of Motor Coach Bodies it pays to consult Superior. Write for complete information on any type of body.

THE SUPERIOR MOTOR COACH BODY CO.

LIMA, OHIO

SUPERIOR BODIES

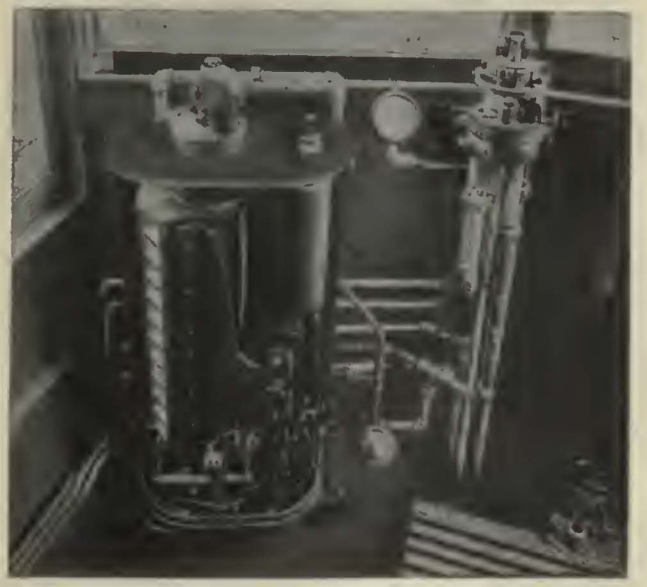
HERE'S THE TROUBLE, and HERE'S THE CURE

"All maintenance men are familiar with the difficulties experienced with new air actuated equipment on account of scale and dirt from the new piping collecting at undesirable points. Many of these difficulties can be avoided by a careful installation of the pipe. Before pipe is assembled it should be thoroughly hammered to loosen all scale or dirt, all fins and burrs tending to restrict the opening should be cut away and the pipe should then be blown out to remove all such matter. This treatment should be given before the pipe is in place, for otherwise it is apt to result in the deposit of this matter in some part of the pipe system or in the appliances connected thereto.*"

From an article in Electric Railway Journal, by Joseph C. McCune, Westinghouse Traction Brake Co., entitled, "Installing Safety Car Control and Air Brake Equipment."

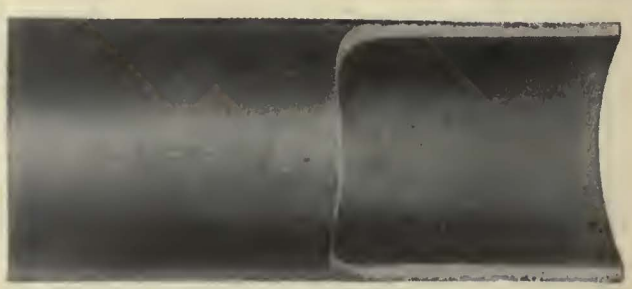
"NATIONAL" Welding-SCALE FREE Pipe having clean, smooth surfaces both inside and out, is ideal for installations on electric railway cars, and can be depended upon to greatly reduce the troubles caused where welding-scale is present.

All "NATIONAL" Butt-weld Pipe, sizes ½ to 3-inch inclusive, is made by the scale-removing process. The advantages resulting are described in "NATIONAL" Bulletin No. 7—"NATIONAL" Welding SCALE - FREE Pipe—Manufacture and Advantages. Everyone interested in the installation of piping for conducting air, in any type of service, should have a copy of this Bulletin. Ask for your copy today.



A typical installation of "NATIONAL" Welding-SCALE FREE Pipe on a modern street car.

Ordinary black butt-weld pipe showing chara coating of welding-scale



"NATIONAL" Welding-SCALE FREE Pipe, showing clean, smooth surfaces of this modern product.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.

General Sales Offices: Frick Building

DISTRICT SALES OFFICES

Atlanta Boston Chicago Denver Detroit New Orleans New York Salt Lake City Philadelphia Pittsburgh St. Louis St. Paul

PACIFIC COAST REPRESENTATIVES: U. S. Steel Products Company San Francisco Los Angeles Portland Seattle

EXPORT REPRESENTATIVES: U. S. Steel Products Company New York City

Davis "One-Wear" Wheels On the Key System

ON the inter-urban lines of the Key System Transit Company, Oakland, Cal., service is fast and equipment heavy.

Such a combination calls for wheels of the greatest possible strength and wear resistance.

Consequently Davis "One-Wear" Steel Wheels are used. Not only have they greater resistance to impact but they completely avoid the task of contour conditioning.

The Davis "One-Wear" Wheel is made of special steel compressed by centrifugal action while the metal is molten and later subjected to heat treatment to secure great strength and resistance to wear.

American Steel Foundries
NEW YORK CHICAGO ST. LOUIS

DAVIS
"ONE-WEAR"
STEEL WHEELS

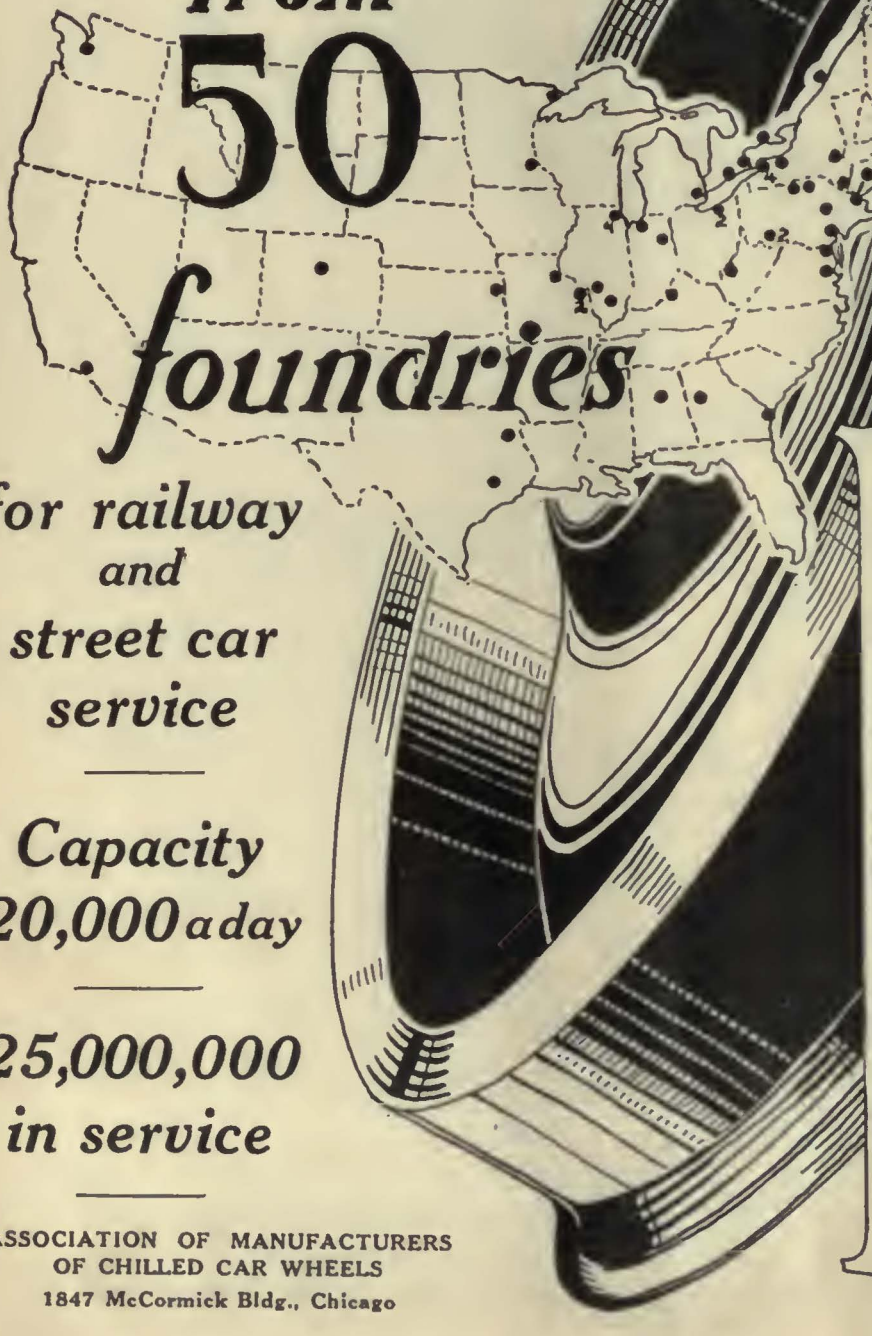
CHILLED IRON WHEELS

from **50** *foundries*

for railway and street car service

Capacity 20,000 a day

25,000,000 in service



THE map above shows the location of the 50 foundries in the United States and Canada represented by the Association of Manufacturers of Chilled Car Wheels.

Chicago, 4	Sayre, Pa.
St. Louis, 2	Berwick, Pa.
Buffalo, 4	Albany
Pittsburgh, 2	Toronto
Cleveland, 2	New Glasgow, N.S.
Amherst, N. S.	Madison, Ill.
Montreal	Huntington, W.Va.
Mich. City, Ind.	Wilmington, Del.
Louisville	Houston, Tex.
Mt. Vernon, Ill.	Hannibal, Mo.
Ft. Wayne, Ind.	Reading, Pa.
Birmingham	Baltimore
Atlanta	Richmond, Va.
Savannah	Ft. Williams, Ont.
Boston	St. Thomas
Detroit	Hamilton
St. Paul	Ramapo, N. Y.
Kansas City, Kan.	Marshall, Tex.
Denver	Los Angeles
Tacoma	Council Bluffs
Rochester, N. Y.	Winnipeg, Man.

American Railway Association Standards

650 lb. wheel	for	60,000 Capacity Cars
700 lb. wheel	for	80,000 Capacity Cars
750 lb. wheel	for	100,000 Capacity Cars
850 lb. wheel	for	140,000 Capacity Cars

The Standard Wheel for Seventy-three Years

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS
1847 McCormick Bldg., Chicago

Tooth Contour Tells

The motor coach has created, in many respects, a new field for automotive designing. It has gone far beyond the stage in which a make-shift body on a truck chassis could satisfy the operator.

Some of its needs, however, had been anticipated, among them a most important one—rear drive. The evolution of the more efficient worm type had already met the needs of a faster truck traffic on better roads and pneumatic tires.

Write for an interesting pamphlet which will give you an idea of the reasons why Timken-Detroit Worm Drive is embodied in the most advanced motor coach designs for 1925.

THE TIMKEN-DETROIT
AXLE COMPANY
Detroit, Michigan

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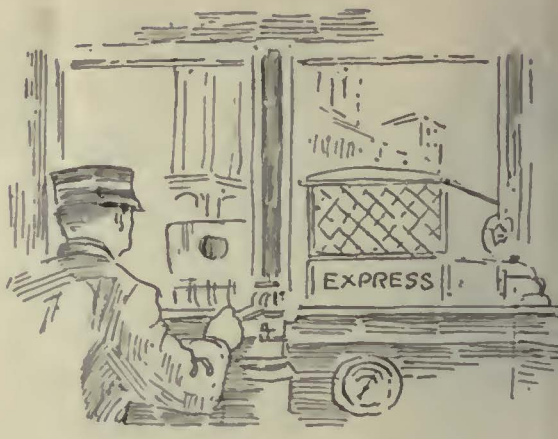
CO

TIMKEN AXLES



Save the motors with Nuttall Standard Helical Gears

First, second—fifth notch on the controller, and a shock goes through the car as the motors gather speed!

That's where the trouble begins, that shock of acceleration that is inevitable with spur gearing. It springs bolts, strains bearings, loosens insulation, cuts gear life and motor life, and piles up maintenance.

Not only the motors suffer; body work suffers too, and soon begins to creak, soon needs "touching up."

Nuttall BP Helical Gears will stop this profit leak. The meshing of the teeth is like the turning of a screw—smooth, vibrationless, noiseless, shockless. There is no grinding and no chattering.

The secret lies in the 7½ deg. Helix Angle; the long and short Addendum tooth; and the famous Nuttall BP Heat Treating Process.

The West Penn Railways have one set of Nuttall Helicals among the many they use with a 500,000 mile record to its credit. Practically every traction property in the country is using helical gears.

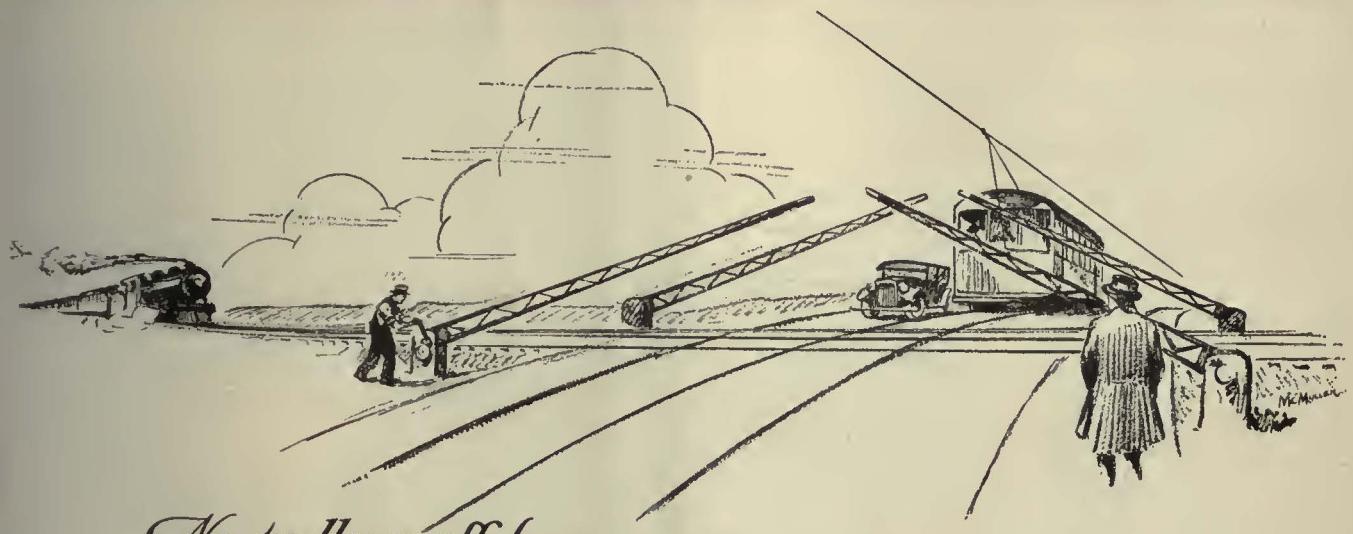
We'll be glad to co-operate in *proving* their economy on your cars. Consult us.

Write for our Helical Gear Book

R.D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

AERA



MILLER TROLLEY SHOES

(Patented)

cling to wire under all sorts of conditions

WHAT a feeling of security it gives, to know that trolley cars won't get stalled on steam railroad crossings. No need to wire the crossing with electrified baskets, or have a man there to replace jumping trolleys. Miller Trolley Shoes will stick to the wire here, or anywhere else.

Moreover, with a complete installation of trolley shoes, service will be improved, line breaks largely eliminated, and trolley maintenance costs materially reduced.

Used by over fifty prominent roads!

MILLER TROLLEY SHOE CO.

Boston 21, Mass.

Western Representative:

L. E. Gould, 1590 Old Colony Bldg., Chicago

Are you using tokens?

THE advantages of tokens over split change and paper tickets are obvious to all of the street railway companies.

If you want tokens that are difficult to counterfeit, that are accurate in size and always fit the fare boxes, that wear well and stay sharp, we can make them for you.

Next to the Government Mints, we have the largest and most complete equipment for making coin quality tokens—an organization built up in the past 104 years.

We have recently made up a sample card showing the tokens which are most popular today. May we send you one free—without obligation?

Besides tokens, we supply the railway field with cup drawn admiralty *condenser tubing* as well as ***uniform buttons.***

SCOVILL MANUFACTURING COMPANY

Main Office, Mills and Factories—Waterbury, Conn.

HIGHEST QUALITY—MATERIALS OF PRECISION—QUANTITY PRODUCTION

280 Broadway, New York
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ESTABLISHED 1802
SCOVILL
MANUFACTURING COMPANY

Pacific Coast Sales Agents:
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149 California Street,
San Francisco
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Selections may be made from a lot of two hundred.
Cars are three years old and in first-class condition.

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If interested in the purchase of the above kindly get in touch with the Department of Street Railways before date that bids are to be opened, for information relative to submitting formal bid, etc.

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Ingersoll-Rand Co.

Anchors, Guy
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Ohio Brass Co.
Westinghouse Elec. & M. Co.

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Bemis Car Truck Co.
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Laclede Steel Co.
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Standard Steel Co.

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Timken-Detroit Axle Co.

Axle Straighteners
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Universal Lubricating Co.

Lumber (See Poles, Ties, etc.)

Machine Tools
Columbia M. W. & M. I. Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Castings
Wm. Wharton Jr. & Co., Inc.

Manganese Steel Guard Rails
Ramapo Ajax Corp.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Indianapolis Switch & Frog Co.
Wm. Wharton Jr. & Co., Inc.

Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp

Meters, Car Watt-Hour
Economy Electric Devices Co.

Mica
Mica Insulator Co.

Motor and Generator Sets
General Electric Co.

Motor Buses
(See Buses, Motor)

Motormen's Seats
Brill Co., The J. G.
Electric Service Sup. Co.
St. Louis Car Co.
Wood Co., Chas. N.

Motors, Electric
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Nuts and Bolts
Allis-Chalmers Mfg. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Bethlehem Steel Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.

Oils (See Lubricants)

Oxygen
International Oxygen Co.

Paint & Varnishes (Insulating)
Mitchell-Rand Co.

Packing
Electric Service Sup. Co.
Westinghouse Tr. Br Co.

Paints & Varnish Preservatives
Baldwin Locomotive Wks.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Pavement Breakers
Ingersoll-Rand Co.

Paving Material
Amer. Br. Shoe & Fdry. Co.

Pickups, Trolley Wire
Electric Service Sup. Co.
Ohio Brass Co.

Pinion Pullers
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Electric Service Sup. Co
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Pipe
National Tube Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Electric Service Sup. Co.

Pneumatic Tools and Accessories
Ingersoll-Rand Co.

Pole Line Hardware
Bethlehem Steel Co.
Ohio Brass Co.

Pole Reinforcing
Drew Elec. & Mfg. Co.
Hubbard & Co.

Poles and Ties, Treated
Bell Lumber Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Electric Ry. Equip. Co.
Hubbard & Co.

Poles, Ties, Posts, Piling and Lumber
Bell Lumber Co.

Poles, Trolley
Anderson M. Co., A. & J. M.
Columbia M. W. & M. I. Co
National Tube Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Elec. Ry. Equip. Co.
Electric Service Sup. Co.
National Tube Co.

Porcelain, Special High Voltage
Lapp Insulator Co.

Pothends
Okonite Co.

Power Saving Devices
Nat'l Ry. Appliance Co.

Pressure Regulators
General Electric Co.
Westinghouse Elec. & M. Co.

Pumps
Allis-Chalmers Mfg. Co.
Ingersoll-Rand Co.

Pumps, Vacuum
Ingersoll-Rand Co.

Punches, Ticket
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N

Rail Braces and Fastenings
Ramapo Ajax Corp.

Rail Joints
Carnegie Steel Co.

Rail Joints, Welded
Indianapolis Switch & Frog Co.

Rail Grinders (See Grinders)

Rails, Relaying
L. B. Foster Co.
Hyman-Michaels Co.

Rails, Steel
Carnegie Steel Co.
L. B. Foster Co.

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

Railway Welding (See Welding Processes)

Rattan
Brill Co., The J. G.
Electric Service Sup. Co.
Hale-Kilburn Co.
Heywood-Wakefield Co.
St. Louis Car Co.

Registers and Fittings
Brill Co., The J. G.
Electric Service Sup. Co.
International Reg. Co., The
Rooke Automatic Reg. Co.

Reinforcement, Concrete
Amer. Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.

Repair Work (See also Coils)
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Replacers, Car
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.

Resistance, Grid
Columbia M. W. & M. I. Co.

Resistance, Wire and Tube
General Electric Co.
Westinghouse Elec. & M. Co.

Resistances
Consolidated Car Heating Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Westinghouse Elec. & M. Co.

Roofs
Haskelite Mfg. Co.

Sanders, Track
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.

Sash Fixtures, Car
Brill Co., The J. G.

Sash, Metal, Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Electric Service Sup. Co.

Seating Materials
Brill Co., The J. G.

Seats, Bus
Hale-Kilburn Co.
Heywood-Wakefield Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Hale-Kilburn Co.
Heywood-Wakefield Corp.
St. Louis Car Co.

Second-Hand Equipment
Electric Equipment Co.
Hyman-Michaels Co.
Transit Equipment Co
Zelnicker Supply Co., W. A.

Shades, Vestibule
Brill Co., The J. G.

Shovels
Hubbard & Co.

Shovels, Power
Allis-Chalmers Mfg. Co.
Brill Co., The J. G.

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Sup. Co.
Nat'l Pneumatic Co., Inc.

Signals, Indicating
Nichols-Lintern Co.
Oskel Equipment Co.

Signal Systems, Block
Electric Service Sup. Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Slack Adjusters (See Brake Adjusters)

Slag
Carnegie Steel Co

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Anderson M. Co., A. & J. M
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Bethlehem Steel Co.
Lorain Steel Co., The

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Splicing Sleeves (See Clamps and Connectors)

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American Steel Foundries
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Ft. Pitt Spring & Mfg. Co.
St. Louis Car Co
Taylor Electric Truck Co.

Sprinklers, Track and Road
Brill Co., The J. G.

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Morton Mfg. Co.

Steps, Car
Morton Mfg. Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse Elec. & M. Co.

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Oskel Equipment Co.

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Ohio Brass Co.

Strand
Roebling's Sons Co., J. A.

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Johns-Pratt Co.

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

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Indianapolis Switch & Frog Co.
Ramapo Ajax Corp.

Switches, Safety
Johns-Pratt Co.

Switches and Switchboards
Allis-Chalmers Mfg. Co.
Anderson M. Co., A. & J. M
Electric Service Sup. Co.
General Electric Co.
Westinghouse Elec. & M. Co

Switches, Selector
Nichols-Lintern Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track, Special Work)

Tampers, Tie
Ingersoll-Rand Co.
Railway Track-work Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail, Special Track Work
Bethlehem Steel Co.
Rampo Ajax Corp.

Telephones and Parts
Electric Service Sup. Co

Terminals, Cable
Standard-Underground Cable Co.

Testing Devices, Meter
Johns Pratt Co.

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and Destroyers
Electric Service Sup. Co

Ties and Tie Rods, Steel
American Bridge Co.
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co

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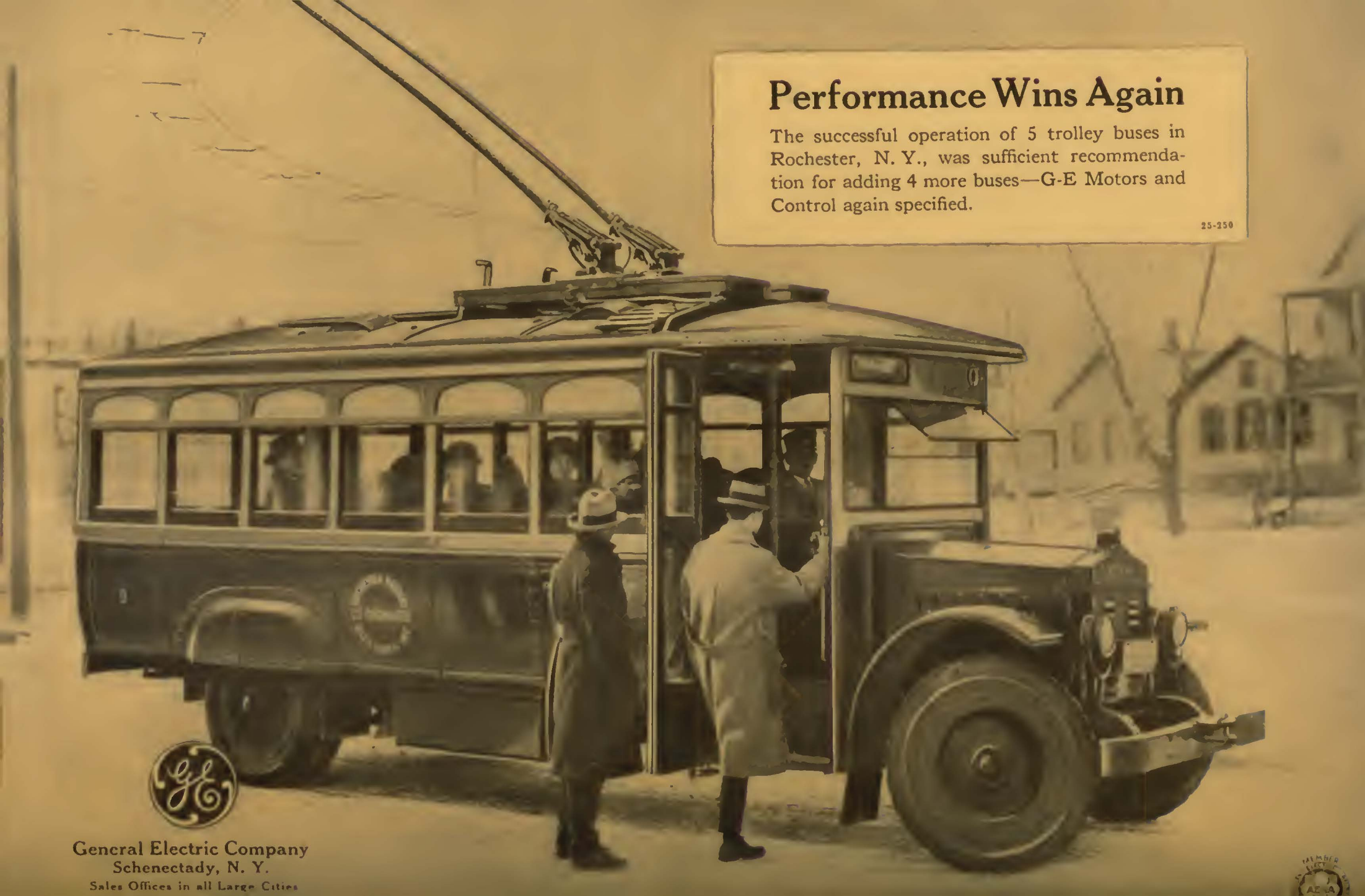

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