Street Railway Journal

VOL. XXXI. NEW YORK, SATURDAY, APRIL 25, 1908. No. 17

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

Henry W. Blake, Editor.

MAIN OFFICE:
NEW YORK, 239 WEST THIRTY-NINTH STREET.

BRANCH OFFICES:
Chicago: Old Colony Building.
Philadelphia: Real Estate Trust Building.
Cleveland: Schofield Building.
London: Hastings House, Norfolk St., Strand.

Cable Address, "Stryjourn, New York"; "Stryjourn, London"—Lieber's Code used.

TERMS OF SUBSCRIPTION

In the United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and the Canal Zone:

Street Railway Journal (52 issues).....$3.00 per annum
Single copies.....10 cents
Combination Rate, with Electric Railway Directory and Buyer's Manual (3 issues—Feb., Aug. and Nov.).....$4.00 per annum
Both of the above, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, $5.00 per copy).....$6.50 per annum

To Dominion of Canada:

Street Railway Journal (52 issues), postage prepaid.....$4.50 per annum
Single copies.....10 cents

To All Countries Other Than Those Mentioned Above:

Street Railway Journal (52 issues), postage prepaid.....$6.00
25 shillings. 25 marks. 31 francs.
Single copies.....20 cents

Remittances for foreign subscriptions may be made through our European office.

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During 1907 the Street Railway Journal printed and circulated 427,250 copies, an average of 8216 copies per week. Of this issue 7500 copies are printed.

Exoneration of Metropolitan Officials in New York

The long and careful investigation of the financial affairs of the Metropolitan Street Railway Company, of New York, and its allied corporations by the grand jury, which has lasted since January 6, was completed April 20, when that body submitted the result of its examination to the court absolving the operating officials from all charges of wrong doing. No such exhaustive consideration of the affairs of any street railway company has probably ever been held before, and the results must be very gratifying to Mr. Vreeland and his associates. The investigation by the grand jury followed as a result of the points brought out in the examination by the Public Service Commission last fall and through an unfortunate coincidence at a time when effects of various causes culminated in the insolvency of the Metropolitan Street Railway system. According to Mr. Ryan's statement, however, the chief reasons of the financial embarrassment of the company consisted briefly in the enforced extension of the free transfer system, increases in taxes, street congestion which added to the cost of operation and accident claims, and the competition of the subway lines. An abstract of the findings of the grand jury is presented on another page. It is fortunate that the latter took the broad ground that public interest in the subject demanded the freest publicity of its minutes. So many unfounded charges have been made in New York during the past six months, and for even a longer period, that it is of benefit to the entire street railway industry that a thorough examination should have been made of them all. Mr. Vreeland as president of the company has naturally been made the target of many of these attacks, and no one will congratulate him more upon his exoneration than his associates in the street railway industry.

Competition Among Foremen

The third of the series of articles on the car equipment department of the Interborough Rapid Transit Company is published this week, the particular subjects discussed being the maintenance and repair shop practice of the company. The adoption of the 65,000-mile basis for overhauling elevated cars, the progressive mileage system for subway cars, the organization of the maintenance forces, and the methods followed in the maintenance work of the company, are taken up so explicitly in the article itself as to call for no special elaboration here, but attention might be drawn to one feature of the practice of the company, the value of which we have often urged for both large and small companies. This is the establishment of the policy of keeping the foremen of the different divisions, in this particular case the maintenance foremen, regularly informed of the troubles chargeable to their departments and supplied with statements of the material and labor cost on cars repaired under their direction. Of course such a plan would not be possible in a company where these accounts are kept in only a loose or approximate way. If, however, the management itself has accurate figures of the cost of different operations, there is no reason except that of policy for not keeping the force informed as to them. In fact, the plan will often disclose any errors if such exist in these figures, because the men actually engaged on the road will be prompt to call attention to excessive charges against work under their supervision. At all events, the system has

proved very satisfactory in the car equipment department of the Interborough Rapid Transit Company and has produced a spirit of intelligent cooperation and an effort to reduce unnecessary expenses to a minimum. The cost figures for one month in one department are naturally compared with those of preceding months, and of other departments by both the management and the men in charge of the work, and unnecessary expenses, as well as results which are not up to the standard set in quantity and quality, can soon be traced to those responsible. The detailed costs of a number of the more common operations are reproduced in the article and will be of interest and assistance to those engaged in similar work.

The Outlook for the Rural Trolley Lines in Massachusetts

The decision of the Massachusetts Railroad Commission that a 6-cent fare is reasonable under present conditions on the Blue Hill Street Railway augurs well for the future of the rural trolley in the Bay State. However unwise the indiscriminate building of cross country lines may have been in the earlier days of electric railway expansion in New England, there is no question that these lines have proved of the greatest value in the territory which they have served so well. The isolation of the farm has been almost eliminated by means of the telephone and the rural trolley, and the interchange of trade between city and country is only in its infancy as far as New England trolley conditions are concerned. Discounting all the clamor of the sensational press and the political self seeker, the fact is being daily demonstrated in Massachusetts that the public prefers to pay a reasonable fare to having good service seriously contracted or stopped altogether. None but a government can stand the strain of operating a system which does not pay expenses, and it can do so only because it draws upon the taxpayers for the deficits that annually occur in the conduct of certain departments.

It is to be expected that there will be a certain percentage of revenue lost whenever a fare increase goes into effect, until the public gets accustomed to the new conditions. It is a curious fact that any change in rates up or down is usually, for a short time at least, followed by decreased revenue. The New England Telephone & Telegraph Company has just cut the suburban toll rates in two within the 5-mile radius of Boston, and it is estimated by the company that this will at first mean a loss of over $150,000 per year. The hope is that an increasing volume of business will soon turn the loss into a profit, but for a time the decreased income is a factor to be carefully considered. If street railway fares were to be cut, there is no doubt that the same general results would apply. Now that the fares are to be raised in cases approved by the Commission, it will be most interesting to see what the effect actually is upon travel. We believe that the falling off in total passengers handled will be inconsiderable, even in a section as well served by steam lines as Eastern Massachusetts, for the fact remains that the trolley is still the cheapest, most frequent, cleanest and most convenient transportation service offered to the public, and in the long run no intelligent man will deny any public service corporation the right to a reasonable return upon its investment.

Simple Records of Construction Costs

In the course of a year a considerable amount of construction work is handled on the average electric road, and when this is done by day labor under the company's supervision, it is very desirable to keep an accurate record of the detailed expense that shall not be complicated in its methods. Small companies particularly have little time to devote to the clerical end of construction, and elaborate systems of cost keeping are rarely if ever feasible under such conditions. It is well worth some trouble, however, to keep a record of the cost of the work in total and per unit, for the existence of data of this kind often is an invaluable help to a company in comparing the cost of other work and in deciding for or against having a particular job done by contract or by the day under the direction of the company's engineers.

Perhaps the simplest way to keep track of an ordinary construction problem is to tabulate all the labor, material, quantities used and their amounts under the five columns: Items or Segregation, Quantities or Time, Rate, Total Amount and Cost per Unit. The use of this simple method of classification enables a great variety of work to be covered, and without the complications that attend more extensive systems of records. Thus, in keeping the record of an excavation job, the company may list the work done under the head Items as follows: "Excavation," including pick and shovel work, different columns being used where different rates are paid, miscellaneous labor, team hoist, tools, blacksmithing and foreman. If the job calls for timbering, the cost can easily be listed under "Timbering," including carpenter, helpers, lumber, miscellaneous materials and foreman. All these items are easily listed in a single column, and to complete the record four other columns respectively headed, "Time," "Rate," "Total Amount" and "Cost per Cubic Yard," will be filled out on the sheet. Under the Time column will be recorded the total number of hours spent by the force on each kind of work, and from the data of the rate column, the total cost of each kind of work on the particular job is at once determined. The last column should give the cost per cubic yard or per foot, mile or unit for each kind of work done on the job, and this is a valuable kind of information for a company to collect.

There is no hard and fast rule that must be followed in keeping such data, but it is so easily handled on the foregoing lines that an illustration of its facility when applied to the cost of constructing concrete foundations may be cited. Concrete work is so attractive for many kinds of electric construction problems that it is well worth while for any company to make an effort to secure exact data when it has this kind of work on hand. In recording concrete work the same general headings suggested under excavation can be applied, but the tabulation will give the best results if divided horizontally into two parts, the first dealing with the cost of labor and forms, and the second with materials. The items will include the following: "Labor," including wheeling sand and gravel, mixing, placing and tamping. "Forms," including carpenter, helpers, miscellaneous and foreman. Under "Materials" come sand, cement, gravel, form lumber and tools. With a simple

system of this character, the quantities and costs in detail and in total can be shown for all sorts of construction work, and at an expenditure of time and trouble which is nominal in relation to the benefits derived.

Another Classification of Accounts

Since the first of March we have published a number of letters and articles discussing the proposed classification of accounts of the Interstate Commerce Commission, contained in Circular No. 20 of that bureau. These expressions of opinion, and others which have been published elsewhere, are from representatives of all branches of the street railway companies which will have to perform the actual work of maintaining the classification, and have been unanimously in opposition to it. We believe that the railway companies are anxious to meet the views of the Commission if it can be done in any practical way, and would be willing to undergo the inconvenience which even a radical change in classification would entail if they could be assured that any material benefit to themselves or to the public would result from such a change. At the time that the text of the Interstate classification was announced we said it was unfortunate that the Commission did not take up this phase of the question and give some explanation of its reasons for requiring a change of the magnitude proposed. We still believe that such a statement would be of value in clearing up the situation. It is true committees representing the street railway association have been in conference with the Commission for some time, but there are many railway companies which are not members of the association and to them especially such an announcement would be welcome. The confusion in which the average street railway manager now finds himself is enhanced by the fact that some of the State railroad commissioners do not seem ready to adopt the Interstate classification of accounts, while in New York one of the Public Service Commissions has issued for the accounts of all electrical companies, other than railway, a classification scheme which is absolutely opposed to that of the Interstate Commerce Commission in many important particulars.

A summary of the number of accounts provided in this latter classification was published last week. Although electric railway companies are not included in those for whom its use is proposed, we believe they will be interested in it for at least three reasons. The first is because so many electric railway companies are also doing an electric light and power and gas business. The second is that the same Public Service Commission is shortly to issue for electric railway companies a tentative classification which presumably will be in working accord with that just published for other electrical companies. A third reason is that when this latest classification is compared with that for electric railways of the Interstate Commerce Commission one may well wonder where all these proposals will end.

So far as the first reason is concerned, it would seem that those companies which conduct both electric railway and lighting service in New York will find themselves in a—to express it mildly—very bewildering position if they attempt to follow both the State electric light classification and the Interstate railway classification. The two have little in common, and at those points where complete harmony must exist regardless of all theory—i. e., in the production of power and the treatment of general expenses—the arrangement, the language and the titles for the accounts are so different that they are not the same in meaning and will give different results when compiled. In other words, if both are employed the reports of power-station operation will be practically useless for the public because joint statistics and costs will be obtained with difficulty. The two classifications seem to be alike only in the wonderful amount of detail called for and the fact that in both so many accounts must be estimated or apportioned that accuracy will be lost.

This leads up to the third point mentioned, What will be the ultimate result? We confess we do not know. Is it not time for the several commissions to pause and consider the needs of the companies as well as any other requirements they may have in mind? In this connection the report of the Interstate Commerce Commission to Congress for the year ending June 30, 1907, is worthy of consideration. The commission states its purpose to hold "the accounting officers responsible for the correct application of the rules of accounting which are prescribed." It further says that the accounting officer has been selected "from among the officials of each of the carriers [as the] one whose duty it is to certify to the legality of the acts which the accounts record." This is a serious matter for the accountants of those companies which are under the jurisdiction of the commission, if the classification provided is one that is difficult to construe or practically impossible of application.

We emphasize again what has been already said that we believe the railway companies have no intention or desire to consider only one side of this question. They want to assist in reaching a correct and fair solution of the question, but with different classifications or schemes for classifications in the various departments of their business and in different States the situation grows daily in complexity, especially if the company or any of its officers is to be held liable for the accurate maintenance of an unworkable system. For economic reasons electrical companies, electric railways and gas companies have been consolidated in numerous places and as such have become departments of the whole company. None of the three classes of public service can be said to predominate in the organization. Three sets of funded debt, stock issues and other corporate matters are not provided, and the actual difficulties of keeping the accounts as though there were separate and distinct companies for each business must be considered in whatever plan is finally adopted.

We recognize the difficulty of the commissions in fixing upon any plan that will satisfy every one, but if progress is to be made and a change of classification is necessary we submit that fine-spun distinctions in accounts should be set aside for the practical requirements of the industry involved.

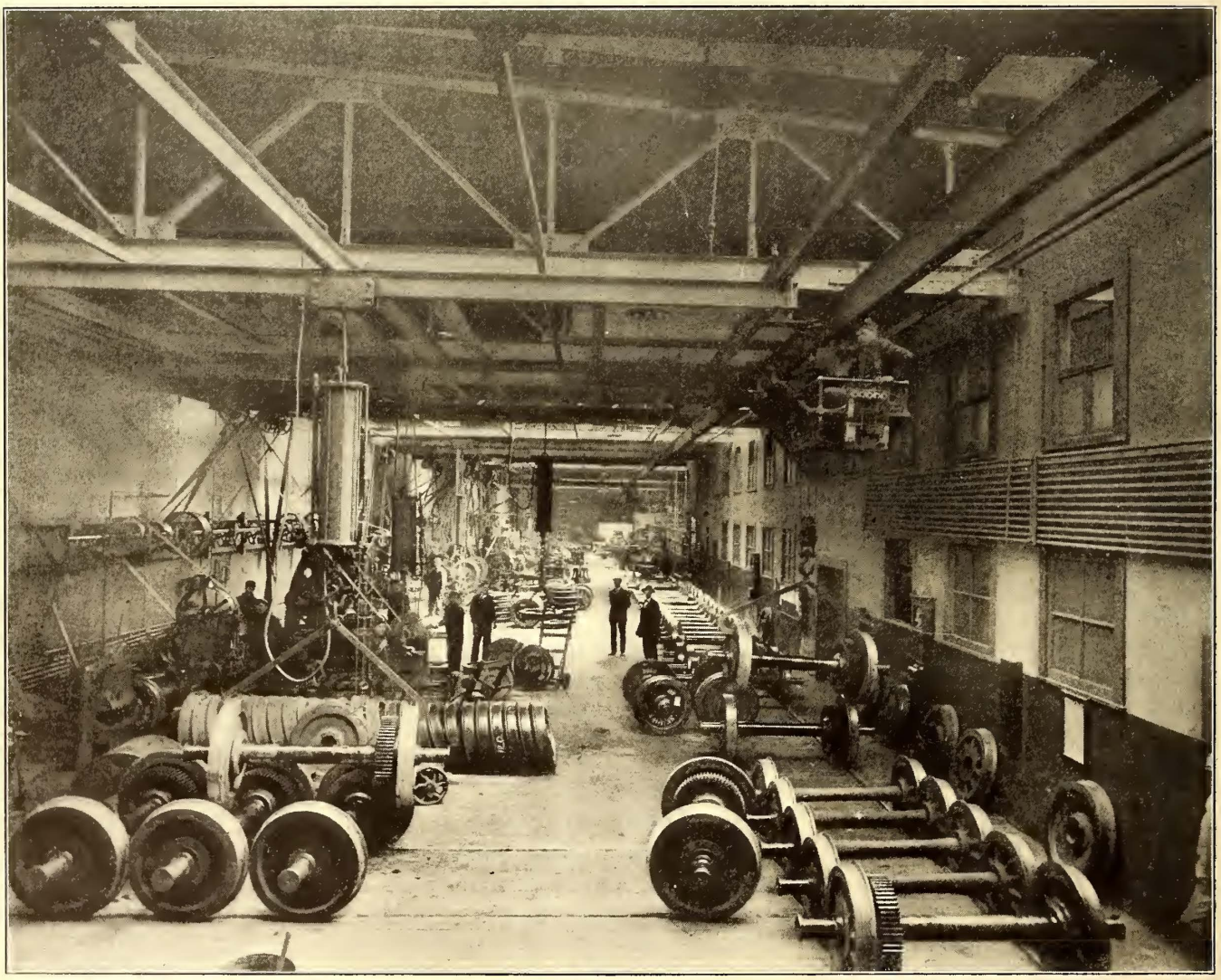
THE CAR EQUIPMENT DEPARTMENT OF THE INTERBOROUGH RAPID TRANSIT COMPANY—MAINTENANCE AND REPAIR SHOP PRACTICE

In studying rolling stock maintenance as applied by the Interborough Rapid Transit Company, it should be emphasized at the outset that the crux of the question is not how many cars must be cared for, but what operating conditions must those cars fulfill. Therein lies the great interest of the Interborough Company's problem: That it can offer to others the valuable experience it has gained in maintaining side by side two distinct classes of equipment—one for the elevated service, which is so well understood that its treatment is practically standardized, and the other for the subway service, which has demonstrated again and again the futility of conventional methods.

months, ending about February, 1906. The various averages from maximum to minimum were as follows:

MANHATTAN ELEVATED CARS

Number of Cars	Average Mileage
1	90,290
2	83,751
21	72,321
125	63,951
399	54,246
175	46,591
27	36,985
4	26,411
Maximum mileage	90,290
Minimum mileage	22,727
Average for all motor cars	54,088



GENERAL VIEW OF THE 148TH STREET MACHINE SHOP, TAKEN FROM THE WHEEL STORAGE END, SHOWING ALSO THE OVERHEAD TRAVELING CAGE AND PNEUMATIC HOISTS CONNECTING WITH IT

MAINTENANCE RECORDS ON BOTH DIVISIONS

As early as April, 1906, the company had adopted the mileage system for carrying out maintenance work on elevated equipment, the overhauling figure being placed at 65,000 miles after a careful study had been made of the average mileage previously run by cars before being shopped.

This study covered the old overhauling period of 14

Inasmuch as 18 per cent of the cars had operated from 60,000 to 90,000 miles between overhaulings, it was considered safe to set the average mileage at 65,000 miles.

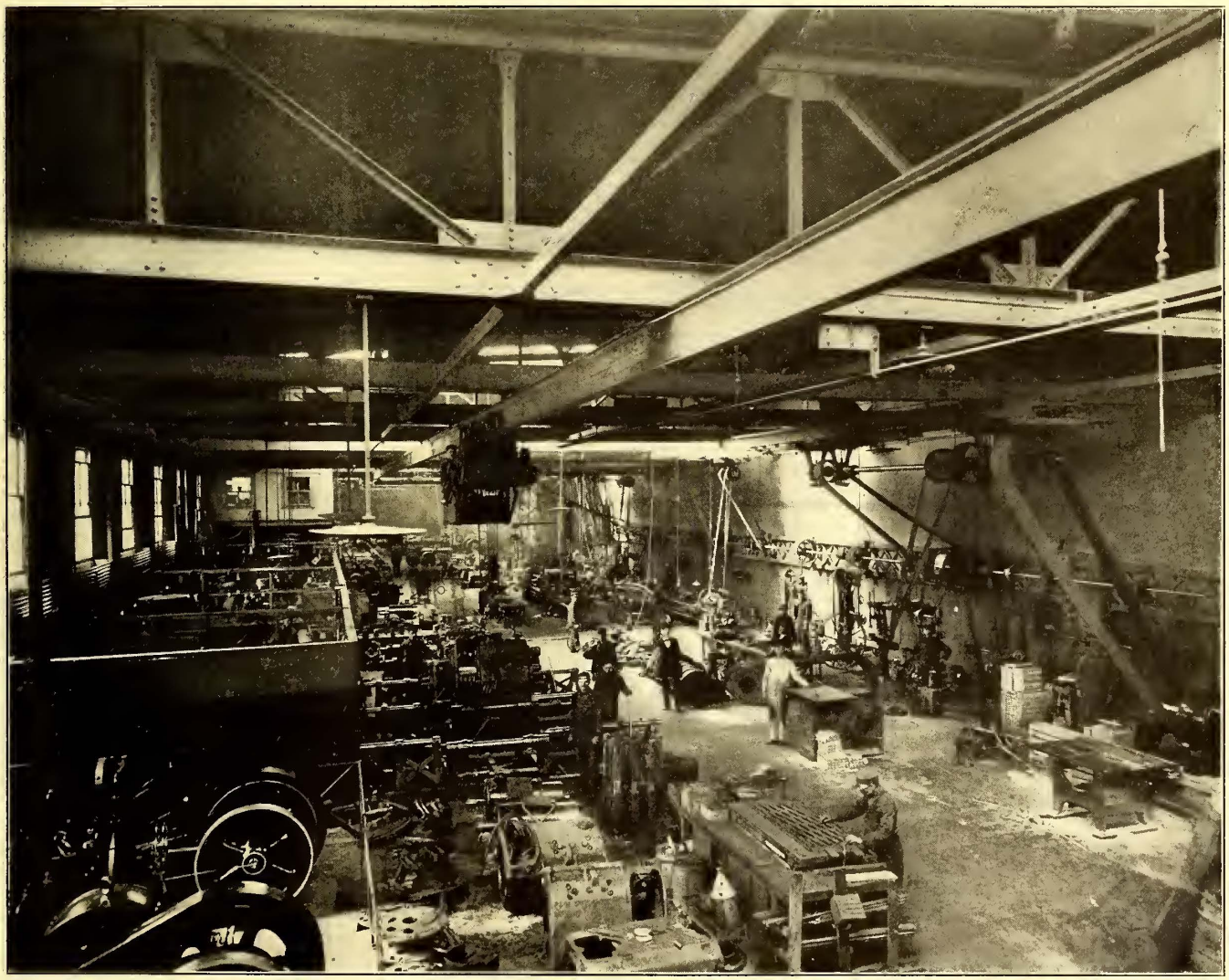
This 65,000-mile basis proved so much better than the comparatively hap-hazard time practice that by the end of 1907 the maintenance cost of cars had been reduced 20 per cent and the number of cars available for transportation increased 10 per cent. The gain in cars for service was due

directly to the mileage system, which lengthened the periods between overhaulings and thereby shortened the shop time of the cars.

This method of simultaneously overhauling everything on a car once every 65,000 miles, despite its unqualified success on the elevated division, was found to be undesirable for the subway equipment. It did not take long to discover that, no matter how carefully a subway car was repaired, some part would need attention before the overhauling mileage limit had been reached. Quick to recognize that these inter-overhauling failures caused unnecessary expenditures, the car equipment department set about to devise for the subway rolling stock a record system that would permit the maintenance of each piece of apparatus at a predetermined mileage and avoid overhauling the entire car every time it entered the shop.

This practice is carried out by keeping a separate record of each piece of apparatus together with the numbers of the cars on which it is successively used. Since the mileage record of every running car is obtained monthly from the mileage department, all that the shop clerk need do is to add the additional mileage to each item on the car until a given part, such as the control system or air brake, has reached the point of general overhauling. When the car is in the shop for any failure whatsoever, the mileage of the individual parts is examined and if any part has reached or is approaching the maximum mileage, only that part receives a general overhauling. When the apparatus has been thoroughly repaired it is rated at zero mileage and sent on its travels on whatever car is next in line to receive it.

It will be apparent that this progressive system of overhauling is a great step toward higher reliability and decreased cost. A car unfortunately cannot be designed like the "wonderful one-hoss shay," with equal strength in every part. Superior as the regular mileage system is to the policy of time maintenance in placing the car units on an even basis, it cannot be denied that it has an inherent imperfection in the assumption that apparatus so dissimilar as control contactors and motors, for instance, require overhauling at the same mileage. On a small railway, of course, it might be undesirable to introduce so refined a mileage record as this; but on a large railway it certainly will cost less money to find out what continuous mileage each part of the equipment can stand before repairing than it does to do needless work in the shop. It must not be supposed, however, that this system has been introduced on the subway for the sake of economy. On the contrary, the management has adopted it primarily to insure maximum reliability in a most exacting service. This scheme, in addi-



VIEW OF THE 148TH STREET MACHINE SHOP, TAKEN FROM THE MOTOR-OVERHAULING END, SHOWING THE PARTITIONED TOOL ROOM AND SHOP FOR AIR BRAKE AND REFINED ELECTRICAL REPAIRS

tion, has proved a money-saver, and similar individual mileage standards will be worked out for the elevated equipment.

As will be noted from the foregoing, the cars on the elevated division easily average the 65,000-mile run specified between overhaulings. Since the car body and its

TRIPLE VALVE RECORD.

No.....

TYPE YEAR RECEIVED

CAR NO.	APPLIED	REMOVED	MILEAGE	GEN'L REPAIRS	TROUBLE

PUMP RECORD.

MAKER'S NO..... No.....

TYPE MAKER YEAR RECEIVED

CAR NO.	APPLIED	REMOVED	MILEAGE	GEN'L REPAIRS	TROUBLE

PUMP ARMATURE RECORD.

MAKER'S NO..... No.....

TYPE MAKER YEAR RECEIVED

CAR NO.	APPLIED	REMOVED	COM. TURNED	DIAM. OF COM.	MILEAGE	GEN'L REPAIRS	TROUBLE

GOVERNOR RECORD.

No.....

TYPE MAKER YEAR RECEIVED

CAR NO.	APPLIED	REMOVED	MILEAGE	GEN'L REPAIRS	TROUBLE

PINION RECORD.

No.....

MAKE TYPE

ARMATURE	APPLIED	REMOVED	MILEAGE	TROUBLE

GEAR RECORD.

No.....

MAKE TYPE

AXLE	APPLIED	REMOVED	MILEAGE	TROUBLE

TRAILER TIRE RECORD.

AXLE No.....

MAKER TYPE YEAR RECEIVED

TRUCK	APPLIED	REMOVED	MILEAGE	TURNED	DIAM.	TROUBLE

MOTOR TIRE RECORD.

AXLE No.....

MAKER TYPE YEAR RECEIVED

TRUCK	APPLIED	REMOVED	MILEAGE	TURNED	DIAM.	TROUBLE

TRAILER TRUCK RECORD.

No.....

TYPE BUILDER YEAR RECEIVED

CAR NO.	APPLIED	REMOVED	MILEAGE	GEN'L REPAIRS	TROUBLE

MOTOR TRUCK RECORD.

No.....

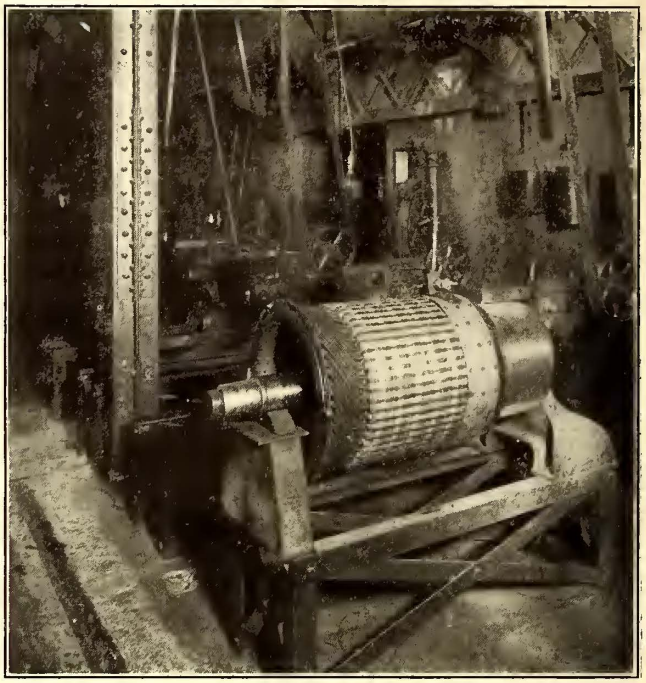
TYPE BUILDER YEAR RECEIVED

CAR NO.	APPLIED	REMOVED	MILEAGE	GEN'L REPAIRS	TROUBLE

HEADINGS OF CARDS FOR KEEPING RECORDS OF MILEAGE LIFE

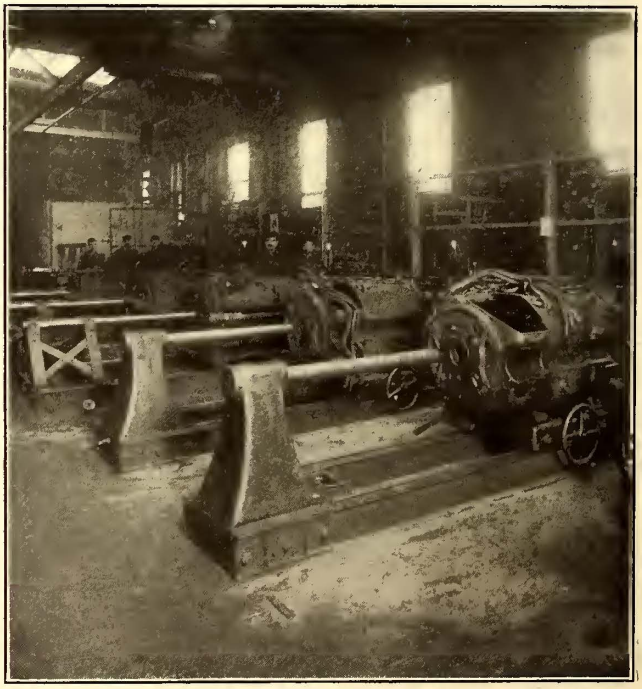
equipment are not treated as a unit, it is necessary to have some system which will show what was on the car body when it entered the shop and what it had when it left. This is accomplished by using "in" and "out" cards 8 in. x 5 in. in size, on which to record the identifying numbers of the trucks, motor parts, pump, governor and triple valve. The "in" and "out" cards are exactly alike except in color, pink being the color of the "in" card and blue of the "out" card.

Differently colored cards of the same size are made out



COMMUTATOR SLOTTER IN THE 148TH STREET SHOPS

also for the individual records of trucks, gears, armatures, governors, pumps, etc., each part having an individual number assigned to it besides that given by the manufacturer. These cards are used as a convenient means for



MOTOR ASSEMBLY SLIDES FOR END-OPENED MOTORS

determining the total mileage life of any particular piece of apparatus.

ORGANIZATION OF MAINTENANCE FORCES

A sharp line of demarcation separates the inspection and maintenance forces of the car equipment department, no

overlapping being permitted. Each maintenance feature, such as painting, machine work, carpentry and electrical repairs, is under a different general foreman, each reporting directly to the superintendent of car equipment. The inspection foremen, as noted in the first article, are under one general foreman, who reports to the superintendent of car equipment. This separation of inspection and maintenance holds each man to a definite duty and creates a strong spirit of emulation, as the maintenance foremen will not hesitate to report that some breakdown was due to careless inspection, if such is the case. On the other hand, the inspection foremen would be more than human if they overlooked an opportunity to catch the repair force napping. In accordance with the general policy of publicity, the maintenance foremen are kept regularly informed of what troubles are charged to their departments, being led in this way to pay closer attention to the work of their subordinates. Like the inspection foremen, the heads of the maintenance shops receive monthly recapitulations of labor and material cost on cars repaired under their direction. This enables them to make comparisons with preceding months and gives them a closer appreciation of the financial side of their activities.

ARMATURE RECORD.

MAKER'S No..... No.....

TYPE YEAR RECEIVED

TRUCK	MOTOR NO.	APPLIED	REMOVED	COM. TURNED	DIAM. OF COM.	MILEAGE	GEN'L REPAIRS	TROUBLE

HEADING OF ARMATURE RECORD CARD.

MOTOR CAR OUT RECORD.

DATE.....190 CAR No.....

MOTOR TRUCK NO.					TRAILER TRUCK NO.	
1 AXLE	SHELL	ARMA.	TYPE		1 AXLE	
2 AXLE	SHELL	ARMA.	TYPE		2 AXLE	
PUMP	ARMA.	MAKE	TYPE			
GOVERNOR	MAKE	TYPE				
TRIPLE VALVE	MAKE	TYPE				

REMARKS:

N. B. CHECK ALL PARTS RECEIVING A GENERAL REPAIR AND RECORD UNDER "REMARKS" ANY MISCELLANEOUS EQUIPMENT REPLACED.

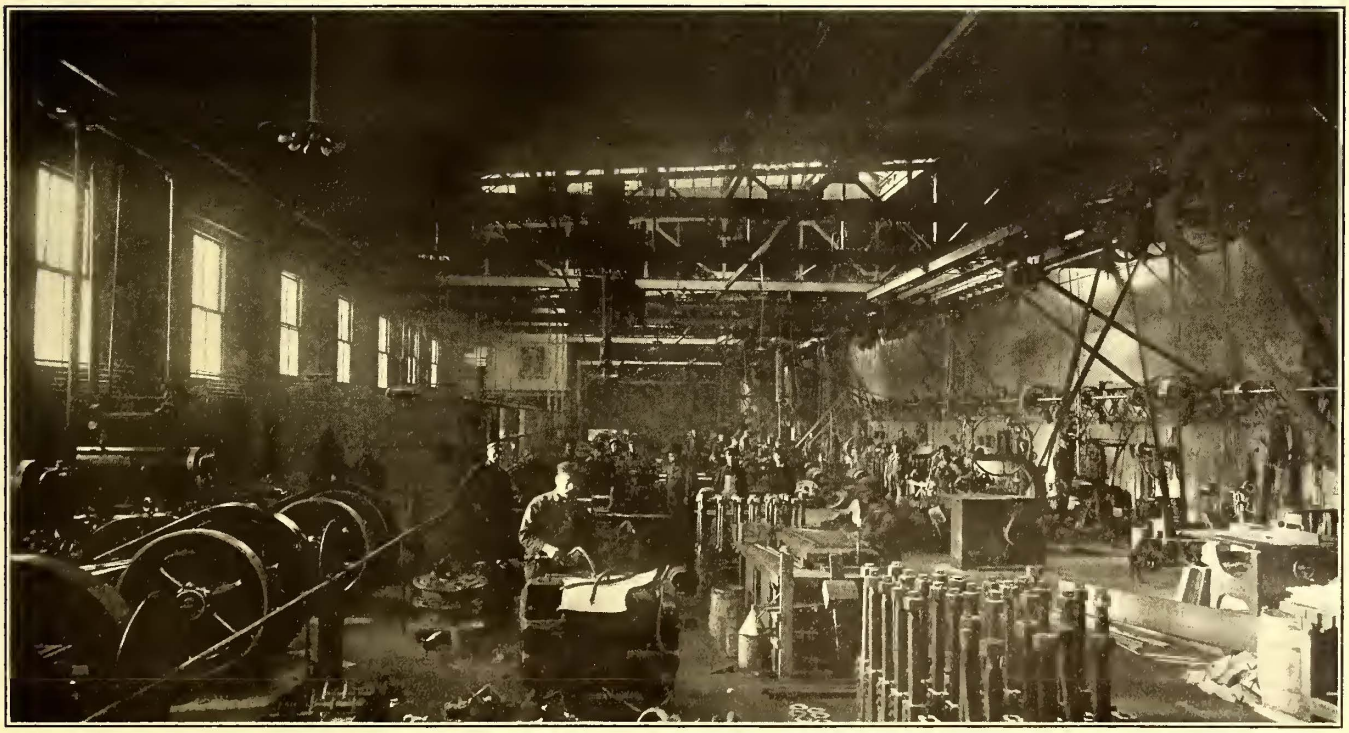
CARD USED FOR ELEVATED CAR LEAVING THE REPAIR SHOP.

THE MAINTENANCE AND REPAIR SHOPS

The maintenance and repair work of the car equipment department is divided between two shops, one at Ninety-eighth Street and Third Avenue and the other at 148th Street and Lenox Avenue. The second shop provides for subway rolling stock only, while the first handles all elevated equipment and also the painting of the subway cars.

The Ninety-eighth Street plant is a series of brick buildings formerly used for repairing steam locomotives. In addition to the regular maintenance facilities, it contains a brass foundry, mill room, paint shop and motor-winding shop. A description of the constructional arrangement and details of this installation is omitted because the plant represents simply an adaptation of existing facilities to present necessities until such time as the company can go ahead with its matured plans for strictly modern repair shops.

On the other hand, the 148th Street plant is strictly up to date, the frame work being of steel, walls of expanded metal lath and cement, and roof of reinforced concrete slabs covered with vulcanite and gravel. Abundant lighting is supplied in the center shed by the monitor construc-



ANOTHER VIEW OF THE 148TH STREET MACHINE SHOP

tion and in the side bays by flat skylights. Steel rolling doors protect all the track openings. In general there is little wood in the building aside from the covering on the concrete floor in part of the machine shop and for a few minor details. As the subway rolling stock is either of all-steel or fire-retardant construction, the Interborough Rapid Transit Company may justly boast that it is the first railway in the world to house fireproof cars in a fireproof building.

THE FIRST STEP IN DISMANTLING SUBWAY CAR: 25-TON CRANE RAISING ONE END OF CAR BODY

Of the three bays into which the 148th Street plant is divided, the northern is used for inspection as described in the Street Railway Journal of April 4, while the middle and southern bays constitute respectively the truck and machine shops. The middle bay is 240 ft. long and contains five tracks; the southern bay is 240 ft. x 60 ft., has one track and contains a mezzanine office floor over storage locker and toilet rooms. The shops are heated with a vacuum return steam system.

The tracks in every bay extend through the building to a transfer table at the inner end. All of these tracks, except the one in the machine shop, have steam-heated pits. Concrete pits are used in the inspection bay and timber in the truck and body overhauling shop.

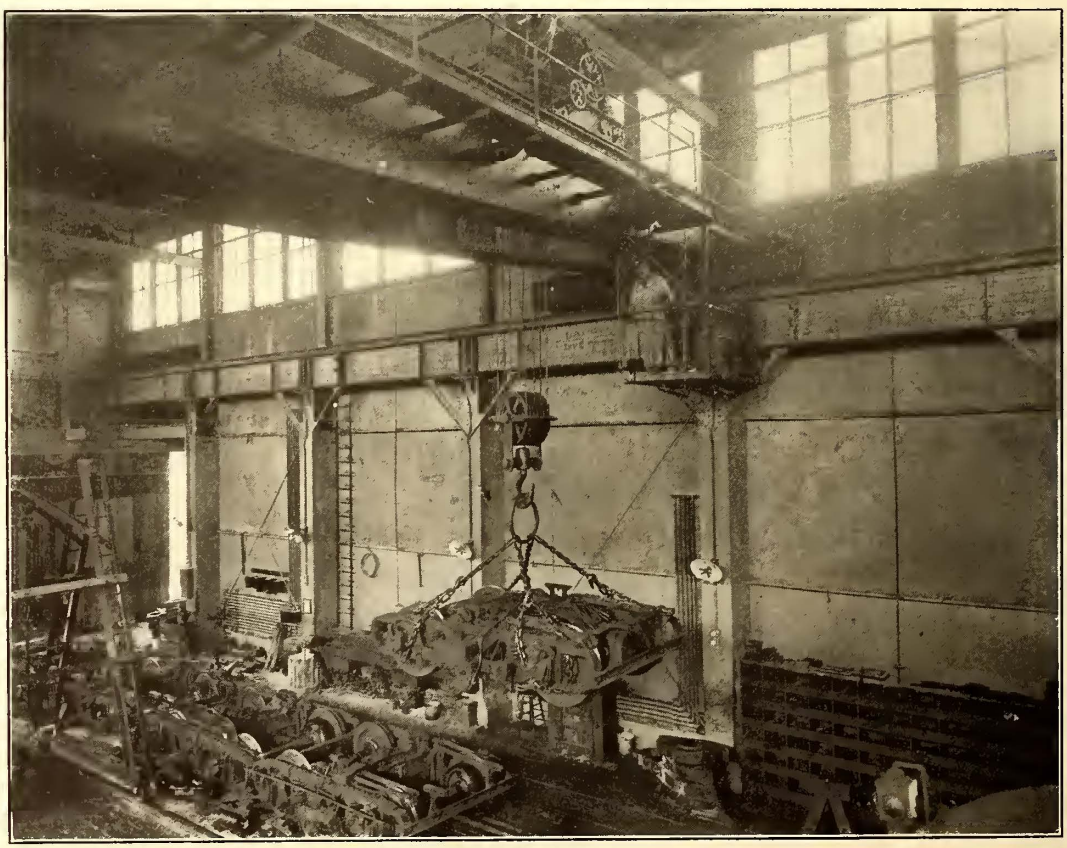
On the other side of the turntable mentioned there is a brick structure for the blacksmith shop, oilroom and general material storage, and each section is thoroughly isolated by brick partition and fire doors.

General Scheme for Dismantling Cars and Trucks in the 148th Street Subway Shops

The real working capacity of a shop may be considered as composed of these five factors: The area, the arrangement of departments, the shop conveyance facilities, the machinery and the human element. In the case of the Interborough Company the imperative necessity of locating the shops on high-priced real estate at once restricted the area allowable and demanded the best possible exploitation of the other factors. Hence the same high-pressure conditions that prevail in subway car operation are also found in the shops where the subway cars must be handled systematically as soon as each piece of car equipment reaches its overhauling mileage.

The arrangement of departments and shop conveyance means in the 148th Street shops is of particular interest, because on their efficiency depends primarily the success of the progressive or other forms of general repair practice.

Assuming that the car has been placed on any track in the body and truck shop, the first operation will be to raise the car body from the trucks in the manner illustrated with a 25-ton Shaw crane which spans the entire bay. The trucks are then carried in a chain hanger by this crane to the back of the truck shop for disassembly. There the



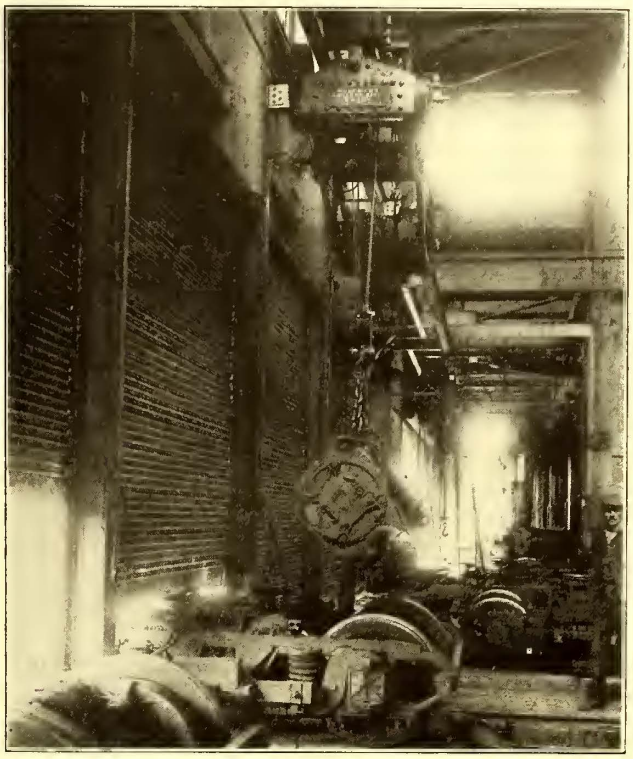
SECOND STEP IN DISMANTLING A SUBWAY CAR: CRANE TAKING TRUCK TO THE OVERHAULING SHOP.

crane is relieved of all lighter work by Pedrick & Ayer pneumatic hoists which take wheel sets or motors out of the truck frame as shown in the accompanying views. It will be seen that these hoists have a runway on horses considerably wider than the regular track gage. The horses are either stationary or are mounted on wheels so that they and their burdens are easily pushed along a special track to the extreme rear of the truck dismantling section. At this point the load is readily transferred to one of the 3½-ton Northern telphers which travel on an I-beam extending the full length of the machine shop and all the way across each end of the truck shop.

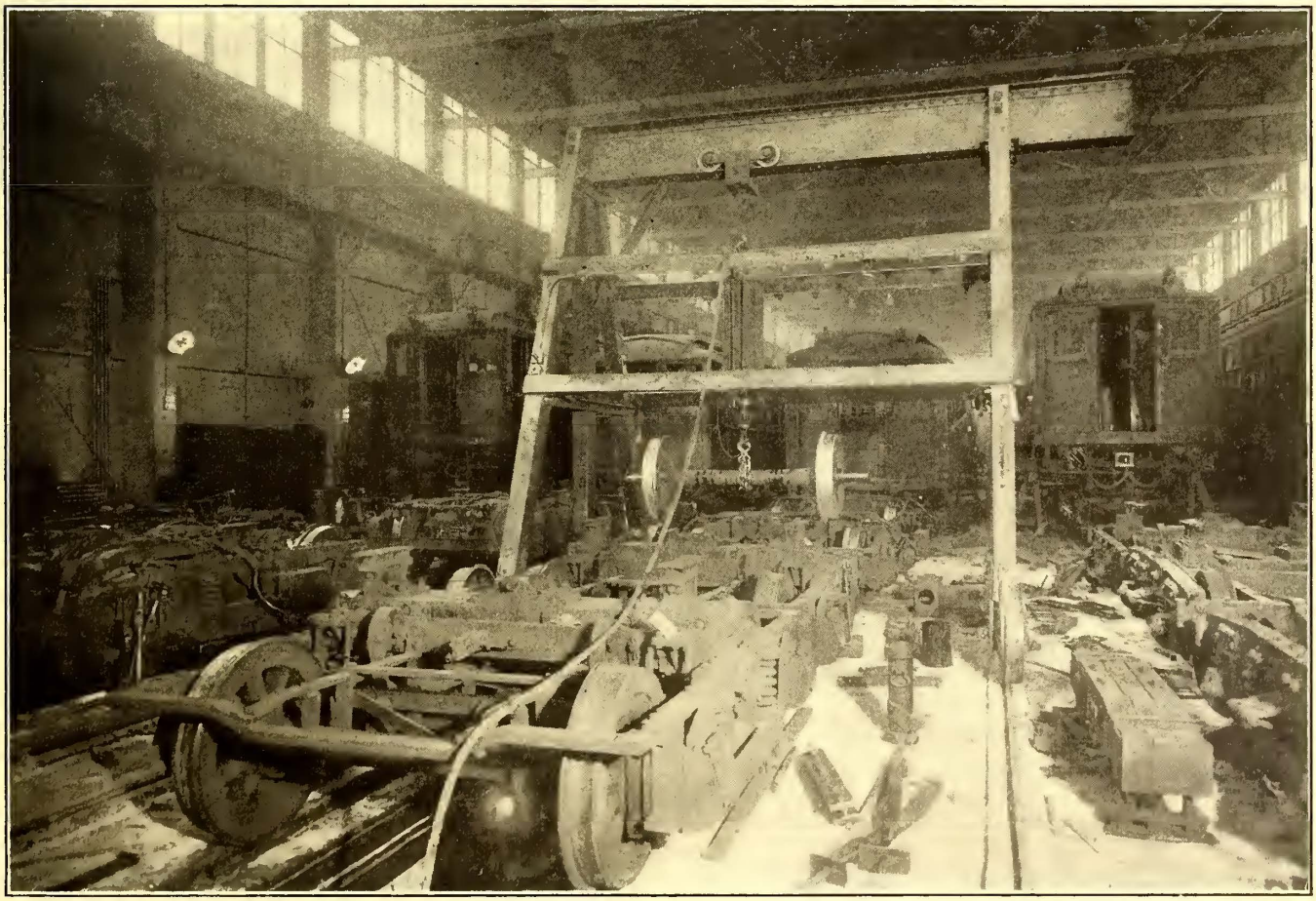
If the object taken up by the telpher is a wheel set, it is quickly deposited on the wheel storage track located in the rear of the machine shop and directly beneath the telpher line. The wheel and axle handling tools are located opposite the storage track from which the wheel sets are taken by the air hoists running over the cross tracks leading to the machine tools.

Similarly, a motor is lifted out of the truck with an air hoist and transferred to the telpher which carries it directly to the motor assembly slides in the central part of the machine shop. The shop conveyance system does not stop with the motors, however, but is also carried on with the armatures and all other parts of a car. The method of handling the 1800-lb. railway armatures deserves an extended description as illustrating how much care is exercised to handle this important type of apparatus without mechanical or electrical injury.

After an armature is taken out of a motor on the assembly slides, it is cleaned by compressed air and deposited in either a stationary or movable horizontal storage rack. When the armature is in line for machine work, it is taken out of the rack by a pneumatic hoist and carried over to an armature truck which runs on a track alongside the lathes, banders, commutator slotter, etc. The armature is moved

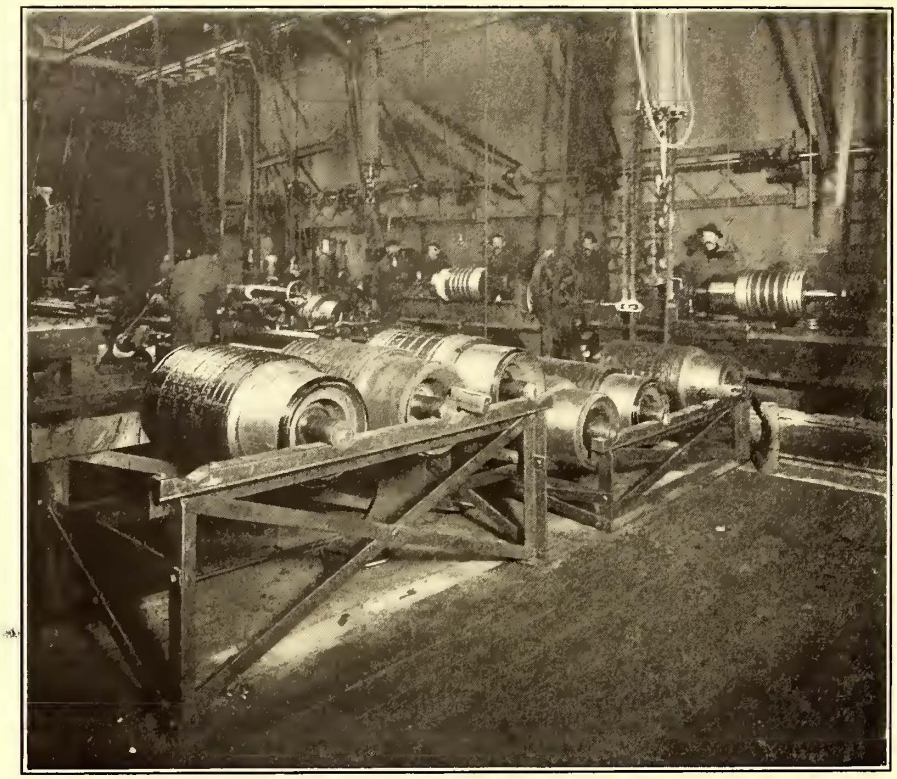


THIRD STEP IN DISMANTLING CAR: MOTOR TRANSFERRED BY HOIST TO TELPHER FOR CONVEYING TO MACHINE SHOP



FOURTH STEP: PNEUMATIC HOIST ON MOVABLE HORSE, TAKING WHEEL AND AXLE SET FROM TRUCK TO TELPHER

pneumatically to and from these machines until having completed every step in the renovation process it is taken to the storage rack and eventually to the motor assembly slides. Thus the complete circuit has been made without



PNEUMATIC HOISTS OVER ARMATURE RACKS IN THE 148TH STREET SHOP

any heavy manual labor whatsoever, nor has the armature come into contact with the floor at any point in its progress.

The following figures, extending over a period of three months, cover the cost of removing the truck from the car, the motor from the truck and the armature from the motor at the 148th Street shops:

To remove a motor truck from car to truck shop	$0.56
To take one motor out of truck.	.75
To take armature out of one motor	.27
Total cost of removing an armature from car	$1.58
To hoist trailer end of car and remove trailer truck and carry trailer truck to truck shop	.28

Note.—The difference in cost of removing the trailer and motor truck is due to the fact that the motor end of the car has to be hoisted up part way and rested on horses to allow a man to get in on top of the motor to disconnect the leads. It is then raised up to its permanent position on the horses.

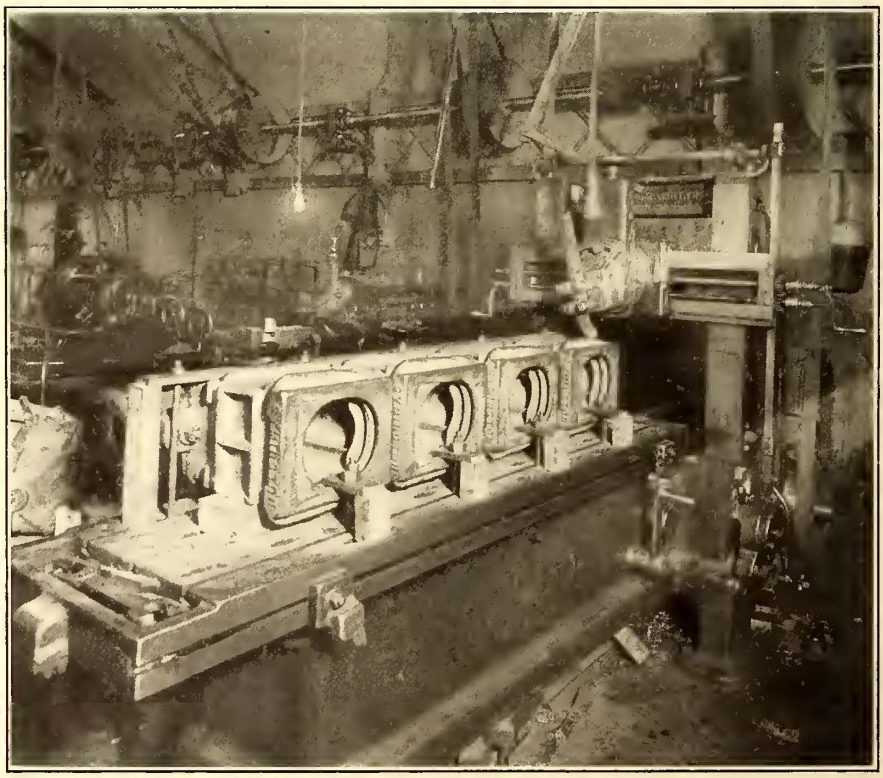
In concluding the subject of shop conveyance it may be added that every tool in the machine shop handling heavy work is furnished with an air hoist or jib crane within easy call on one side of the telpher. The telpher does not have to serve the other side of the shop, as the latter is occupied successively by the locker, toilet, tool, air-brake and control repair rooms, none of which requires the moving of heavy parts.

General Equipment of the 148th Street Shops

In addition to a few wood-working tools, the 148th Street shop contains the following machinery:

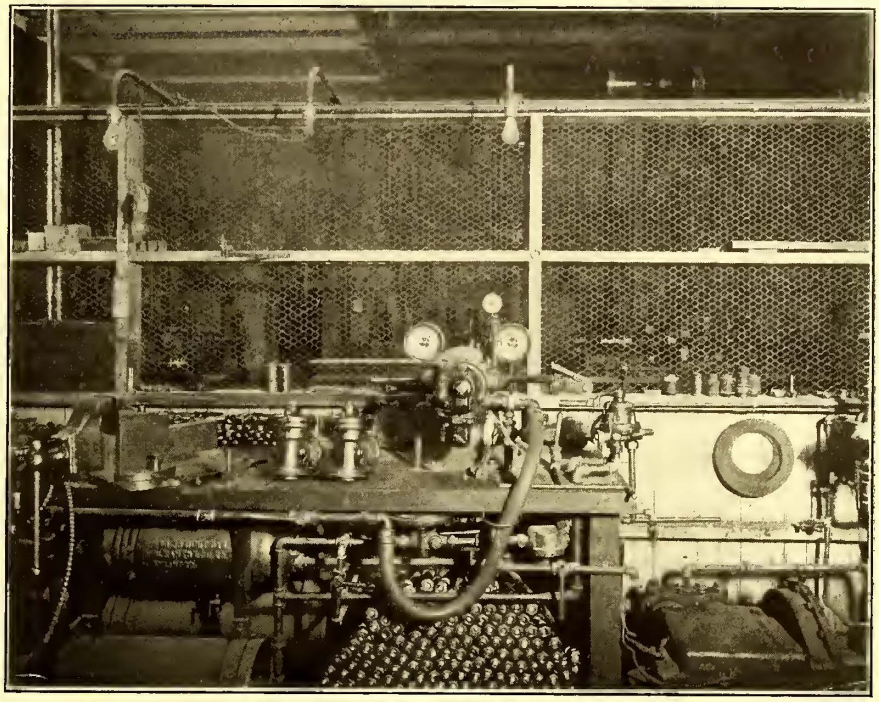
Two 42-in. Pond car wheel lathes.
One 200-ton Niles hydraulic press.
One 51-in. Niles boring and turning mill.
One 42-in. King boring and turning mill.
One 36-in. triple-geared Pond engine lathe.
One 28-in. Niles engine lathe.
One Acme bolt cutting machine.
One Gould & Eberhardt shaper.
One Putnam planer.
One Bement-Miles slotting machine.
One 14-in. Reed engine lathe.
Four mica slotting machines.
One 28-in. Putnam engine lathe.
One armature bander.
One 30-in. Reed engine lathe.
One 24-in. LeBlond engine lathe.
Three small drill presses, including one speed drill.
One radial drill.
One Gisholt tool grinder.
Three emery wheels.

One characteristic feature of the machine-tool equipment as a whole is that mandrels are provided for each standard machine-tool operation, thus eliminating loss of time in setting up the work and making it possible to procure the maximum output of each machine. A typical instance of the care which this company gives to the subject of the efficiency of tools and men alike is afforded by studying the work it has done in turning steel-tired wheels.

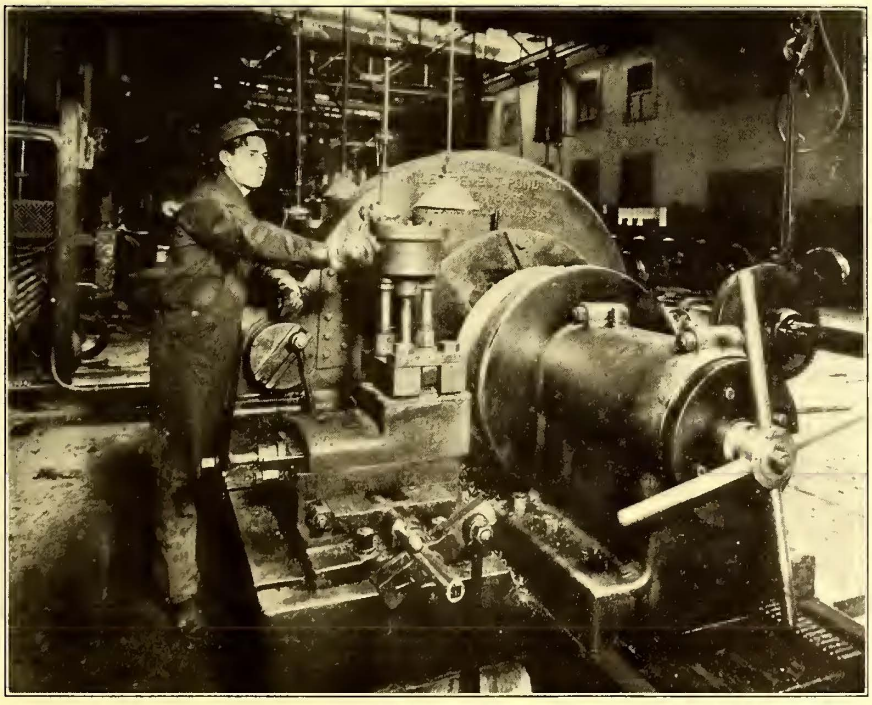


MILLING FOUR JOURNAL BOX CASTINGS AT A TIME IN THE 148TH STREET SHOPS

When the company began turning steel-tired wheels three or four years ago, the average output of a wheel lathe of the best steam railroad shops was six pairs a day and the maximum rarely exceeded eight pairs. First, the lathes were speeded up from 11 ft. to 18 ft. per minute; second, the best high-speed alloy steels were adopted; third, a standard design of tools was introduced; and fourth, in the case of one lathe, a Fisher pneumatic clamp has been applied for holding the roughing and scraping tools. The result of these different improvements, aside from the question of labor, has been to raise the output from six to ten pairs a day on the lathe without the pneumatic clamp and from 6 to 12 pairs a day on the lathe which is furnished with one. This increase of two pairs of wheels with the latter lathe over the output of a similar machine otherwise thoroughly equipped is due to the time saved in adjusting the tools. Doing the work by hand means the loosening and tightening of heavy nuts 80 times, or 40 complete adjustments, for every pair of wheels turned. The pneumatic clamp, requiring nothing more than the turn of a lever, leaves the lathe hand in condition to give better attention to the quality of his work and makes it easier to work up to the limit of the machine or of the tool steel.



TRIPLE VALVE TESTER IN THE AIR-BRAKE ROOM



WHEEL LATHE, WITH PNEUMATIC TOOL CLAMP

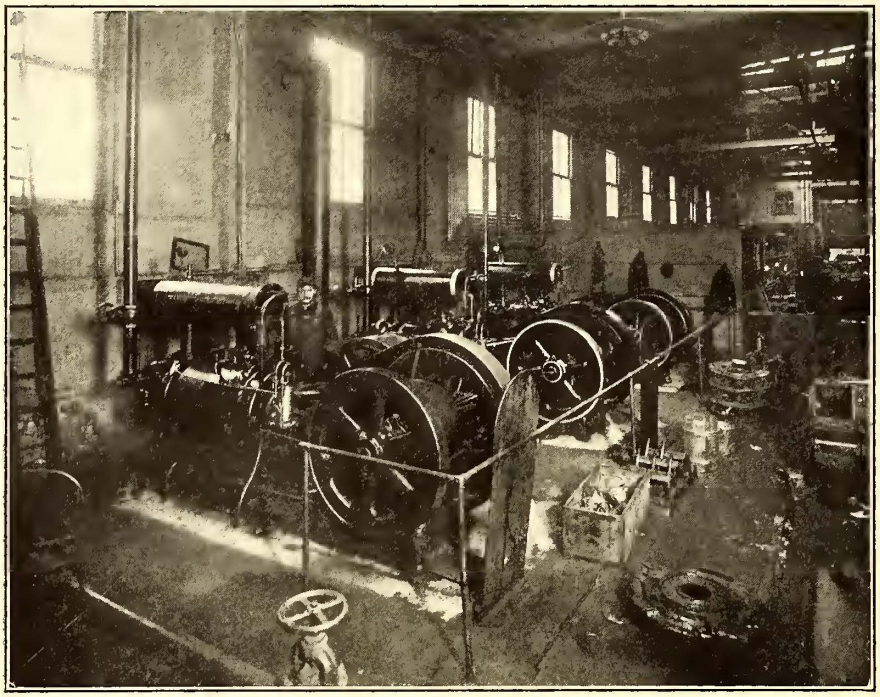
The last but not least important factor in securing the maximum output from the machine tools is the human element. It is essential that the machine attendants should be paid on an individual merit plan that will encourage them to work rapidly and make full use of the mechanical devices and high-speed tool steels placed at their command. This has been accomplished in the case of wheel turning by paying the men according to the diameter of the finished wheel, the rate being 1 cent per inch. Consequently a man receives 30 cents for a 30-in. wheel, 30⅛ cents for a 30⅛-in wheel, 33 cents for a 33-in. wheel, etc. These figures are by far the lowest that have been attained either in steam or electric railway shops of this country, and they afford convincing evidence of what can be accomplished by painstaking study. The practical doubling of the output of the wheel lathes alone means the saving of thousands of dollars which would otherwise have been needed for extra machines.

MISCELLANEOUS SHOP FEATURES

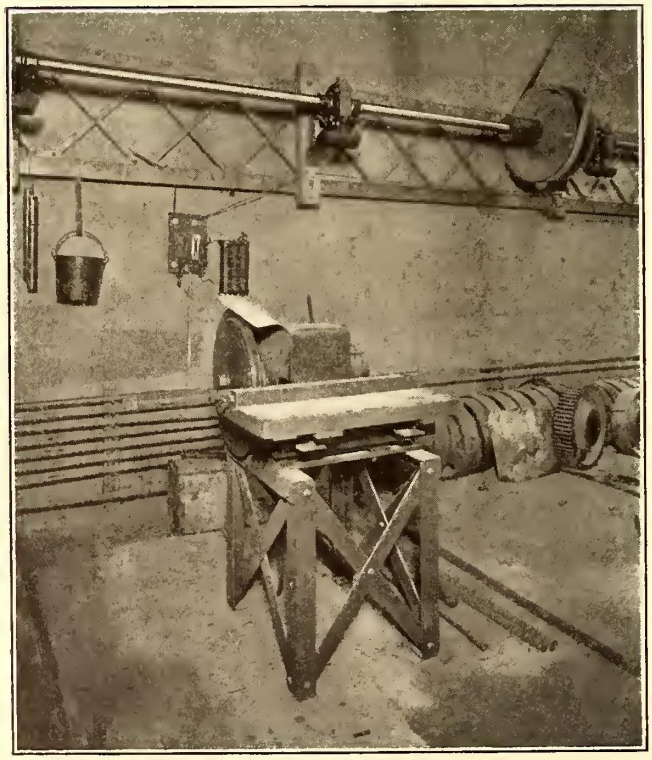
To secure better machine work and save time, the car equipment department now has all of its tools ground uniformly in the tool room of the 148th Street shops by one expert who has complete sets of the company's standards. This scheme eliminates the personal faddishness or aberration factor of the individual machinist and by specializing the work introduces a considerable saving in time. The company has given a great deal of attention also to the subject of tool steels, its present alloy tool steels for steel, brass and copper work being the result of five years' constant experimenting.

The tool room and the adjoining air-brake and control repair room are isolated from the rest of the shop by a wood and wire partition. It is obvious why this should be done in the case of the tool room, but it was equally desirable to keep the machine hands out of the air-brake and car-equip-

ment control shop. The men in the latter shop must be skilled and trustworthy mechanics, because they handle delicate and expensive apparatus. The partitions around this shop also are advantageous in avoiding disturbance from the operation of hoists, cranes and heavy tools in the vicinity.



AIR COMPRESSOR PLANT IN 148TH STREET SHOP.



PIPE CUTTER, MADE OF A SHEET IRON DISK, WITH STEEL BACKING

The lower end of the machine shop, opposite the tools, contains the steam plant, compressor room and shop for air-brake and control work. One Ingersoll-Sergeant compressor of 230-cu. ft. capacity is used exclusively for furnishing air at 80-lb. pressure to the piping system which supplies the pneumatic hoists, tools, blow-out hose, etc.; the other compressors are connected to a pipe line for the drainage pumps in the adjacent Harlem River tunnel of the West Farms subway line.

COMPARATIVE MAINTENANCE PRACTICE ON THE SUBWAY AND ELEVATED DIVISIONS

When it is considered that of the original subway car equipment designs only the wrought-iron side frame of the trucks and car axles remain unchanged, it is easy to understand why the maintenance problem of the subway cars is so serious. The serviceable life of every part is a subject of never-ending study carried to such detail that even the motor lead connections between the car body and tracks are discarded not by waiting until they are worn out to a danger point, but at predetermined intervals. The following paragraphs summarizing the several processes followed in repairing or replacing the specified parts of subway and elevated equipment will indicate some of the differences that obtain on the two divisions of this railway system.

VIEW OF TELPHER IN THE MOTOR OVERHAULING SECTION

SUBWAY AND ELEVATED MOTOR PRACTICE

When an armature is removed from the motor shell, the latter is first cleaned by blowing out with air at 20-lb. pressure and then washed with gasoline. The oil wells are

drained, blown out and then scoured with waste and gasoline, after which the inside of the motor shell is painted with insulating varnish. While this treatment is perfectly satisfactory for elevated motors, the subway motors are also relined with asbestos.

The fields are also tested for grounds with a voltmeter, and if the potential difference is over 20 volts they are removed for repairs. Troubles of this character, however, are rare, and in general there are practically no mechanical or electrical field failures. It is customary, also, to untape all field connections to see that no solder has melted in service, thereby avoiding danger of short-circuits.

The armature after it has been blown out with compressed air is painted with insulating varnish and finally tested with 1200 volts a.c. for five seconds. The commutator is taken to a lathe for turning and then passed to a mica slotter, where the mica is grooved out to a depth of 1/16 in. In the subway shop the brush holders are cleaned, repaired and calibrated in the air-brake room, where all of the refined mechanical work is done. The brush-holders are scrapped if they are worn more than 1/32 in.

The armature pinion, which is shrunk on originally, is heated with a gas flame to get the bearing housing off the shaft. Afterward it is reheated and shrunk on the shaft when the bearing housing has been replaced.

COST OF RENEWING BEARINGS, SUBWAY DIVISION

Renewing One Journal Bearing, Truck Not Removed from Car.

Total labor for one bearing	$0.13
Material for one motor truck bearing, 4 lb. babbit at 30 cts	1.20
Material for one trailer truck bearing, 2 lb. babbit at 9 cts	.18
Cost of labor and material in renewing one motor truck journal bearing	1.33
Cost of labor and material in renewing one trailer truck journal bearing	.31

Renewing One Motor Axle Bearing, Truck Not Removed from Car.

Removing	$0.45½
Babbitting	.08
Trimming up	.07½
Boring out	.09
Filing up and cutting oil grooves	.08
Replacing and repacking	.45½
Total labor	$1.23½
Material, 9 lb. babbit at 30 cts	2.70
Total	$3.93½

Renewing One Armature Bushing with Truck Removed from Car.

Removing, including taking motor out of truck	$1.02½
Babbitting	.05
Filing up, cutting oil grooves, etc	.09½
Boring	.10
Replacing	1.02½
Total labor	$2.29½
Material, 8 lb. babbit at 30 cts	2.40
Total	$4.69½

COST OF RENEWING BEARINGS, MANHATTAN DIVISION

Renewing One Motor Axle Bearing, Truck Not Removed from Car.

Removing, cleaning and replacing	$0.15	
Melting out old babbit and rebabbitting	.10	
Trimming up for boring	.03	
Boring and facing	.13	
Drilling for end liners on flanges	.05	
Putting liners on flanges	18	
Packing	.02	
Total labor		$0.66
MATERIAL		
5 lb. babbit at 9c	$0.45	
Material for end liners	.67	
Cost of material		1.12
Total		$1.78

COST OF RENEWING BEARINGS, MANHATTAN DIVISION

Renewing One Journal Bearing, Truck Not Removed from Car.

Total labor for one bearing	$0.13
Material for one trailer truck bearing 3 lb. babbit at 9 cts	.27
Material for one motor truck bearing 4 lb. babbit at 9 cts	.36
Cost of labor and material in renewing one trailer truck journal bearing	.40
Cost of labor and material in renewing one motor truck journal bearing	.49

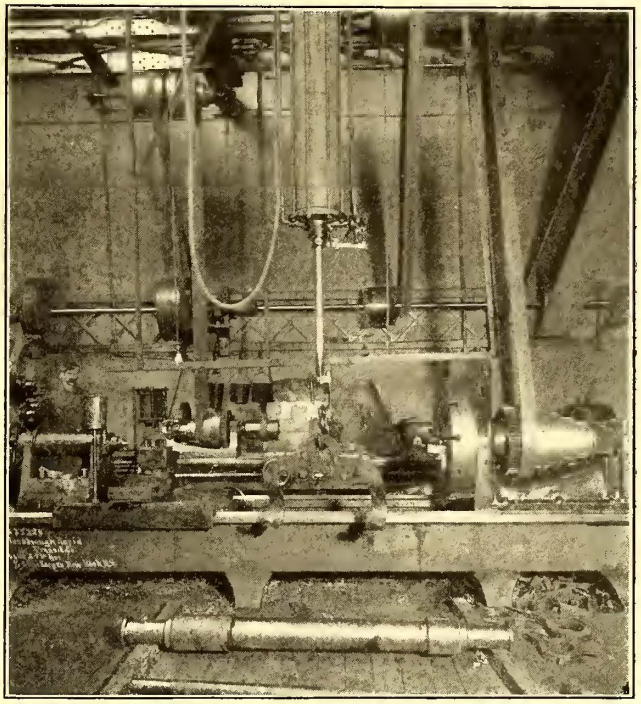
Renewing One Armature Bushing with Truck Removed from Car.

Taking out motor and removing head	$0.57	
Putting in new bushing, replacing head and motor	.57	
Cleaning	.03	
Rebabbitting bushing	.08	
Boring and facing	.10	
Filing oil grooves and finishing	.05	
Packing oil bearings on one motor	.06	
Total labor		$1.46
Material, 3 lb. babbit at 30c		.90
Total		$2.36

BEARINGS

Two types of babbitt linings are used by this company. One of these is a tin-base alloy, which consists of 83 1/3 per cent tin, 8 1/3 per cent antimony and 8 1/3 per cent copper, used for all types of the subway motors and trucks, and for the armature bearings of the elevated motors. The babbitt for the motor axle bearings and journal bearings on the elevated division is a lead-base alloy of 85 per cent lead, 10 per cent antimony and 5 per cent tin. All bearings are kept in standard sizes varying 1/32 in. in diameter.

The babbitt linings of armature bearings are renewed on general overhaulings, but it is not always necessary to renew the motor axle bearings. The tables on this page show the cost of renewing journal bearings, motor axle bearings and armature bushings on the elevated and subway divisions under the conditions noted.



PNEUMATIC HOIST, WITH SLING FOR BRINGING AXLES TO LATHE.

SUBWAY AND ELEVATED WHEEL PRACTICE

The conditions prevailing in the subway made it necessary to find some better way for securing wheels than is customary. The subject, therefore, was carefully worked up by the engineers of the department, who recommended that steel retaining rings should be shrunk around the hub. It has been demonstrated by experience that these retaining rings increase the holding power over 100 per cent. However, it might be mentioned that one of the first experiences with the steel-tired wheel in subway operation was that the heat generated by the intensive breaking was not dissipated quickly enough to prevent expansion of the tires and consequent loosening from the wheel center. This was

the primary cause for adopting the Schoen solid forged and rolled steel wheel for the subway service.

MAINTENANCE OF SUBWAY AND ELEVATED BRAKE APPARATUS

In going over the brake rigging the pins are taken out and inspected for wear; the piston is removed from the brake cylinder, which is cleaned and lubricated with grease, and all hose is tested at 120 lb. pressure. The air pump is taken completely apart and thoroughly cleaned and repaired. All worn parts are exchanged for new or repaired duplicates, while the triple, motorman's and brake valves are cleaned, ground, repaired and adjusted. The valves and valve seats are both scraped separately on a face plate, then scraped together and finally touched up with a little ground-glass grinding. In addition to the hose-testing apparatus, the air-brake room also contains means for applying new hose to couplers and hose nipples.

The most important tool is the Westinghouse triple valve tester, shown in one of the accompanying views. This is used for determining packing ring leakage; feed groove test and examination for leakage at exhaust and through gaskets and castings; application, graduating valve and slide valve test; release test; and check valve and slide valve tests. The air-brake room also contains a test gage for the governor controller valves.

CONTROL APPARATUS

The contactors, reverser, circuit-breaker and other parts of the control equipment are stripped of all moving pieces. The latter are then examined for wear and perfect parts substituted in making the new assembly. The coils of the contactors and of the control-circuit rheostats are measured and tested with an ohmmeter. The motor rheostats are removed from the car and taken apart, their mica tubes being replaced by new ones. To insure good connections the resistance lead terminals are always sweated off and then put back. Light and heater wiring is examined for deterioration and corrosion; in winter the heater circuits are tested with an ammeter.

CAR BODY WORK

While the trucks and electrical equipment are being cared for elsewhere, the overhauling of car bodies is taking place under the general foreman of carpenters, who is responsible for the correction of all car-body troubles. A car body usually is in two days for the carpentry and such work as the painting of the control apparatus cases, shoe beam and fuse box with insulating varnish.

CONTENTS OF FOURTH ARTICLE.

The next article will take up brake-shoe practice, contact-shoe practice, cost of different classes of electrical work and car painting.

THE RELATIVE VALUE OF ALCOHOL AND GASOLINE

The technologic branch of the United States Geological Survey, under the direction of J. A. Holmes, has recently completed a series of more than 2000 tests on the relative value of gasoline and alcohol as producers of power. These tests were conducted at the fuel-testing plant of the Geological Survey at Norfolk, Va., and show the following results in regard to the comparative fuel consumption of 73 deg. specific gravity gasoline and commercial completely denatured alcohol, per unit of power.

Correspondingly well-designed alcohol and gasoline engines, when running under the most advantageous conditions for each, will consume equal volumes of the fuel for which they are designed. An average of the minimum fuel consumption values thus obtained gives a like figure of .8 of a pint per hour per brake hp for gasoline and alcohol. Considering that the heat value of a gallon of the denatured alcohol is only a little more than .6 that of a gallon of the gasoline, this result of equal fuel consumption by volume for gasoline and alcohol engines probably represents the best comparative value that can be obtained for alcohol at the present time, as is also indicated by Continental practice.

The gasoline engines that were used in these tests are representative of the standard American stationary engine types, rating at 10 to 15 horse-power at speeds of from 250 to 300 r.p.m., while the alcohol engines were of similar construction and identical in size with the gasoline engines.

The air was not preheated for the above tests on alcohol and gasoline, and the engines were equipped with the ordinary types of constant level suction lift and constant level pressure spray carburetters. Many special tests with air preheated to various temperatures up to 250 deg. and tests with special carburetters were made, but no beneficial effects traceable to better carburation were found when the engines were handled under the special test conditions, including constant speed and best load.

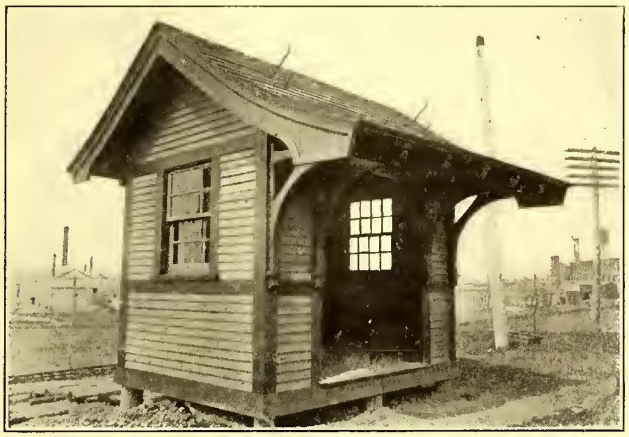
The commercial completely denatured alcohol referred to is 100 parts ethyl alcohol plus 10 parts methyl alcohol plus one-half of one part benzol and corresponds very closely to 94 per cent by volume or 91 per cent by weight ethyl alcohol. No detrimental effects on the cylinder walls and valves of the engines were found from the use of the denatured alcohol.

The conclusion is that alcohol can be used with more or less satisfaction in stationary and marine gasoline engines and these gasoline engines will use from one and one-half to twice as much alcohol as gasoline when operating under the same conditions. The possibilities, however, of altering the ordinary gasoline engine as required to obtain the best economies with alcohol are very limited; for the amount that the compression can be raised without entirely redesigning the cylinder head and valve arrangement is ordinarily not sufficient, nor are the gasoline engines usually built heavy enough to stand the maximum explosive pressures, which often reach 600 and 700 lb. per square inch. With the increase in weight for the same sized engine designed to use alcohol instead of gasoline, comes an increase in maximum horse-power of a little over 35 per cent, so that its weight per horse-power need not be greater than that of the gasoline engine and probably will be less.

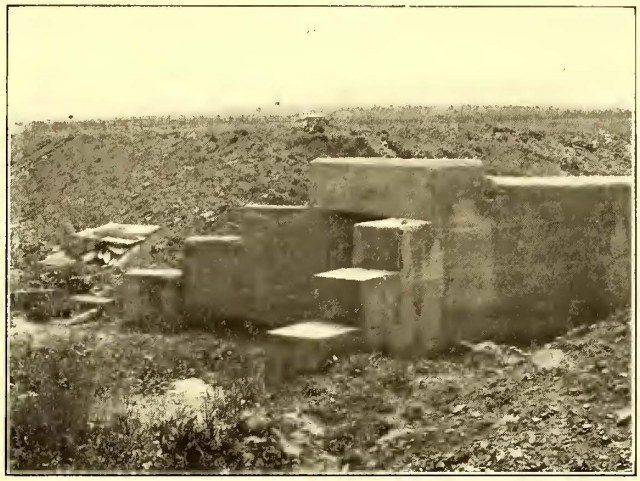
E. G. Bailey, of Boston, Mass., in a paper read before the meeting of the National Association of Cotton Manufacturers presented some very interesting facts regarding the weathering of coal that are too frequently ignored. He said the height to which the coal is piled is generally considered a very important factor, but frequently the hottest part of a pile 20 ft. deep is within 3 ft. of the surface. He cited the case of a pile of coal 10 ft. deep which took fire about 6 ft. below the surface, while in another part of the same pile at a depth of 35 ft. there were no signs whatever of heating. The rate of circulation of air through a coal pile, he said, seems to have more to do with this question than any other condition outside of the character of the coal. For the reason that the heating is irregular in the pile, the usual method of taking temperature measurements by letting a thermometer down a set of pipes scatttered throughout the pile is very unsatisfactory.

THE YORK AND HANOVER SINGLE-PHASE RAILWAY

The York Railways Company, of York, Pa., opened its high-speed single-phase line between York and Hanover to the public February 17. The road is 18½ miles long from Center Square, York, to Center Square, Hanover, and runs through a beautiful, fertile country in almost a direct line. En route it passes through Bear's Station, Graybills, Spring Grove, Menges Mills and East Hanover and follows closely the Pennsylvania Railroad, operating through one of the most thickly populated districts of Pennsylvania. The territory between York and Hanover has a population, including Hanover, of about 20,000, and with an hourly service with running time between York and Hanover of 55 minutes the residents are afforded a ready means of transit to and from York. Freight cars make several trips each way daily between the termini for the handling of merchandise and general express.



TYPICAL WAITING STATION



CONCRETE CULVERT

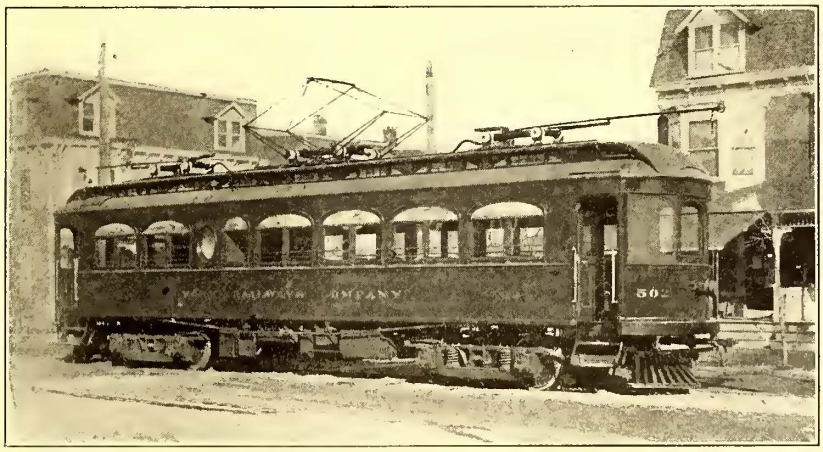
Leaving Center Square, York, the cars operate on the city streets for about two miles, then on private right of way for the rest of the way, with the exception of about one mile in Hanover. A feature of the line is that the maximum grade is only 2 per cent. The curves are all long radius. All crossings with steam roads are overhead, except one undercrossing. All bridges are built of steel and set on concrete piers and abutments, as shown by the accompanying illustrations.

The track is laid with 75-lb. T-rail with Weber joints and ballasted with crushed rock. The rails are bonded with No. 0000 15-in. American Steel & Wire soldered bonds, one at each joint. The track is also cross-bonded.

Current is procured from the York Haven Water Power Company, at York Haven, 12 miles north of York. It is transmitted to the railway company's station at 2300 volts, three-phase, 60 cycles, is changed by a motor generator set to 6600 volts, single-phase, 25 cycles, and crosses the city on an independent pole line supporting a No. 0000 feeder. The track return is of the same conductivity. The station equipment consists of two 450-kw Westinghouse motor generator sets, each consisting of a 2300-volt, three-phase, synchronous motor, driving a single-phase, 660-volt, 25-cycle generator.

The trolley wire throughout the entire length of private right of way carries 6600 volts. It is supported by the latest catenary construction of Westinghouse manufacture, and is suspended from the messenger wire by vertical hangers 10 ft. apart, and steadied at different intervals by 6-ft. wooden strain insulators. Where the trolley wire passes under bridges the latter are protected by heavy wooden troughs so designed that if trolley or pantograph should at any time leave the wire there would be no possibility of a ground on the overhead structure.

The rolling stock consists of four Pullman cars, with smoking and passenger compartments, toilet rooms and heater closets. They were built by the Niles Car Company, of Niles, Ohio. Their principal dimensions are: Length over buffers, 51 ft. 3 in.; length over vestibules, 49 ft. 11 in.; length over car body, 40 ft. 5 in.; vestibules, 4 ft. 9 in.; passenger compartment, 28 ft. 5¼ in.; smoking compartment, 11 ft. 11¾ in.; width over sheathing, 8 ft. 7½ in.; width over all, 8 ft. 10 in.; width of aisle, 19 in.; length of seats, 37¾ in.; height under sills to top of roof, 9 ft. 5 in.; track to top of roof, 12 ft. 11⅜ in.; wheel base of trucks, 6 ft. 6 in.; weight of car body, 30,000 lb.; total weight, 82,000 lb.; seating capacity, 52.



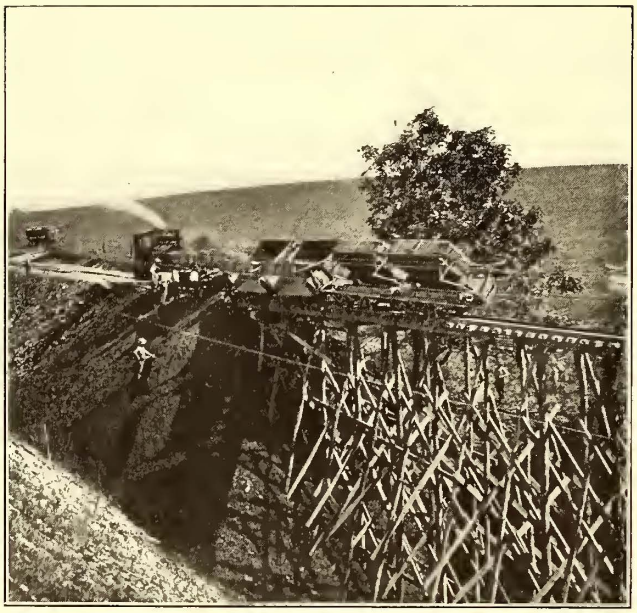
ONE OF THE SINGLE-PHASE CARS

Each car is illuminated by thirty-five 16-cp lamps along the deck rail of the ceiling and three Holophane bowls, each inclosing five lights. The finish is natural oak with empire ceilings. The seats, furnished by Hale & Kilburn, are upholstered in green plush in the passenger compartments and leather in the smoking compartment.

The cars are mounted on Baldwin 78-30 trucks with standard rolled-steel wheels and Symington journal boxes.

Both Peacock hand and Westinghouse air brakes are used, the Westinghouse brake being equipped with an a. c.-d. c. air compressor. Sand is delivered to the rail by air from an iron pipe clamped to the truck frame in front of each wheel in such a manner that, no matter how sharp a curve may be, the sand will be carried to the delivery pipe fastened to the truck frame.

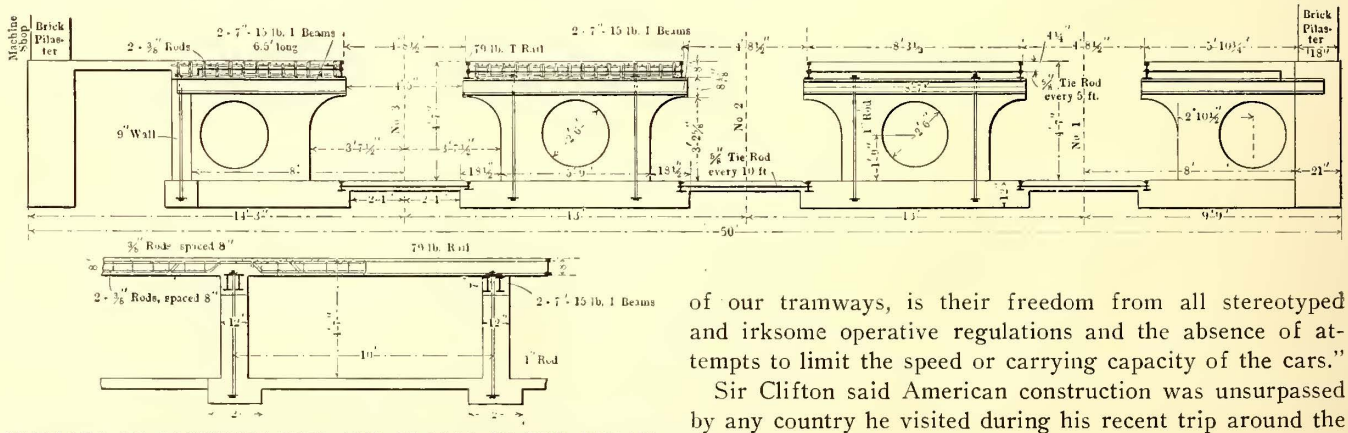
The electrical equipment was furnished by the Westing-



A HEAVY FILL

house Electric & Manufacturing Company. It consists of four 75-hp, No. 135 B motors, connected for multiple operation with unit switch control system. All the wiring is inclosed in loricated conduit.

The new cars are equipped with both wheel trolley and pantograph. The operation of the pantograph is controlled from the master controller. Air is released from two pis-



SECTIONS OF CONCRETE PITS AND FLOORS IN THE REPAIR SHOP OF THE YORK RAILWAYS COMPANY

tons connected to a pair of springs to force the pantograph to the wire, whereas the air is allowed to flow in between the two pistons connected with the pantograph springs to force them apart and pull down the pantograph.

The cars are heated by the Franklin hot-water system. The toilets have dry hoppers and cement floors. Lintern marker lights are used, supplied with current from storage batteries, thereby eliminating all danger of rear-end or head-on collisions. Other equipment includes Providence fenders, Tomlinson automatic couplers and Lintern sand boxes.

All 5-cent fares, all city tickets and passes are recorded on Sterling-Meaker registers. The McDonald ticket system is used for fares over 5 cents. This provides each passenger with a receipt showing to what place fare is paid.

Automatic block signals are installed on this line, manufactured by W. S. Jackson Automatic Signal Company, of York.

At the principal highways along the line the company has built attractive stations for the accommodation of its patrons. A freight and passenger station will be erected in Hanover, at which place an agent is stationed to attend to all business and where conductors can procure supplies.

The survey of the line was made about eight and one-half months ago by Louis C. Mayer, chief engineer of the company. The construction was carried out by Dodge & Day, contractors of Philadelphia, and John Dobbling, of York.

The officers of the road are: W. F. Bay Stewart, president; David Young, Jr., general manager; Joseph Wayne, general superintendent. The directors are: David Young, Sr., Judge W. F. Bay Stewart, Francis Farquhar, John Charles Schmidt, Grier Hersh, George Frazier and John C. Dawson.

DIFFERENCES IN AMERICAN AND BRITISH STREET RAILWAY PRACTICE

Sir Clifton Robinson, managing director of the London United Electric Tramways Company, in a recent London interview, compared the practices of American and British railways. He said:

"The question of tramways in the United States is viewed from an entirely different standpoint to that taken in this country. There street railways are an institution; here they are regarded as an innovation—not always acceptable—and often only tolerated for what can be got out of them by zealots. . . . The most striking feature in street railway operation in America, in contradistinction to that of our tramways, is their freedom from all stereotyped and irksome operative regulations and the absence of attempts to limit the speed or carrying capacity of the cars."

Sir Clifton said American construction was unsurpassed by any country he visited during his recent trip around the world.

"There are three salient features," he said, "concerning tramway operations which are certainly detrimental to us in our comparison with other countries: The speed limit—our tramways do not travel fast enough; the double-deck type of car, which is the cause of much lost time, and the volume of traffic on special occasions, which could be handled more satisfactorily were the present restrictions regarding overcrowding removed."

On the question of general discipline of employees as between the two countries, Sir Clifton said: "The method of selection, training and discipline of our men is hard to be excelled."

HANDLING FARES ON INTERURBAN RAILWAYS*

BY P. P. CRAFTS,
General Manager, Iowa & Illinois Railway Company.

Probably the question of proper collection, registration and auditing of interurban fares has received more attention from interurban managers than any other individual item in connection with their work. It is fully as important to safeguard the receipts against loss through careless and inefficient methods of handling and accounting, and the peculations of the dishonest employee and passenger, as properly to account for the operating expenses, if not more so. Too many of us look upon the money obtained from traffic as so much cash received, and do not give sufficient thought to analyzing and preventing the small leaks, which taken individually may be very small, but collectively amount to a large sum per annum. Such money is earned, but not collected nor accounted for. For instance, a three-car road operating 12 trips per car per day of 18 hours, and losing only 10 cents per trip, will in one year be short $1,314. One-half this amount expended in clerk hire or in proper ticket forms might be the means of saving such a loss. On the other hand, some managers surround the handling and accounting of fares with so many safeguards that their expenses are enormous in proportion to the benefits derived.

The question, therefore, resolves itself down to "What is the simplest system of accounting and tickets which, with the least expense, will transfer the greatest percentage of money due from traffic to the treasury of the company?" The answer is not nearly as simple as perhaps it may seem, because local conditions of traffic, number of stops, terminal arrangements, etc., must govern the system finally adopted A road whose stops are far apart and which carries mostly through traffic, i. e., from one terminal to the other, may successfully adopt a system of collection and registration which would utterly fail of its purpose on a road whose stops were frequent and the local or short riding heavy. In other words, the fares lost from not being collected, on the latter line, because of a very accurate but cumbersome system of fare collection and registration, would be greater than the losses which might be sustained by the use of a somewhat less accurate system permitting quicker work on the part of the conductor. This assertion, it must be admitted, is a very strong one, but the writer has, for several months past, operated two interurbans, one of which presents the former condition and one the latter. The opportunity to study both conditions has therefore been an excellent one and the experience gained is of sufficient value to make the above statement.

A number of so-called standard systems have been devised from time to time, some of which have been guaranteed by the originators to cure all evils in the line of fare collection, etc., but local conditions were not given sufficient consideration, with the result that some of these systems have been adopted by some roads and some by others, but none of them has been sufficiently universal to be applied to all conditions.

The most universally used systems at present are as follows:

First—The duplex check used in various forms and in various manners.

Second—A combination of the duplex check, sold only on cars and tickets sold only in stations.

Third—The use of registers upon which can be recorded the various classes of fares collected.

Fourth—The zone system of fare collection by which fares are collected every few miles and recorded on ordinary registers.

Various other systems are in use, but those described will be found on the greater number of the electric lines in this country.

Probably all the different forms of the duplex check, under that and other names, have been called to the attention of all interurban managers, therefore I will not take the time to describe them in this paper; but the variety of combinations of their use are worthy of description and discussion. The general combinations are:

A—One form of duplex check for one way fares, with and without registers.

B—One form of duplex check for both single and round trip fares, with and without registers.

C—Two forms of duplex check, one for single and one for round trip fares, in either direction, with and without registers.

D—Four forms of duplex check, one for single and one for round trip fares in one direction; one for single and one for round trip fares in the opposite direction.

E—Forms for special reduced rates, generally used on certain days only.

With any form of the duplex check a very careful record must be maintained of the checks issued to the conductors and the number reported daily by them as used, and the checks turned in by all conductors whether issued by the man turning in or by some other man.

One of the most valuable assistants in checking the issue and collection of checks is a comprehensive trip sheet which will not require the conductor to be a bookkeeper, but upon which he can properly classify the fares collected in an intelligent manner. In that connection, some roads allow each conductor to use one trip sheet for the entire day, while others require a trip sheet to be turned in at the end of each swing or at the end of each trip. The necessity of either of the latter arrangements varies with conditions, but in general, and for reasons too obvious to all managers, it is desirable to have trip sheets made up and handed in at the end of each round trip. Tickets collected should also be handed in with the trip sheets upon which they have been recorded.

To illustrate the point brought out earlier in this paper, the writer will describe the system of fare collection and accounting in use upon each of the roads which he has managed for some time past, namely, the Iowa & Illinois Railway and the Joplin & Pittsburg Railway, the former illustrating the first and the latter the second class mentioned.

On the Iowa & Illinois Railway a combination system is used consisting of duplex checks sold only on cars, card tickets and mileage books sold at the terminal offices, special rate duplex checks sold on cars, and special rate tickets sold in offices. The last two are sold only on special rate days and for special car parties.

Of the regular rate tickets issued there are four forms of duplex checks, sold only on cars, one single trip and one round trip form for each direction. Four forms of terminal office tickets are also sold, one single trip and one round trip form, for each terminal. In addition a color scheme is carried out, all tickets having colored panels printed upon them. Tickets which can be collected on southbound cars bear blue panels and those collected on northbound bear

*Paper presented at the meeting of the Iowa Street & Interurban Railway Association, Des Moines, April 23-24.

red panels. It is, therefore, necessary for conductors to change their pads of tickets at the end of each half trip, and in order that they may have a sufficient supply on hand for all emergencies each conductor is provided with a small tin box having a proper lock, in which he can keep all tickets not actually in use.

Round-trip tickets are so arranged that the return coupon bears the proper color of panel for the return trip. The conductor of a southbound car sells a round-trip ticket having a red panel on the return coupon, retaining the plain going coupon. The same color scheme applies to office tickets sold at terminals.

Regular rate tickets are never sold at a reduced rate, a special form being provided for that purpose. These special-rate tickets are easily distinguished from the regular-rate tickets both by form and color. Therefore, if conductors receive orders to sell at a reduced rate between any two points they must use the special rate form of check. Inasmuch as the terminal officers sell reduced rate tickets only between termini, or between either terminal and the I. & I. Park, only two forms of special rate tickets are sold at each of the offices mentioned. Special rates are never made for a ride in one direction only, but only for round trips.

In addition to a fairly comprehensive system of tickets, conductors must close trip sheets and turn them in with all tickets collected at the end of each round trip. This, of course, materially increases the work of auditing tickets, but it decreases the possibility of the double use of ticket stubs, against which the company is again partially protected by the consecutive numbering of each form of ticket, which also includes a letter designating whether the ticket is southbound or northbound.

We also make use of a register, but its purpose is not to register the amounts of fare paid by passengers nor to check the number of passengers on the car at any one time, except when going into or going out of the city of Davenport. This is done to comply with the terms of a terminal contract with the Tri-City Railway Company.

A daily check is kept of all tickets of different classes sold by each conductor and by each terminal office. When a conductor receives a pad of tickets he is charged with it by the initial serial number. After checking through his trip sheets from the beginning to the end of his run, to ascertain whether or not the numbers of all tickets sold check with the closing number as reported at the end of the day, the closing number is entered on the ticket ledger and this number is, of course, the opening number for the following day. This same method is carried out in accounting for tickets sold by the terminal offices. When transferring tickets from the stock room to the distribution drawer, care is taken that consecutive numbers are transferred and in no case are pads of tickets bearing anything but the proper numbers allowed to be issued to the conductors or to the offices.

We find it is a very easy matter to check irregularities or losses on the part of conductors or agents and to trace out any tickets presented for redemption. It is very surprising to some person demanding a return of his fare on some excuse, when, after asking a few questions we ascertain that perhaps the party had picked up a receipt in a car leaving Clinton at 5:30 p. m., which receipt was left in the same car by some party riding on its 2:30 p. m. trip. When the road was first started we had a large number of these demands, but it is now a rare thing to have a demand for a return of fare except in cases where people buying round trip tickets have been unable to use them. In such cases we immediately return the difference between the regular trip fare and the round trip fare paid.

The system of using colored panels reduces the chance of the double use of receipt stubs so materially that we have never been able so far to find any evidence of such double use. This can very readily be seen when it is explained that after once selling a duplex check from one station it is impossible for the receipt stub to be again used from the same station, because the conductor's stub is recorded and turned in before he again passes that station in the same direction. Furthermore, each conductor, knowing that the serial numbers of all tickets issued to him are recorded, is extremely careful about selling any which do not bear the proper number.

The above, of course, applies wholly to single trip duplex checks, for all office tickets are collected by the conductor, leaving no receipt in the hands of passengers, and all parts of round trip duplex checks remaining with passengers are valuable to the latter. The only chance of material loss is in connection with the single trip duplex checks which are, therefore, very carefully surrounded with a number of safeguards.

We do not attempt to keep a very accurate account of the business derived at the various flag stations along the line, preferring to divide it between through and local business. From these records it is very easy to ascertain whether or not the traffic from any one particular point is falling off or increasing materially. We are very careful, however, to separate northbound from southbound traffic, in order that we may ascertain whether or not the line is being used as a connecting link by traveling men in one general direction.

Under the contract with the Tri-City Railway Company it is necessary for us to report the number of passengers going in and coming out of the city, the number of transfers issued and received. Proper spaces are provided on trip sheets for filling out these reports, which are carefully transcribed on a record sheet and reported monthly to the terminal company.

Having described the system in use on a road whose stops average one about every 3 miles, I will now illustrate that such a system is not at all practicable for a road whose stops average about one for each half mile, by describing the system in use on the Joplin & Pittsburg Railway.

This road operates through a number of small mining towns radiating from Pittsburg, Kan. The local traffic between the various towns and the morning and night traffic between the homes of the miners and their work are extremely heavy. To better illustrate the amount of local riding, I will state that the average fare per revenue passenger on this road is approximately 7½ cents in a maximum fare of 35 cents, without round trips or special rates, whereas on the Iowa & Illinois Railway the average fare per revenue passenger is 32 cents in a maximum fare of 70 cents, besides round trips, mileages and special rates, the latter being frequently given.

The situation on the Joplin & Pittsburg Railway was studied very carefully and it was soon ascertained that the use of a very comprehensive ticket system would defeat its purpose, because so many fares would be missed owing to the extremely large number of local passengers handled. A system of registration by which all classes of fares could be rung up and recorded was finally adopted, hat checks being issued to designate passengers traveling between the

principal stations. This system, however, has its disadvantages, because the conductor is comparatively free to ring up any amount of fare regardless of what he collects.

This may seem like a very bold statement, but the writer has made a special study to ascertain whether or not passengers pay any particular attention to the registration of fares, and he is satisfied that most people do not do so. Even if they hear the bell, it is very unlikely that they pay any attention to the actual amount indicated on the register. It is very hard, therefore, when using this system, to check conductors unless the checker can actually see the amount paid. The system of hat checks recently designed by Mr. Pierce, of the East St. Louis & Suburban, obviates this trouble to a certain extent, but it again introduces a considerable loss of time in the collection of fares.

One method which would partially overcome the difficulty referred to would be to use an ordinary fare register, registering by 5-cent fares. If a passenger paid 25 cents, the register would be rung five times. This method, however, destroys the means of keeping account of passengers carried. Another partial cure is the zone system, but the writer's experience with that system has been very unsatisfactory. The zone system as a general proposition causes the passengers too much annoyance and the earnings of the road must suffer in consequence. Some managers claim to have overcome the objection to it by collecting full fare and requiring the conductor to ring up for each passenger carried in each zone. Assuming a car carrying over two hundred people in a trip of 22 miles, the passengers would not be able to carry on much conversation and would hear very little else than the ringing of the fare register. This system, unless used in combination with duplex checks, also prevents an accurate accounting of passengers carried.

The accounting for fares collected on the Joplin & Pittsburg Railway is naturally a simple matter, there being no round trip nor special rates, fares between any two points on the road remaining the same. It is only necessary to check trip sheets with the registers and with cash turned in by the conductors. From the trip sheets also is obtained the number of passengers carried and the car mileage.

In conclusion, I believe it is conceded that the use of the duplex checks on roads whose short riding traffic is normal is practically a success, but a satisfactory system has not been discovered for roads carrying a large proportion of local traffic. There is great room for improvement in the latter instance.

One of the most important features in connection with any system of fare collection and accounting is to keep a careful record of tickets issued to conductors and offices, to have the conductors turn in frequently enough to prevent the double use of duplex checks and to carefully audit the returns of conductors and offices. It is extremely important, of course, that the latter item shall be followed up efficiently, otherwise mistakes will occur in the auditing department in connection with the correcting of conductors' mistakes, which will not only be embarrassing but will destroy the efficiency of the auditing system. Under no condition should the handling of fares and tickets be allowed to drag in any department, because upon the efficiency of the system of accounting for receipts depends the efficiency of other departments, whose standard is set by the former.

A multi-side-door car has recently been put in service on the tramway system of Wellington, New Zealand. The car has six side doors under running board like an open car.

DEPRECIATION IN ELECTRIC RAILWAY ACCOUNTING*

BY DANIEL ROYSE,
Assistant Editor in Chief, *The Railway Age.*

Electric railways comprise an important part of the transportation industry of the country and are founded upon an enduring need. Therefore their securities should be among the most desirable of investments, considering both safety and income, but even in the largest centers of population, where the need of transportation is greatest and large earnings most certain, electric railway securities have in the past proved to be most precarious—not only as to earnings but as to safety of capital—to illustrate which it is only necessary to refer to recent history in Chicago and New York.

This anomalous condition exists because for years the electric railway was on a promotion basis and was made to yield big returns to a few—it being made to appear that these returns came out of the earnings, when really they were in large part improper diversions of the capital of many innocent investors in both stocks and bonds. The practice of dissipating capital in the guise of dividends was possible because the matter of providing for the renewal of the physical property was ignored until the need of renewal was imminent, and then the simple device of a reorganization or a sale or lease to a new company afforded opportunity for charging the cost of rebuilding to capital account. In some cases corporation was thus piled upon corporation until the outstanding capital obligations amounted to 10 or more times the annual gross earnings—in practice, apparently, the only limit was the capacity of the bond market to assimilate securities.

The fact that "Depreciation" is one of the subjects on the program for this meeting of the Iowa Street & Interurban Railway Association is an indication not only that the members of the association recognize that depreciation of the physical property of electric railways does occur, but also that they wish to consider the extent to which it is desirable to make present provision for the demand which the future will bring.

Heretofore recognition of depreciation and of the accrued liability resulting from it seldom has been given except when trying to convince the tax assessor that the property was not nearly as valuable as the reports of net earnings seemed to indicate, or when endeavoring to demonstrate that the books of some plant owned or operated by a municipality were not properly kept. Now, however, principally because of the activity of the Interstate Commerce Commission and of the State railway commissions, which promise to co-operate with the national body, conditions are changed, and it is the part of wisdom, and of expediency as well, to meet the new conditions squarely and work in harmony with these regulating bodies.

The most serious effect of the mistaken theory heretofore so generally followed by electric railways is not the deceiving of investors, though in some cases the result to them has been sufficiently disastrous, but the misinforming of the public. Taught to believe that electric railways are cheap to operate and yield large returns to the owners, the public naturally has demanded that fares be reduced, that compensation for franchise grants be paid, that more extended transfer privileges be given, that the streets be paved, cleaned and lighted by the railways operating in them, etc. Moreover, it is believed that the growth of the idea that

*A paper presented at the meeting of the Iowa Street & Interurban Railway Association, Des Moines, Ia., April 23-24, 1908.

franchise grants should be strictly limited to a short term is for the most part due to this same misapprehension on the part of the public for which the railways are directly responsible.

In considering what present provision for future demands it is desirable or necessary to make railways should be classified according to the length of time their franchise grants run. Depreciation applies to all railways, but plans for the amortization or retirement of the capital need be made only by those companies having short-term franchises.

Depreciation is that deterioration of the physical property which is not made good by current repairs. For example, a car, though kept in the best of repair, eventually will have to be taken out of service and replaced. If the term of service be 20 years it is evident that the car each year has depreciated in value to the extent of 5 per cent of the difference between its original cost and its value as scrap. Assuming a scrap value of 20 per cent of the original cost, there will be a depreciation of 4 per cent per annum on the car. If no provision has been made for this current depreciation, when the time comes for replacing the car it will be necessary to charge the 80 per cent of the cost of the old car to operating expenses if the capital is to remain unimpaired.

This in general has for many years been the practice of the steam railways, and is that prescribed in the "Standard Classification of Operating Expenses" adopted in 1898 by the Street Railway Accountants' Association. There is, however, much reason to believe that electric railways have too often charged renewals to "Construction" or "Reconstruction," instead of to operating expenses under the head of "Maintenance," as the standard requires.

But even if the injunction to include in maintenance "all expenditures for repairs and renewals" be strictly observed, there will be a gradual reduction in the value of the physical property subject to depreciation that will finally amount to between 40 and 50 per cent of the original cost of that property. To illustrate: Railways develop gradually and their equipment is acquired from time to time as the need arises. Now, take 20 cars, purchased one each year, the oldest having been in service 19½ years, another 18½ years, and so on down to the newest, which is one-half year old. The life of cars being taken at 20 years, the total car-years of service yet before these 20 cars is 200, or an average of 10 years per car. With salvage at 20 per cent of the cost the average depreciation of the cars is ½ (100 — 20) = 40 per cent of the cost.

The same reasoning applied to other classes of equipment will give similar results, varying a little according as the scrap value is greater or less than 20 per cent. When a group of units, such as the cars in the example cited, varying in age by equal increments is considered the life assumed does not affect the average depreciation, it being always one-half of the total life if the computation be made midway between the regular renewal dates. Hence the conclusion that when proper renewals are made the normal value for service of the physical property of a railway after a sufficient period of operation is only from 50 to 60 per cent of its original cost.

In Accounting Series Circular No. 20, dated Jan. 10, 1908, Prof. Henry C. Adams, in charge of statistics and accounts for the Interstate Commerce Commission, submitted tentative classifications for the operating expense accounts of electric railways engaged in interstate commerce, which classifications contain provisions for depreciation accounts as follows:

A. Under the head of "Depreciation Estimate—Revenue Equipment," in "Maintenance of Equipment," there are provided eight accounts for cars and locomotives, and under "Depreciation Estimate—Service Equipment," in "Maintenance of Way and Structures," three accounts. Each of these 11 accounts is designated "Depreciation Estimate" and is subdivided into two subaccounts designated as "Estimate" and "Renewals," respectively. The instructions as to what are included in the subaccounts, taking "Passenger Cars" as an example, read as follows:

a-1. Passenger Cars—Estimate.

This account includes a monthly charge of one-twelfth (1/12) of .... per cent per annum of the original cost (estimated, if not known) of passenger cars, to provide a fund for replacement when retired.

Note.—Where, in the opinion of the carrier company, depreciation can be more accurately estimated by basing the estimate upon the service rendered by the property, such method of estimate may be permitted, in case the carrier company first files with the ..... Commission a statement of the rule or principle upon which it will base its estimates of depreciation, subject to disapproval by the commission.

a-2. Passenger Cars—Renewals.

This account includes the original cost (estimated, if not known), of all passenger cars condemned, destroyed or sold, less:

Amount previously charged for depreciation up to date of retirement; plus

Scrap value of salvage or the amount received from sale of passenger cars retired.

Note A.—Passenger cars permanently retired from service, but held, pending disposition, should be written out of service through this account, and carried in an appropriate material account at a nominal valuation or at actual scrap value, if determinable.

Note B.—The appropriate charge to this account, in respect to equipment in service on (a fixed date, as, July 1, 1908), will be determined by deducting from its depreciated value on that date the amount charged for depreciation accruing subsequently to (June 30, 1908), up to the date of retirement, and the scrap value of salvage or the amount received from sale of such equipment retired. The depreciation accruing before (a fixed date, as, July 1, 1908), must not be charged to the operating expenses of any part of the period subsequent to (June 30, 1908). The purpose of the instructions in this note is to prevent any charge against renewals account for depreciation accruing previously to the setting up of regular depreciation charges under this classification, and, inasmuch as such previously accrued depreciation is not an item of current operating expenses, it should be adjusted by appropriate entries in the general books.

B. Under the head of "Depreciation Estimate—Maintenance of Shop and Power Apparatus," in "Maintenance of Equipment," there are provided three accounts, each sub-divided into two, with designations and instructions, taking "Shop Machinery and Tools" as an example, as follows:

(a) Depreciation Estimate—"Shop machinery and Tools."

a-1. Shop Machinery and Tools—Estimate.

This account includes a monthly charge of one-twelfth of .... per cent per annum of the original cost (estimated, if not known) of shop machinery and tools in service to provide a fund for replacement when retired.

a-2. Shop Machinery and Tools—Adjustment.

This account includes the original cost (estimated, if not known) of all shop machinery and tools prematurely condemned, destroyed, sold or otherwise removed from service, less the amount previously charged for depreciation up to date of retirement and salvage recovered from final disposition.

C. Under the heads of "Depreciation Estimate.....," in "Maintenance of Way and Structures," there are provided 25 accounts, each subdivided into two, with designa-

tions and instructions, taking "Rails" as an example, as follows:

b-1. Rails—Estimate.

This account includes a monthly charge of one-twelfth of .... per cent per annum of the original cost (estimated, if not known) of rails in service to provide a fund for replacement when retired.

b-2. Rails—Adjustment.

This account includes the original cost (estimated, if not known) of all rails permanently condemned, destroyed, sold or otherwise removed from service, less the amount previously charged for depreciation up to date of retirement and salvage recovered from final disposition.

Of these three groups two, B and C, it is stated, have been included only for the convenience of those desiring to use them and are not at this time required, the explanatory note reading as follows:

Note.—Depreciation charges on maintenance of way property are not required at this time by the interstate commerce commission. It is arranged, however, in this classification to introduce this account to provide rules for computing depreciation charges on maintenance of way property for the guidance of those carriers that desire to make such depreciation charges and for the use of such commissions of the various States as may prescribe them.

In discussing depreciation Professor Adams further says:

5. The monthly charges to operating expenses for "depreciation" on the several classes of equipment will, of necessity, create or require corresponding liability accounts to which such depreciation may be credited. To that end carriers will be required, beginning ..... to set up an appropriate liability depreciation account for each of the several classes of equipment upon which depreciation is charged. These accounts should be designated as follows:

(a) Electric Locomotives—Replacement.
(b) Passenger Train Cars—Replacement.
(c) Freight Train Cars—Replacement.
(d) Electric Equipment of Cars—Replacement.
(e) Work Equipment—Replacement.

To these replacement accounts should be credited monthly the amount of accrued depreciation on each class of equipment, respectively. Such credits should invariably equal the gross charges to maintenance for depreciation.

On analyzing these instructions it is seen that two objects are sought through the establishment of depreciation of equipment accounts:

(1) The charging to operating expenses monthly of a sum sufficient to cover the depreciation of equipment that is accruing currently over and above that loss in value which is made good through current repairs and maintenance.

(2) A means whereby there will be charged to surplus or profit and loss, in the course of a number of years, representing the average life of the property subject to depreciation, a sum equivalent to the total depreciation of equipment that had already accrued prior to some fixed date, as, for instance, July 1, 1908.

The fact that these two objects are coupled does not mean that both are equally desirable or undesirable—each proposition should be considered on its merits. Concerning the first object, accounting for current depreciation month by month, the writer believes that since depreciation exists it should be accounted for as it accrues.

The depreciation of equipment which ultimately results in the need for renewals is an accrued liability and should have a place in the balance sheet. This being true, the corresponding debit should appear somewhere in the accounts.

Charging accrued depreciation to operating expenses or to income and crediting a reserve account cannot affect the liability of a company to its bondholders, nor will such entries in the books, since they involve the payment of no real money, curtail the ability of the company to pay fixed charges. Further, such entries need not curtail the payment of dividends, but if the dividends are paid these entries will perform the important function of showing the stockholder that his dividend has come out of capital and not out of profits, and of showing the bondholder that his security is being impaired, facts which the investors and, in the case of a permanent institution like a railroad, the public should fully appreciate.

Whether these charges should be made to operating expenses or to income is perhaps open to argument, but it is the opinion of the writer that they should be made to income, first for the reason that depreciation is not an "expense" because it may not involve the payment of money (per contra, appreciation if shown would not be credited to earnings) and, second, because depreciation goes on independent of operation; especially is this latter true of that class of depreciation caused by the advancement of the art, sometimes designated as that due to obsolescence or supersession.

In considering the second object of the commission—the charging of depreciation already accrued to surplus—it is necessary to distinguish between companies having short-term franchises and those not so limited. As regards the former the accrued depreciation must be made good before the franchise expires or the investors—stockholders or bondholders or both—will surely suffer. With railway companies owning their rights of way, terminals, etc., in fee, the case is different and they perhaps can claim credit for the appreciation of the portion of their assets that is not subject to depreciation. This phase of depreciation accounting is discussed by Frederic A. Delano, president of the Wabash Railroad, in a paper published in *The Railway Age* of March 27, 1908, page 471. In this connection Mr. Delano says:

(a) Steam railroads do not have to provide for any depreciation as against the expiration of a franchise, which, of course, is a serious item with public service corparations having limited franchises. Nor is there, in the case of steam railroads, a large share of the total investment in a central power plant which is becoming obsolete. In most cases the depreciation due to the diminished value of equipment, track, bridges, structures of all kinds, shops and shop tools already referred to, is limited, as has been explained, and is, furthermore, a good deal more than counterbalanced by the appreciation due to the fact that the age of the railroad has given it an established business. This amounts to a good deal more in the case of a railroad than what is called "good will" in the case of a mercantile corporation. As a railroad is developed industries, mines, factories, etc., are established along its tracks, with switches and side-track facilities, towns grow up along it, and a certain amount of business becomes assured to it—business which it takes years and a large expenditure of money and energy to develop—all of which is charged into current operating expenses and should be considered as an offset to any depreciation of the property.

(b) Besides the appreciation due to this cause there is, of course, an actual physical enhancement of value due to the condition of the roadbed and embankments becoming better solidified, the water courses established and the original structures gradually replaced with others of a more permanent character, even without any addition to capital account; thus wooden trestles, bridges, culverts, etc., have been filled with earth or replaced by steel or iron, stone or concrete.

(c) No account is taken and no estimate can be made of the enhanced value of the railroad property (right of way and terminals) due to the enhanced value of the land, even though the existence of the railroad may have contributed largely to the development of the country through which it runs. The railroad corporation suffers by reason of this enhanced value which it has so largely contributed to create if it is compelled to purchase any additional property, as well as in the increased amount of the taxes it is called upon to pay each year as its contribution to the needs of the growing communities; but it has not been usual to make any allowance

for this. Those who have had the greatest experience with railways generally believe that the enhancement in value or appreciation of the property in the direction already referred to far more than balances the depreciation, especially when it is remembered that the total depreciation, under proper maintenance rules, is, without doubt, limited to about half the cost of the property subject to depreciation.

Strictly urban properties with limited franchises and those having tracks laid in the public highways cannot avail themselves of these arguments to the same extent.

It may be desirable to cite some statistics to show how much those railways which undertake to care for current depreciation find it necessary to provide for this purpose. Here it is proper to say that expenditures for repairs, renewals and depreciation charges should all be grouped together, since any one of the three items taken separately means but little, because human nature is too apt to shift the dividing line between repairs and renewals according to the showing it is desired to make. Thus grouped it is found that the gross earnings per mile, the total repairs, renewals and depreciation per mile, and the latter expressed as a percentage of the former are as follows for the properties which are making the largest provision for current depreciation:

In addition to the electric railways given in the table roads making charges for depreciation include the following:

The United Railways Company, of St. Louis, began in January, 1905, to charge off 5 per cent of gross earnings, crediting it to a depreciation reserve. In 1906 the total charges for maintenance and depreciation amounted to 15.09 per cent of gross earnings. In 1907 the charge for depreciation was 5.08 per cent and the total of maintenance and depreciation was 18.69 per cent of gross earnings.

The Milwaukee Light, Heat & Traction Company began in 1903 by charging 5 per cent of gross earnings for depreciation, increasing the proportion 1 per cent each year, so that the charge was 9 per cent of gross earnings in 1907, and presumably is 10 per cent for the current year. In 1907 the railway departments of the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company showed gross earnings of $14,330 per mile of single track; maintenance was 10.28 per cent and depreciation 6.84 per cent of gross earnings.

The Wisconsin Traction, Light, Heat & Power Company, of Appleton, Wis., in 1907 began to charge 5 per cent of gross earnings for depreciation, the intention being to increase the proportion gradually to 10 per cent. The rate this year is 6 per cent. In 1907 the total of maintenance and depreciation for the railway department was 19.21 per cent of gross earnings.

The foregoing three companies are all under the management of John I. Beggs, who, it is believed, was the pioneer in this country in the matter of accounting for depreciation, having begun with the Milwaukee Electric Railway & Light Company in 1897.

The International Traction System, of Buffalo, in its report for 1907, shows a depreciation charge of 5 per cent of gross earnings. In the 1906 report no such charge was shown, but in the 1907 report the figures for 1906 were differently stated to permit of comparison and the depreciation charge for 1906 is shown at about 4¾ per cent of gross earnings, this being subtracted from the operating expenses as shown the year before. Figures published in *American Street Railway Investments* show the total of maintenance and depreciation charges (no depreciation shown prior to 1906) in per cent of gross receipts for this system to have been as follows:

1903	1904	1905	1906	1907
7.52	10.00	9.48	14.17	15.03

This indicates that the proper interpretation was not placed upon maintenance until 1906. The maintenance for 1907 was assumed to bear the same ratio to depreciation as in 1906, in order to get the 15.03 per cent given.

The Twin City Rapid Transit Company began to establish renewal reserves in 1905, setting aside 7.14 per cent of gross earnings in 1905, 8.54 per cent in 1906 and 8.35 per cent in 1907. The totals of maintenance and renewal reserves in per cent of gross earnings have been:

1899	1903	1905	1906	1907
7.89	8.09	14.44	16.25	15.98

The new ordinances of the Chicago City Railway Company and the Chicago Railways Company specify that after the three-year period of rehabilitation at least 6 per cent of gross receipts shall be spent or reserved for repairs and that 8 per cent of gross receipts shall be spent or reserved for renewals. The reserves are to be carried in cash with approved depositaries. In the case of the Chicago City Railway the total maintenance reported for the first half of 1907 was 13.05 per cent of earnings.

The Union Electric Company, of Dubuque, Ia., began Jan. 1, 1906, to set aside 20 per cent of gross receipts for the purpose of maintenance and depreciation reserves. For the railway department in 1906 maintenance amounted to 11 per cent, leaving 9 per cent of the gross receipts to apply on account of depreciation; in 1907 maintenance required 7½ per cent, leaving 12½ per cent of the gross receipts for the depreciation reserve.

The British Columbia Electric Railway Company, Vancouver and Victoria, B. C., has for some years charged depreciation at the rate of 5 per cent on steam, electrical and water machinery, 3.5 per cent on rolling stock, 10 per cent on poles, 3 per cent on lines, 2 per cent on track and 1 per cent on buildings.

The Kansas City Western Railway, operating between Kansas City and Leavenworth, and in Leavenworth, Kan., has adopted 7.5 per cent on steam and electrical machinery and rolling stock, 5 per cent on poles, 55 cents per ton on rails, 12.5 per cent on ties, 10 per cent on paving and 2.5 per cent on buildings, as the annual depreciation charges.

Depreciation in Electric Railway Accounting—Gross Receipts and Charges for Maintenance and Depreciation per Mile of Single Track.

	Fiscal year of	Total gross receipts per mile of single track.	Total maintenance and depreciation per mile of single track.	Maintenance and depreciation in per cent of gross receipts.
Steam railways of the United States as reported to the interstate commerce commission	1899	$ 5,308	$1,313	24.74
Steam railways of the United States as reported to the interstate commerce commission	1902	6,453	1,684	26.10
Steam railways of the United States as reported to the interstate commerce commission	1904	6,815	1,779	26.10
Steam railways of the United States as reported to the interstate commerce commission	1905	6,956	1.837	26.41
Steam railways of the United States as reported to the interstate commerce commission	1906	7,526	2,019	26.83
Steam railways reporting to New York railroad commission	1905	10,548	2,674	25.35
West Chicago Street Railroad	*1904	26,857	6,445	*24.00
North Chicago Street Railroad	*1904	33,607	7,394	*22.00
Milwaukee Electric Railway & Light Company (railway department)	1906	†25,632	4,606	17.97

*Percentage is the same in 1905 and 1906.
†Gross Earnings.

Referring to the table on page 690 these points should be noted:

1. The steam railways have long included renewals in operating expenses and it is fair to presume that the maintenance expenditures shown include ample provision for current depreciation.

2. The percentages of 22 and 24, respectively, for the North Chicago and the West Chicago lines were fixed after a careful survey of the property and examination of the books by the company's engineers and by Stone & Webster. An account of this work was published in the *Electric Railway Review* of Feb. 23, 1907.

3. The allowance for depreciation of the Milwaukee Electric Railway & Light Company, which is 10 per cent of gross earnings, is not considered by the management to be as large as it should be. In replying to the inquiries in Accounting Series Circular No. 20 of the Interstate Commerce Commission, C. N. Duffy, comptroller of the company, said:

> This company believes in the principle of depreciation and the practical application of the principle in providing for depreciation in its accounts; it has recognized and applied this principle in its accounts since Jan. 1, 1897. The provision for depreciation has not been to the extent the company considered necessary, but to the extent it was consistently able to provide and give to capital some measure of fair return on its investment.

From the foregoing arguments the conclusions are that current depreciation ought to be provided for and that when this is done the total charges for up-keep and replacement of the property of an electric railway will approximate one-quarter of the gross earnings. That is, one-fourth of the gross earnings should be sufficient if the road has a fair amount of traffic and a proper basis for fares.

An estimate of the amount of the charges for depreciation may be made in another way. The reports of the Chicago Union Traction Company and the Glasgow Tramways committee show that where charges for repairs and for depreciation are carefully divided the latter is about one-third greater than the former. Analysis of the reports of electric railways to the railroad commissioners of New York, Massachusetts and Connecticut indicate that these companies are expending for "maintenance" about one-third more in proportion than the Chicago and Glasgow lines cited are expending for "repairs." From this it may be inferred that to provide for current depreciation would require an additional charge equal to 75 per cent of the usual charges for maintenance.

It is now in order to inquire what benefit may be expected from the assumption of a burden that must in many cases, for a time at least, prove to be very onerous, and the answer is that the policy must result in bringing about better relations between the public and the railways. With the facts honestly placed before the public it is not too much to hope that short-term franchises, unreasonable exactions as to compensation and inadequate fares will become things of the past. A beginning has already been made in Massachusetts, where within a few months fares on several roads have been increased from 5 cents to 6 cents, or the 5-cent zones correspondingly narrowed, and as this has the approval of the State railway commissioners the other improvements are not entirely utopian.

A quarterly dividend of 1 per cent was paid March 31 on the $800,000 common stock of the Honolulu Rapid Transit & Land Company, thus increasing the annual rate to 4 per cent, contrasting with 3 per cent in 1907, 3¼ per cent in 1906 and 4 per cent in both 1904 and 1905.

CORRESPONDENCE

THE INTERSTATE COMMERCE COMMISSION'S CLASSIFICATION.

Wayne, Pa., April 20, 1908.

Editors Street Railway Journal:

The Street Railway Journal has apparently exhausted the subject of the now famous "Circular No. 20." Certainly none of us can hope to excel the masterly keenness with which Messrs. Brockway, Tingley and Duffy have analyzed the proposed classification and pointed out its mistakes and absurdities. If the Commission is not entirely deaf to argument and modifies the proposed classification, electric railway accountants will surely be greatly indebted to the above-named gentlemen.

It hardly becomes a mere tyro in the profession like myself to venture to comment on the views which have appeared in your journal, yet I cannot help expressing my regret that any of the writers even appeared to yield an iota on the point of dividing the railways into two or more classes. Perhaps the point assumes undue importance in my eyes, yet I cannot but feel that for inconsistency and uselessness it surpasses anything else in the circular.

The objects of the circular would seem to be quite manifest. First and foremost, it would enforce the section of the Interstate Commerce Act providing for a uniform system of accounting; second, incidentally it appears to be preparing the ground for statistical information which will be of use to the public, the Government and the railways themselves, and, third, it apparently asks for the advice and co-operation of expert electric railway accountants in getting up a suitable form of classification. Of the last probably the least said the better. When it is known that the gentlemen in charge of the matter for the Commission deliberately ignored the advice and urgent pleas of the committee representing the American Association after several hearings, and, furthermore, in the most naive way invite in the circular itself those who are unfamiliar with the steam road classification to send for a copy in order to familiarize themselves with it, it is hard to take seriously that portion of the circular which requests the opinion of expert electric railway accountants on the subject.

The Interstate Commerce Act provides that the Commission shall prescribe a uniform system of accounting for all common carriers. These carriers include steam roads, water carriers, express companies, sleeping-car companies, electric railways and possibly might be extended to cover air-ships. Does the law mean that the same system of accounts and classification must be prescribed for all these? Probably not, as most of our law-makers are practical men who can see that one system will not answer for such totally diverse methods. If not, then each system of transportation should have its own peculiar features considered in making up a classification. Then why should the Commission ignore the practical experience of the electric railways and endeavor to force upon us the strange and unfamiliar steam classification? On the other hand, perhaps the Commission is under the impression that the law means literally that there must be one system of accounts for *all* common carriers and is struggling as best it can with a hopeless task. In that case the Commission is itself proceeding in direct defiance of law in proposing one system for small companies and another for the large.

Again, assuming that the Commission is interpreting the law in a common-sense way, viz., that the uniformity clause

refers only to carriers of the same class, we find the same inconsistency in this proposal to divide the electric railways into two classes. For the small companies we have a rigid, inelastic system of 22 accounts and for the large companies a classification of 116 accounts *with permission to add as many more as the companies see fit.* Granted that this permission extends only to sub-division of prescribed accounts, it does not explain away the fact that the small companies are practically denied this privilege. For the law is very explicit that no other accounts than those prescribed by the Commission shall be kept by any company under heavy penalty for infraction. So that while the accountant of a large company may sub-divide his "Ties" into "treated" and "untreated," or into different kinds of timber used, the accountant of a small road may not even venture to keep a separate account of his rails and ties under Account "A."

The large number of accounts proposed by the Commission can hardly be required merely to furnish useful mental exercise to accountants or even to satisfy the curiosity of bureau clerks as to where the money goes. Apparently what the Commission wants is statistical information which may be useful when assembled and compared to students of traction conditions and problems. That this is a most useful and laudable aim no one, I am sure, will deny for a moment. Yet the Commission could not have started out more deliberately to utterly destroy the value of all such statistics if it had tried to find a way of doing so than by proposing at the outset to require most of the details from the minority of the companies. How many companies would fall below the Commission's tentative limit it would be impossible to say, I presume, but estimating on the basis of Mr. Tingley's figures in his article in the Journal 60 per cent at least would not be a bad guess. From the other 40 per cent (and most of these naturally *urban* companies) the Commission is proposing to obtain the figures upon which to base the total cost of ballasting, renewing rails, ties, etc., maintaining trestles, cattle guards (near Wall Street ?) and the like.

It is difficult to speak with any patience on this subject. Either the Commission wants useful statistics covering all the roads or it does not. If it does, it simply cannot get them by ignoring half the roads in the country. If it does not, then why compel all roads over an arbitrary limit to keep accounts for which they may have no need?

Furthermore, it is plain to any one who gives the subject a serious thought that the needful statistics cannot be obtained without a hearty co-operation on the part of the companies. Such co-operation is not usually secured with a club.

There is one feature of this proposed division into classes which I touch upon with hesitation lest I be misunderstood. Whatever the limit adopted, $50,000 or $500,000, there will always be some companies whose revenues fluctuate around that limit. Now railway accountants and managers as a class will average up about as high as any other similar body of men as to honesty and integrity, yet one must admit it is going to take a mighty stiff backbone to keep revenues from getting hopelessly tangled up with "scrap sold," "refunds of operating expense," etc., if toward the close of the year a harassed and over-worked accountant sees the revenue account slowly but surely nearing the limit, with the attendant prospect of many nights' work reviewing the year's expenses and sub-dividing them into 116 accounts for the annual report. With a surprisingly large proportion of companies just *below* the limit reporting to it the Commission might perhaps feel rather pleased that in its profound wisdom it had fixed upon the actual average revenue as its limit, but I fear the expert accountant would treat its statistics with more or less derision.

The Standard Classification of the American Association has been built up by years of hard work and mutual co-operation. It is the work of the brainiest experts in the business and every accountant in the land has had his chance to suggest improvements and has to-day. It represents their ideas and experience. What better suggestions can the Commission expect than from those who built up this system? And when the universal demand from them all is "Give us the Standard System as the minimum basis for *all* companies, and let those who wish sub-divide within its limits," the Commission should in all fairness listen and withdraw its steam classification and its attendant inconsistent and useless class divisions.

W. H. Lawton, Secy. and Treas.,
Chattanooga Railways Company.

THE RESULTS OF THE NEW YORK INVESTIGATION

The special grand jury which has been investigating the affairs of the Metropolitan Street Railway Company and its allied corporation in the charges of wrong doing and has been hearing testimony since Jan. 6, handed in its verdict April 20, 1908. The presentment says:

When the grand jury took up the investigation of this class of crimes, or alleged crimes, it was impressed with the deplorable condition of the street surface railways of this city, both on the physical and financial side. For a long time public attention had been attracted to this subject. There had been very many civil litigations, very many people had suffered severe losses, and the fiercest newspaper criticism had been directed against the persons managing and controlling the management of these railways.

The members of the grand jury, while determined to discharge the duties in a judicial manner, yet, as individuals, could not but feel that the physical and financial destruction of these properties was due in no inconsiderable degree to dishonest and probably criminal acts, rather than to mistakes of judgment and lavish or reckless financiering. While much has appeared in methods and expenditures which, in the light of experience, sound business judgment would not sanction, and there were disbursements deserving severe condemnation, yet, after a prolonged and careful investigation, the grand jury has not been able to obtain any evidence showing the commission of a crime on which it could act.

The grand jury took the unusual course, "on account of the great public interest and in explanation of the conclusions it had reached," of making public all of its minutes, including the charges or suggestions filed by William M. Ivins, special counsel of the Public Service Commission; Herbert R. Limburg, special deputy attorney general in the New York City Railway dissolution suit; Paul Fuller, attorney for an Inter-Met. stockholder who is seeking to have the merger declared illegal; Franklin Pierce, attorney for the Metropolitan Street Railway Stockholders' Committee; William F. King, chairman of this committee, and William N. Amory.

In connection with the Wall and Cortlandt Street ferries deal in 1902, the grand jury examined Mr. Ryan, Mr. Vreeland, all of the directors of the Metropolitan Securities Company, A. M. Grady, who sold the railway to Mr. Whitney, and William H. Page, the attorney concerned in the transaction. It also had before it the books of Mr. Ryan, P. A. B. Widener and Thomas Dolan and those of the estates of William C. Whitney and William Elkins. Briefly, the testimony seems to disclose that prior to 1900 William C. Whitney had disbursed for the Metropolitan

Street Railway Company, for political and legal purposes, various sums aggregating somewhat over $500,000. In 1900 Mr. Vreeland requested to have the money repaid, which was done in sums of $100,000 each by Messrs. Ryan, Elkins, Widener, Dolan and Whitney. The checks were endorsed to George C. Huhn & Company, of Philadelphia, and with the proceeds and certain shares of Electric Storage Battery stock Huhn & Company repaid the Metropolitan Street Railway. In 1902 Messrs. Ryan and Brady, having bought the Wall & Cortlandt Street Ferries Railway Company, Mr. Whitney arranged for its purchase, and of the money paid $555,000 went to reimburse the five men who had advanced $100,000 previously to repay the Metropolitan Street Railway Company. Mr. Ryan was not a director of the Metropolitan Street Railway Company at this time, and Mr. Whitney never was one.

Other payments contained in the list submitted by Mr. Ivins, not as charges but as subjects which should be investigated, included two checks, one of $7,500 and one of $6,666, which were found to be used as a "secret service fund"; two aggregating $45,000 which were found to cover items to be cleared up in connection with the Wall & Cortland Street Ferries Railroad, and one for $60,000 which had been paid to Mr. Whitney in the fall of 1902. This was supposedly for political purposes and was refunded by the Metropolitan Securities Company the next year. The payment of $150,000 to John B. McDonald was considered justified as it thereby relieved the Metropolitan Securities Company from a contract with Mr. McDonald to exchange transfers between the lines in its control and those of any subway which might be constructed by the syndicate of which Mr. McDonald was head. The charges of Mr. Amory of perjury in charging a discount on notes of $4,500,000 in 1902 as an "asset" were not admittted. Other charges were considered but dismissed.

The verdict is considered a complete vindication of H. H. Vreeland and the other operating officials of the company as well as of District Attorney Jerome, who has steadfastly refused to prosecute the officials on charges of misconduct.

Coincident with the announcement of the findings of the grand jury, Thomas F. Ryan gave out the following statement:

MR. RYAN'S STATEMENT

When I appeared before the grand jury recently to tell what I knew about the past history and present difficulties of the Metropolitan Street Railway Company, I told them that when I returned from Europe five or six months ago I had had prepared a succinct statement covering the chief features of the past history and of the present situation of this road, to the best of my knowledge and recollection, with the intention of publishing it immediately. I did not so publish it because I was informed that the matter was to be brought under official investigation, and was advised that it would be improper for me to do so then.

If I had realized the extent of the misrepresentation and vilification to which I have been subjected during these five months, I doubt if I could have been deterred from making the publication; but, as I told the grand jury, I had not done so for the reason stated. I then submitted the statement to them and asked the privilege, which they granted, of placing it before the public. The statement submitted to the grand jury, embodying the facts, to the best of my knowledge and belief, is as follows:

The current accusations against the former management and directorate of the Metropolitan Street Railway Company may be summarized as follows:

1.—That the stock of the company consists chiefly of "water."

2.—That enormous profits were made by so-called "insiders" through construction contracts and otherwise.

3.—That in the purchase by the Metropolitan Securities Company of the Wall & Cortlandt Street Railway the "insiders" appropriated $111,000 each to his personal use.

Each of these charges is false. Taking them in order:

1.—OVERCAPITALIZATION

(a) In 1885 the Metropolitan Traction Company of New Jersey was formed to acquire street railways in New York. Its capital was $10,000,000; there was paid into the treasury in cash $6,000,000. Subsequently the capital was doubled and issued to the shareholders upon the same terms. Result: Total capital issued, $20,000,000, representing $12,000,000 of cash paid in. The sale of the stock at 60 was wholly legitimate. It was a new venture, and subscriptions were obtained with difficulty even upon the terms offered.

(b) In 1892 the Metropolitan Traction Company of New York was formed, with an authorized capital of $30,000,000. It bought all of the stock of the Metropolitan Traction Company of New Jersey, paying $120 per share in its own stock, amounting in the aggregate to $24,000,000, and sold the remaining $6,000,000 for cash at par. Result: Total capital issued, $30,000,000, representing $18,000,000 of cash paid in.

(c) In 1893 the Metropolitan Street Railway Company was formed as an operating company, and acquired from the Metropolitan Traction Company the following stocks:

Chambers Street Ferry Company	$800,000
Houston, West Street & Pavonia Ferry Company	6,250,000
Broadway Railway Company	1,000,000
South Ferry Railway Company	150,000
Lexington Avenue Railway Company	5,000,000
Metropolitan Crosstown Company	300,000
Columbus & Ninth Avenue Railway Company	3,000,000
Total	$16,500,000

These stocks had been bought from time to time by the Metropolitan Traction Company directly from the original owners, and were sold by it to the new operating Metropolitan Street Railway Company for the same par amount ($16,500,000) of its own stock, which went into the treasury of the Metropolitan Traction Company. Result, so far as outstanding shares were concerned, unchanged, to wit: Total capital issued, $30,000,000, representing $18,000,000 of cash paid in.

(d) In 1896 the stock of the Metropolitan Street Railway Company was increased from $16,500,000 to $30,000,000, and the additional $13,500,000 was issued to the Metropolitan Traction Company in exchange for Broadway and Seventh Avenue and other stocks appraised at $9,000,000, and in settlement of indebtedness amounting to $4,500,000, for construction. Result as to outstanding shares, unchanged, to wit: Total capital issued, $30,000,000, representing $18,000,000 of cash paid in.

(e) In 1897 the Metropolitan Traction Company was dissolved, in order that the shareholders might come into possession of stocks resting directly upon the properties and franchises; its assets, consisting of $30,000,000 of Metropolitan Street Railway stock and $6,000,000 of debentures, representing enhanced values of securities owned, were distributed to its stockholders, share and share alike. The traction company thereupon became extinct, and was succeeded by the Metropolitan Street Railway Company. Result: Total capital issued, $30,000,000, representing $18,000,000 of cash paid in.

(f) In 1898 and 1899 $15,000,000 of new stock was sold to stockholders at par, and $6,000,000 of the proceeds was used to retire the debentures. Result: Total capital issued, $45,000,000, representing $33,000,000 of cash paid in.

(g) In 1900 $7,000,000 of new stock was sold to the shareholders at 160. Result: Total capital issued, $52,000,000, representing $44,200,000 of cash paid in.

To the cash paid in should be added interest for the period during which it yielded no return in the form of dividends upon the stock which represented it. This amounted—from 1885 to 1894—to $5,040,000, thus making the total cash investment $49,240,000. From this sum, on the other hand, should be deducted $6,000,000, represented by the debentures distributed pro rata among the shareholders. This leaves $43,240,000 of actual cash investment, representing $52,000,000 of stock now outstanding, or $83.13 per share of $100 each.

2.—ALLEGED PROFITS TO "INSIDERS."

The common accusation is that many millions were made by "insiders" through construction contracts and otherwise. The cost of the Lexington Avenue franchises, property con-

sents, construction (first of cable and then of electric power), equipment, etc., for example, is estimated by the critics at $2,500,000, as against which there were issued $5,000,000 of stock and $5,000,000 of bonds, thus apparently leaving a net profit to the "insiders" of $7,500,000 from this single transaction.

The facts are as follows:

(a) The Lexington Avenue & Pavonia Ferry Railroad Company was incorporated in 1893 and authorized to issue $5,000,000 of bonds and $5,000,000 of stock. The Metropolitan Traction Company contracted to construct the railway, power houses, etc., and to obtain for the Lexington Avenue Company the right to operate its cars on Twenty-third Street and Broadway, in consideration of its bond and share capital. The traction company then sold the $5,000,000 of bonds to the Central Trust Company, Guaranty Trust Company and the Mutual Life Insurance Company for par and interest. This money was paid into the treasury of the traction company and used to construct the road. Whatever of profit or loss ensued inured to the benefit or detriment of all the stockholders of the traction company, share and share alike.

The $5,000,000 of Lexington Avenue stock remained in the treasury until the Lexington Avenue Company was consolidated with the Metropolitan Street Railway Company, whose entire share capital was also owned by the traction company. It was then canceled.

(b) The same procedure was followed in connection with the Columbus & Ninth Avenue Company, which issued to the traction company $3,000,000 of bonds (also sold at par and interest) and $3,000,000 of stock, also exchanged for Metropolitan Street Railway Company stock.

CHANGE OF FORM IN STOCK

When the Lexington Avenue Company ($5,000,000 capital), the Columbus Avenue Company ($3,000,000 capital), and the Metropolitan Crosstown Company ($300,000 capital) were merged in the Metropolitan Street Railway Company all of the shares of these four companies were owned by the traction company, and the only actual result was the extinguishment of the stock of the three merged companies and the corresponding enlargement of the Metropolitan Street Railway Company's stock to $16,500,000, which continued to remain in the treasury of the traction company. In other words, it was no more than a change of form in stock certificates, which could result in no loss or profit to any one, simply the complete ownership was undivided. Whatever advantage or disadvantage accrued from such a change in form was participated in by all of the stockholders of the traction company, share and share alike.

(c) Two old companies held the franchise rights to operate cars on Thirty-fourth Street. Their combined capitalization was: Stock, $1,300,000; bonds, $1,300,000. The traction company bought these securities from the original owners in 1894 and consolidated them into the Thirty-fourth Street Crosstown Railway Company, which issued $1,000,000 stock and $1,000,000 bonds, secured by a mortgage to the Central Trust Company, trustee. The old bonds ($1,300,000) were placed under this mortgage and are now so held by the Central Trust Company. The new $1,000,000 of bonds were sold for 105 and interest, and the proceeds went into the treasury of the traction company. The $1,000,000 of stock was pledged to the Guaranty Trust Company under the general mortgage of the Metropolitan Street Railway Company, and is now held by the Guaranty Trust Company, trustee.

In the process of amalgamation there were many other precisely similar transactions, which might be recounted in detail. Those described are selected for illustration because they are the ones that have been most generally misrepresentd.

"INSIDERS" PROFITS NEVER EXISTED

There was no increase in capitalization to the public in any instance, all of the issued shares of subordinate companies being held in the treasury of the Metropolitan Company or pledged under mortgages, and never offered for sale. The twenty-odd millions of alleged profits to "insiders," therefore, never had any existence.

At no time in the history of the company did the combined stock holdings of Messrs. Whitney, Ryan, Widener, Elkins and Dolan amount to 25 per cent of the total.

Neither Mr. Whitney, nor Mr. Ryan, nor Mr. Widener, nor Mr. Elkins, nor Mr. Dolan, nor Mr. Vreeland ever had a dollar of interest in any construction contract of either the Metropolitan Traction, Metropolitan Street Railway, or any subsidiary company connected with the system.

THE WALL STREET & CORTLANDT STREET FERRIES RAILWAY COMPANY

As to this transaction, the simple truth is that several hundred thousand dollars had been advanced by Messrs. Dolan, Whitney, Ryan, Widener and Elkins to cover expenditures which had been made for the benefit of the property. The $111,000 paid to each of them in connection with the Wall & Cortlandt Street purchase was the precise amount, with interest, which each had advanced.

NOT LOOTED, BUT THROTTLED

The failure of the surface lines was not due to any of the causes alleged, but to conditions which were mainly the results of State interference. Among these are:

1.—The extension of the free-transfer obligation by legislative enactment and court decisions, so that the fare per passenger has been reduced from 5 cents to only a little more than 3 cents.

2.—Enormous increases in taxes, the special franchise tax alone having almost doubled the system's burden of taxation.

3.—The extraordinary congestion of street traffic, resulting in greatly increased cost of operation and maintenance, and also in an abnormal burden of accident claims, this item alone amounting to $2,000,000 a year, or about 10 per cent of the gross receipts.

4.—The competition of subway lines, built with the aid of the city's credit.

These causes have reduced the net earnings of the system fully $6,000,000 a year, or more than 10 per cent upon the company's capital stock.

The company was not "looted"; it was throttled.

ADDING PAY ROLLS ON THE SOUTH CHICAGO CITY RAILWAY

An attachment to an adding machine for carrying out totals on pay rolls and similar operations, which was designed and patented by William R. Gaither, assistant treasurer and auditor of the South Chicago City Railway, was described in the Street Railway Journal, March 16, 1907. The device as then described was somewhat crude, but it has recently been perfected and arrangements have been made for its manufacture and sale as a separate attachment to the Burroughs and other standard makes of adding machines. The method of using it in making up pay rolls on the South Chicago City Railway has also been modified as the result of trials covering several months. The essential feature of the system is the original entry of the items on a continuous roll of paper, enabling the operator to post without interruption and insuring the alignment of the figures.

The perfected attachment consists of two paper-carrying rolls mounted in a frame which may be attached by two clips to the standard printing carriage furnished with the adding machine. The lower roll carries the strip of paper to be fed under the roller of the printing carriage. The upper roll automatically winds up the printed portion of the strip. It has a spring tension mounted in a casing at one end. The rim of this tension device is knurled, and by occasionally giving it a few turns the spring inside is kept wound up. A chain of small gears and a handle are provided at one end of the roller frame for rapidly winding the paper off the top roll on to the bottom roll when through with one posting, in order to commence at the head of the list with the next posting. Paper sufficient for several semi-monthly pay rolls is carried on the lower roll, and when the pay roll for any period is completed it is unwound and detached from the lower roll to be cut into sheets and bound in the loose-leaf pay-roll book. To start

the paper on the top roll it is run around the printing roller and the end inserted under a cloth flap on the top roller, after which it is wound with one wrap to hold it. The accompanying illustrations show the attachment applied to a Burroughs machine and carriage with wide printing roller to take a strip of paper 18 in. wide. When the paper is disconnected from the upper roller, the adding machine can be used as ordinarily.

The device is employed at present for making out pay rolls of trainmen and night force of car cleaners, inspectors and electrical repairmen. These last three classes of employees have their entries made at the rate per night instead of by hours and minutes, as in the case of trainmen. Conductors and motormen, independently of each other, turn in time cards at the end of their runs. These time cards are separate records from the trip sheets from which the pay-roll time is commonly taken. They are approved and signed by the trainmaster or starters before being turned in, and show the regular time as well as overtime. In making up time tables the time of each run is printed on the schedule for the guidance of the trainmen in making out their regular time on the time cards.

Every second day these time cards are sorted by a boy in the auditor's office according to the badge number of the trainmen. They are then taken to the adding machine and posted on the pay roll. The latter is 18 in. wide and is ruled with horizontal lines ¾ in. apart. Near the left-hand edge is entered in each space consecutively the trainmen's numbers. Beginning with the first day of the month, the time shown on the time card for that day is posted on the machine and printed on the strip of paper. The second day's time is entered below it and the third day's time below the second. The adding key is then pressed and the total time for the three days is printed, followed by a distinguishing asterisk or star. These three entries and the total are printed in the space between two of the horizontal rulings. This process is repeated for the cards of each trainman, after which the payroll is wound back on the lower roller until the next posting. Two days later the cards for the fourth and fifth days are sorted and posted, beginning in the second column. The total of the first column is entered first, followed by the two days' time and another total for five days is struck. At the end of the fifteenth day the total gives the grand total for the time since last payday. These grand totals are extended to the next column to the right as the next operation and added by the machine to give the total trainmen's hours for the semi-monthly period. Beginning at the top again, the rate per hour of each man is entered by the machine opposite the total hours. This is followed by computation of the total wages for each man taken from a wage table. As each item of total wages is entered it is added in the machine, which strikes a total at the end. From this is deducted the discharge wages of any man who may have left the service before payday, and the amount remaining is the total pay account required.

The only checking necessary is to see that the totals under

TRAINMEN'S TIME SLIP.

Date..... 190.....

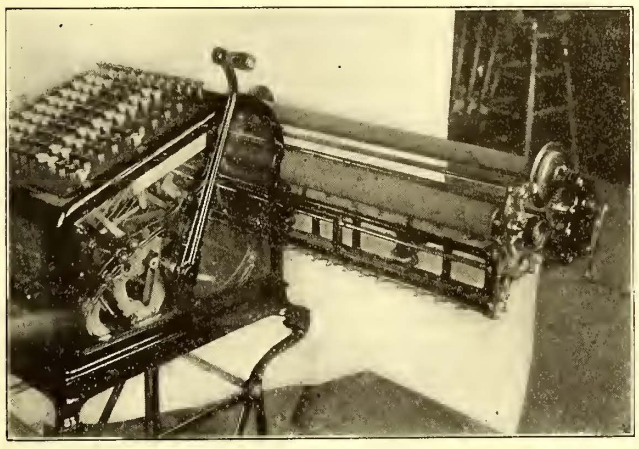
Name..... *No*.....

Occupation..... *Route*.....

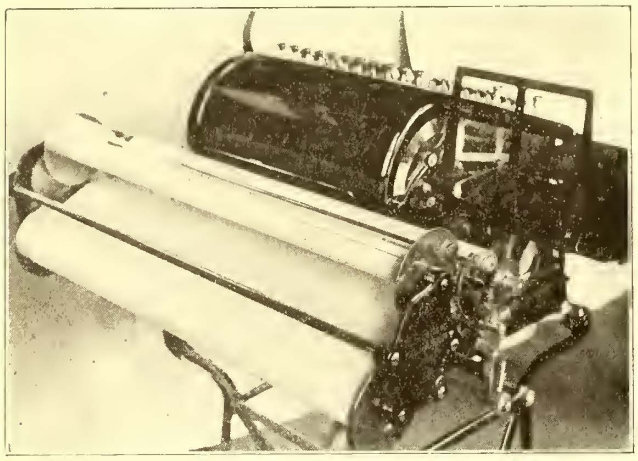
	Time.	Remarks.
Run No.....	.....*hrs.* .....*min.*	.....
Run No.....	.....*hrs.* .....*min.*	.....
Run No.....	.....*hrs.* .....*min.*	.....
Trailers.....	.....*hrs.* .....*min.*	.....
Overtime.....	.....*hrs.* .....*min.*	.....
Total time	.....*hrs.* .....*min.*	.....

Signed.....
Starter.

CARDS USED BY TRAINMEN



FRONT OF MACHINE



BACK OF MACHINE

Railway Co.

Pay Roll for half month ending 19

No.	NAME		16th 17th	18th 19th	20th 21st	22nd 23rd	24th 25th	26th 27th	28th 29th	30th 31st	Rate	Amount	Total	Deduct	Balance Due
		Reg Time		23.	43.55	64.45	85. 4	108.39	132.15	156.50					
			11. 5	9.45	9.35	11. 5	11.33	11.14	13.14	11.23					
245	Oliver, Austin P		11.55	11.10	11.15	9.14	12. 2	12.22	11.21	10.47					
			23. *	43.55*	64.45*	85. 4*	108.39*	132.15*	156.50*	179. *	25	44.75			
		Over Time		2.50	4.28	6.29*	10.54	13.59 *	19.22	20.31					
			1.15	1.13	.55	3.27	1.26	.27	.54	.17					
245	ditto		1.35	.25	1. 6	.58	1.39	4.56	.15	1.42					
			2.50*	4.28*	6.29*	10.54*	13.59*	*19.22*	20.31*	22.30*	37	8.32	53.07	17.50	35.57

SAMPLE OF WORK OF POSTING ATTACHMENT ON ADDING MACHINE

each day's posting of time are correctly carried forward to the next posting and to check the calculation of wages from the wage table. There is no mental calculation or long, tiresome addition, and it has been found that the entries of time can be posted faster on the adding machine than with pen or pencil in the old way. One clerk can post the time of 300 trainmen for two days in about an hour.

ROUTE NO. 5.	
Run Number.	Time.
27	10:25
27	10:20
28	10:25
28	10:20
29	10:20
29	10:25
30	10:20
30	10:25
31	10:20
31	10:25
32	10:20
32	10:25
33	11
33	10:55
34	5:10
34	5:45
35	5:10
35	5:50
36	9:15
Total....	177:35*

SAMPLE OF DAILY TIME TABLE COST RECORD

An additional use has been found for the daily time cards. Each morning all the cards of the day previous are sorted by a boy according to run numbers without regard to names of men. They are then taken to the adding machine and run off on the ordinary narrow paper. The run numbers are struck with the keys on the left-hand side of the machine and the hours and minutes of each run by the keys on the right-hand side. At least two entries must be made for each run, one the time of the conductor and the other the time of the motorman. A glance down the list of run numbers shows whether any cards for any run are missing. When this posting is completed the total hours and minutes are added by the machine. This is done for each route, and the totals are reported daily to the manager, who thus has an exact statement of the time table cost for the day of each of the company's lines. At the end of the semi-monthly period, the grand total of time taken from these daily reports to the manager is used to check up the total time as extended and added on the pay roll. While the time-card system described is advantageous in sorting numbers in rotation, it is not a necessity, as time can be posted from other forms of reports.

The Gaither device makes it possible to adapt the adding machine to a number of bookkeeping operations other than pay rolls, such as posting remittances, sales of tickets, etc.

INDICATOR FOR RUN NUMBERS

An ingenious method of indicating the run or train number of an electric car has recently been devised by W. A. Gibbs, of the Ohio Electric Railway Company, and is in use on some of the electric cars on the Columbus division of that company. The objects sought were to secure a numbering device in which the numbers could be readily

APPEARANCE OF NUMBERS

changed and also one in which they would be readily visible by day or night.

The indicator consists briefly of a box with four ribbons on rollers. Each ribbon has printed on it the numbers from 1 to 0 as well as a blank space. The four ribbons are also marked so that when properly set they will display the words "extra." This position is used on special trains which do not have train numbers. Any combination up to 999 can be

BACK OF BOX, SHOWING ROLLS AND LAMPS

secured from three ribbons. The fourth ribbon is used to specify sections of trains which may consist of more than one car. Each ribbon is operated separately.

CAR WITH RUN NUMBER INDICATOR

The views show a front and a rear view of the box unmounted and also a box installed on one of the Columbus-Zanesville limited cars. The box is illuminated at night by lamps. Mr. Gibbs has made arrangements for manufacturing these signs for general sale.

PURCHASE OF THE DANVILLE CAR COMPANY BY THE J. G. BRILL COMPANY

The J. G. Brill Company announces that on April 1 it acquired the plant of the Danville Car Company, and will continue the business of that company without change of name. Following the purchase the following were elected officers of the Danville Car Company: Samuel M. Curwen, president; George H. Tontrup, vice-president and manager of sales department; H. F. Vogel, general manager, and Edward P. Rawle, treasurer. The company will build street railway cars of every description for both city and interurban service, as well as steam coaches, freight cars, trucks and electric locomotives. It will also make a specialty of building and repairing steel cars.

FLEXIBLE HANGERS FOR THE OVERHEAD CONTACT WIRES OF ELECTRIC RAILWAYS

BY JOSEPH MAYER, M. AM. SOC. C E.

The present hangers are short and rigid castings holding the wire in a fixed direction. The wire is bent laterally by wind pressure and vertically by changes of temperature and the passing trolley wheel or sliding bow. Experience and calculation show that with long spans, without carrying strands, the bending strains in the wire at the hangers are very large, and therefore seriously limit the length of the safe span, especially with high speeds. The trolley wheel or sliding bow approaches the hangers of long spans in summer with a considerable up-slope and at high speed strikes them with considerable impact. During strong winds the wire is bent laterally and the trolley wheel approaches the hangers with a horizontal slope to windward and leaves them with a slope to leeward. The change in the direction of its motion with ordinary hangers is sudden and causes large side pressure and sometimes jumping out of the wheel. This effect is increased at curves. To make long spans safe without supporting stands the contact wire should have large and variable deflections, and its direction at the hangers should be changed by variable transition curves of large minimum radius.

The hanger illustrated in Fig. 1 is intended to provide such a support, and an application for a patent covering its essential features has been made by the writer. The hanger consists essentially of a long tapering bar with clips for holding the wire and an eye for connecting the bar to the pin of an insulator and by it to the bracket or span wire. The contact wire is further supported by bolsters held in position by a steel rod and spacing collars. The taper of the bar is so determined that it will bend vertically and laterally approximately in circles and will thereby provide the required variable transition curves of large radius. For spans of more than 240 ft. in severe climates strain adjusters should be used about one mile apart for relieving the tension in the wire at low temperatures. With 140 deg. variation of temperature and occasional ice ¼ in. thick on the wire, maximum vertical deflections of the wire of 2½ ft. to 3½ ft. are suitable for spans of 160 ft. to 200 ft. Where the trolley wheel has a small range of lateral motion 160-ft. spans with 2½-ft. maximum vertical deflection should be used. Where this range is at least 2½ ft. to each side of center, 200-ft. spans with 3½-ft. maximum vertical deflections are safe. With pantograph collectors 240-ft. spans with 4-ft. 6-in. maximum vertical deflection are safe without strain adjusters. With 264-ft. spans and strain adjusters 4-ft. 6-in. maximum vertical deflection of the wire should be used. In milder climates or with smaller factors of safety longer spans are practicable. The maximum strains in the contact wire, due to tension and bending with the above deflections and spans, are about 22,000 lb. to 23,000 lb. per square inch or less, or about 14,000 lb. less than in the best catenary suspensions of this country. The maximum strains in the bar are less than 32,000 lb. per square inch.

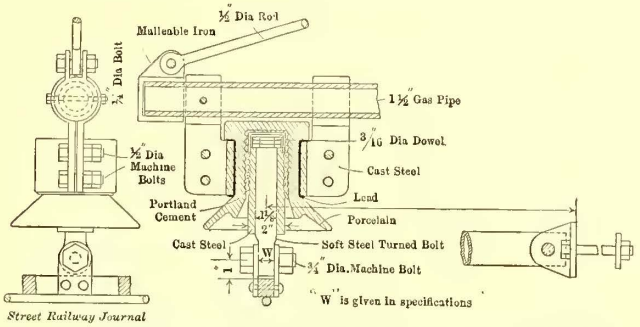


FIG. 2.—SECTION AND SIDE ELEVATION OF INSULATOR SUPPORT.

Where the wire is convex downward its radius of curvature is over 1700 ft.; even a heavy sliding bow with very small static contact pressure will therefore give continuous contact at all speeds. At the hanger the wire is always convex upward and the shortest radius of curvature of the motion of the bow is about 40 ft. The largest contact pressure is moderate and occurs at the hangers, where the wire is reinforced. A sliding bow 7 ft. long is adequate for the largest deflection assumed.

With trolley wheels curves should be provided with long bar pull-offs making transition curves of long radius. With sliding bows ordinary pull-offs are adequate, and so arranged that the regular hangers can be used on curves.

Fig. 2 shows the insulator and bracket. To reduce the bending and torsional strains in the porcelain the hanger is hinged to the insulator pin and the latter turns in a sleeve. The pin carries at its top a round nut fastened by a dowel and covered by a cap which is forced on the sleeve. Outside of the porcelain is first a lead cushion and then two broad cast-steel jaws, which give a moderate unit pressure. When strain adjusters are used the bracket should be hinged at the post, as shown in Fig. 2.

The advantages of the flexible hangers may be summed up as follows: (1) The bending strains in the contact wire are reduced by the avoidance of all short bending,

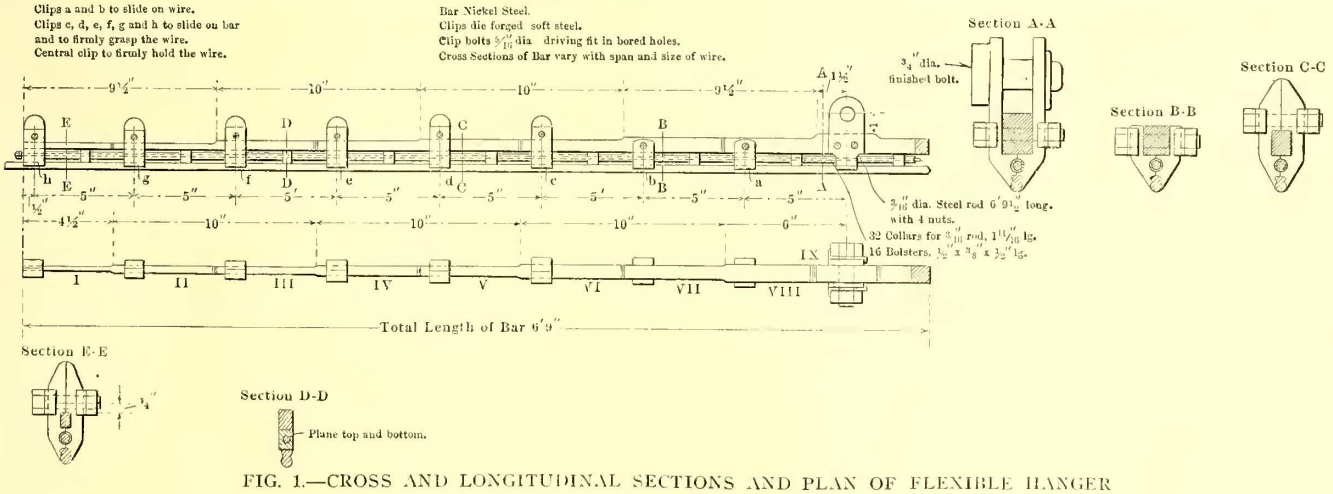


FIG. 1.—CROSS AND LONGITUDINAL SECTIONS AND PLAN OF FLEXIBLE HANGER

the tensions by the use of liberal deflections. Spans one and a half to three times as long as with other suspensions may therefore be used and a greater factor of safety is obtained. (2) The current collector moves in curves of large radii whereby, even with great train speeds, a steady contact is obtained and the contact pressure is never made excessive by centrifugal force. The average contact pressure can be made very low, and the hammering of the wire at the ends of the hangers is entirely avoided; the durability of the current collector and of the wire is thereby increased and their cost of maintenance reduced. (3) The sight of the signals is interfered with on curves by the many poles of the ordinary suspensions, and especially by the ropes and numerous hangers of the catenary suspensions. The first evil is greatly reduced, the latter avoided by the flexible hangers. (4) Since the tensions in the wire are always very moderate no readjustments are ever required. (5) The same hangers will also answer on curves and at changes of grade. (6) As compared with catenary suspensions the load and wind pressure on the carrying structure is only from one-fifth to one-third. (7) All other suspensions require with high speeds a large wire for strength; with the flexible hangers a No. 0 wire is safe and can be used wherever its conductivity is adequate. (8) The apparent safety of the usual catenary suspensions is often illusory. With the large working strains in the wire inevitable with them in severe climates, it will stretch during the first cold winter and will need readjustment in the spring; after a few years and repeated stretching it will occasionally break, then the sliding bow will rise, knock off the hangers and bring it down.

With the moderate working strains adopted with the flexible hangers the wire can be tested during erection by temporarily exposing it to a tension 50 per cent larger than the maximum working strain. It will then be safe thereafter.

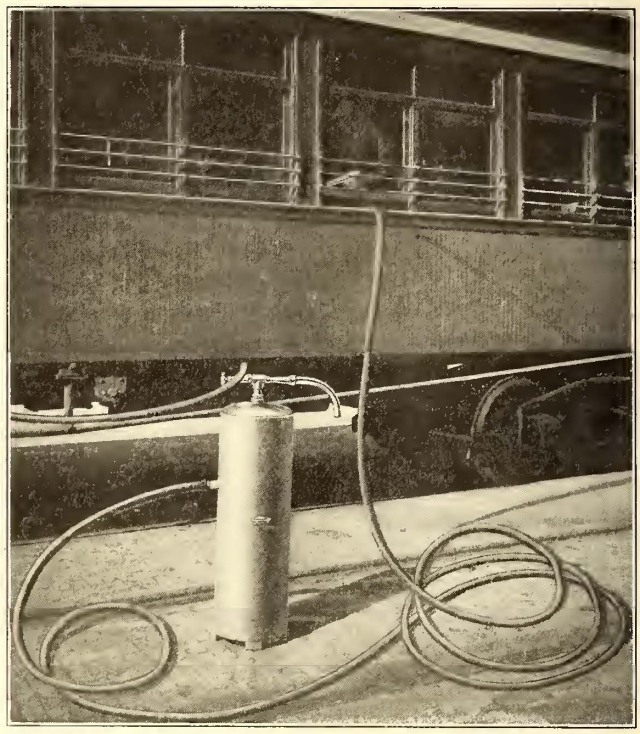
OPERATING THE VESUVIUS RAILWAY

The system of electric traction in use on the Vesuvius Railway, it is claimed, works quite as well as the more general multiple-unit, and is decidedly cheaper. The trains are usually made up of two cars, each carrying two 75-hp motors, electrically connected as follows: The main cable from the trolleys on each car is continued on to each of the platforms, where it ends in a socket. In the cable from the main conductor to the motors is placed a shunt, which is end-connected to two sockets fixed on the platform of each car. Two other conductors run the entire length of both cars, connected to the ammeter leads on the other car. The two trolleys are in parallel, but the regulating magnets and brake equipment are separate. Each motorman watches the readings of the ammeter connected in the circuit of the other car. These readings ensure simultaneous operation. The motorman on the leading car is in charge, and all his movements are followed by the man on the second car.

In Rio de Janeiro there are about 152 miles of single track, divided as follows: Jardin Botanico Company—120 motor cars, 100 miles of track; Villa Isabel Company—71 motor cars, 42 miles of track; Carioca Company—a few cars on about 10 miles of track. Tijuca Line—5 miles of track. Work has been commenced to electrify an extensive system of broad and narrow-gage car lines in the older portion of Rio to fulfil the American company's obligations to the municipality.

VACUUM CLEANER FOR CARS

To free a car from the dust which during the day is deposited on the car seats, sashes and elsewhere, the National Vacuum Cleaning Company, of Dayton, Ohio, has just placed on the market a vacuum car-cleaning outfit which consists of a dust-collecting tank, so arranged as to separate the dust from the air, an air-jet vacuum producer mounted on top of the tank, special vacuum hose for conveying the dirt from the car to the vacuum tank and the



VACUUM CLEANER SET IN USE

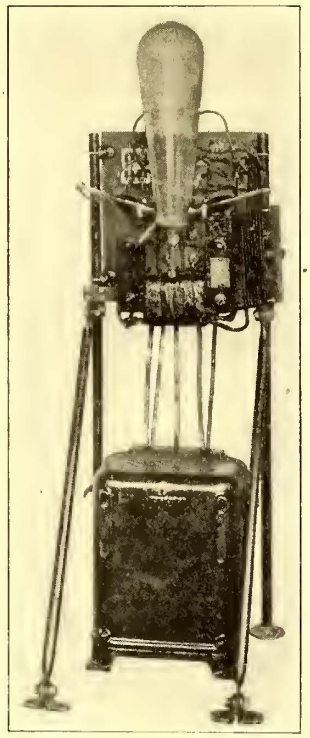
cleaning tools. The latter are made of metal and have from one to three slots through which the air is drawn, carrying all the dirt and dust with it.

The vacuum producer is connected to the compressed air supply (either pipe line or air-brake reservoir on car) by means of a compressed-air hose. The vacuum hose is attached to the side of the tank, as shown in the illustration, and the other end, to which the tools are attached, is taken into the car. The compressed air is turned on and regulated by the valve on the vacuum producer until the proper vacuum is obtained. The cleaning tools are then passed over the seats and other articles to be cleaned until all the dirt is removed.

In cleaning cars by compressed air direct the seats and cushions must be removed from the car and blown out. The blowing scatters the dirt and allows part of it to remain in the cushions. If compressed air is used inside the car for blowing out the dirt, the dust and dirt are simply blown from one seat to another and not removed from the car. The National vacuum cleaner removes all the dirt from seats and cushions by suction, carries it outside the car through the hose and deposits it in the receiving tank without raising dust in the car. A car can be cleaned in about 15 minutes at a cost of about 2 cents for power. One of the principal features of the system is that no outside equipment is required. It is only necessary to couple the compressed-air hose from the air pump on the car to the separating tank. The machine is not complicated and requires no care or attention other than to empty the tank daily of accumulated dirt.

MERCURY ARC RECTIFIERS FOR MOVING-PICTURE MACHINES

One of the most recent applications of the mercury arc rectifier is to the operation of arc lamps for moving-picture shows. The arc lamps which are used as the light source are usually operated from 35 to 60 amp on the alternating current and at about 25 to 30 on direct current. Until quite recently they were operated in series with resistances on 115 or 220 volts to bring the lamps to the proper arc voltages, but this is a wasteful method, especially with alternating-current lamps, on account of the higher amperage necessary for producing a light of sufficient intensity.



MERCURY ARC RECTIFIER

Apparatus for efficiently cutting down the voltage on the direct-current lamps is more expensive and elaborate than a device designed for a similar purpose for alternating current, and the initial cost of the former has prevented its general adoption except for locations where only 500-volt, direct current is available, as in summer resorts operated by street railway interests. On the other hand, the problem of overcoming the waste of energy in rheostats on alternating-current lamps has been at least superficially met by use of compensators, choke coils and similar devices. Most of these alternating-current devices, although in certain respects less wasteful than rheostats, have a very low power factor which makes them inefficient from a central station standpoint.

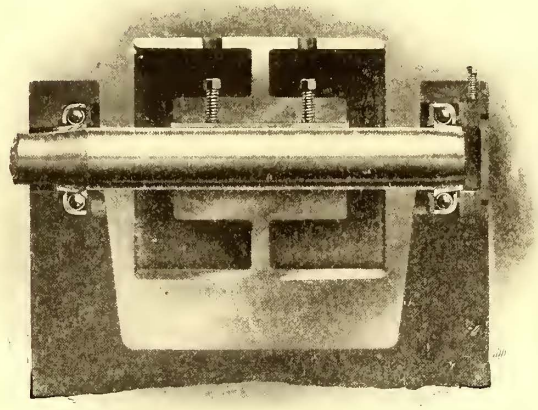
The direct-current arc lamp is a very much better source of light for moving pictures than the alternating-current arc, principally on account of its greater steadiness and the considerably lower consumption. The General Electric Company has recently designed and sold a number of rectifiers adapted especially for use in supplying direct current to moving-picture arcs, where only alternating current is available. This rectifier set is designed for operation on a 220-volt, a. c. circuit, and has a continuous capacity of 30 amp d. c. and a capacity of 40 amp or slightly more during the starting of the arc. The rectifier is designed to deliver a d. c. voltage equal to that required across the arc, or from 45 to 50 volts. A reactance in series with the a. c. supply serves to steady and regulate the current taken by the arc lamp. This eliminates the necessity of having a resistance in the arc circuit.

The rectifier set is similar in some particulars to the battery charging rectifier now in common use. The regulating features and other parts necessary for battery charging, but not required for this service, are omitted, and the rectifier equipment reduced to its simplest form. The rectifier may be installed at a distance from the picture-machine operator and started by the operator without leaving his booth.

To start the rectifier the supply switch is closed and the carbons of the lamp held together for a second or two. On separating the carbons a direct-current arc is drawn. The closing of the carbons allows the current to flow through the shaking coil on the panel which tilts the tube once or twice and causes it to start. The rectifier not only furnishes direct current for the arc lamp so that far better light can be obtained from an alternating-current circuit, but the cost of the operation will be found very much less than with either a. c. or d. c., with a resistance in series with the arc.

BALL-BEARING EXHAUSTERS

The Massachusetts ball-bearing exhauster, made by the Massachusetts Fan Company, of Watertown, Mass., is a departure in fan design. The bearings are of the Chapman double-ball type, and are said to possess the following important advantages over the plain journal—absolute alignment, decreased space, freedom from the necessity of oiling and a reduction of journal friction of at least 85 per cent. The balls, which run in hardened steel sleeves, are thoroughly protected from dust by fiber washers. The shaft may be readily driven out through the fan wheel, pulley and bearings; the taper contact between shaft and inner sleeve thus being easily broken. The exhauster requires very little attention and is adaptable to any location or condition. It is made convertible and may be easily adjusted to discharge in any direction. With equal ease it may be made either right or left hand, or inverted without reference to the bearings.



SECTION BALL-BEARING EXHAUSTER

The exceedingly difficult country over which Austrian railroads are constructed, necessarily making the cost of operating steam locomotives excessive, has turned the attention of railroad officials and the Bureau of Electric Traction to the advantages of the electrical system. It is pointed out that electrifying the steam lines will save the Austrian coal supply and utilize the immense water power at the country's command. The Austrian plans as now presented by the Bureau of Electric Traction propose electrifying 2000 miles of trunk-line system. The Arlberg tunnel, which serves a large traffic and is seven miles long, will be the first section considered. While the government has not definitely decided on any one system for all the roads, the three-phase will be adopted for the Arlberg section.

FINANCIAL INTELLIGENCE

Wall Street, April 21, 1908.

The Stock and Money Markets

The principal event of the past week in financial circles has been the inauguration of an export movement of gold to Europe, which may assume considerable proportions before long. Thus far, only $2,500,000 has been taken for shipment, the same going to Paris, but it is estimated that before the movement terminates the sum may possibly reach between $10,000,000 and $20,000,000, as not only is there a demand for the precious metal on the part of France, but Germany is also in need of cash, as the situation there is at present somewhat acute on account of the extended industrial condition and the heavy borrowing of the government. Although exports of gold from the United States are not at all unusual for this season of the year, the movement this time has started somewhat earlier than is ordinarily the case. Last year it began in May and in the following month shipments amounted to $24,000,000. However, the early starting of the efflux this year has failed to create the slightest apprehension, and even the prospect that the United States may be called upon to part with the amount above mentioned is viewed with perfect equanimity. The principal reason for this condition of affairs is that the engagements announced this week are the first since the early part of last year. But beyond this is the enormous supply of gold at present in this country. It will be remembered that in November and December of last year, following the panic, the United States imported from European countries the unprecedentedly enormous total of $180,000,000 gold. Of this sum, the New York Assay Office alone holds $35,000,000 in gold bars, after having sent something like $60,000,000 to the mints since the panic. Furthermore, the surplus reserves of Clearing House banks now amount to approximately $50,000,000, while in addition to all this the foreign trade balance just now is very heavily in our favor.

It is such facts as the foregoing which explain the comparative firmness of the general stock market during the past week, not only in the face of the gold exports, but also despite the reports of damaging floods in certain sections of the Southwest, as well as of a retrograde movement in several lines of business, notably the iron and steel trade. A further decline in copper metal prices was also practically ignored, and, generally speaking, the tone of the entire stock market was surprisingly firm under the circumstances, even though fluctuations in prices were very irregular. However, the volume of business was reduced almost to a minimum by the advent of the Easter holidays, and taken altogether speculation throughout the week lacked significance. Nevertheless, sentiment in both banking and stock brokerage circles appeared to be quite optimistic, which feeling was based to a large degree upon the prospects of an abundant yield of winter wheat.

The strength and activity that have lately characterized the movements in the local traction stocks were noticeably absent and this group of shares fluctuated irregularly in common with the general stock market. However, there was no pronounced pressure to sell any of them and the reactions which they developed from time to time were regarded as only natural in view of their recent sharp advances. The new agitation looking to the securing of a five-cent fare to Coney Island on the lines of the Brooklyn Rapid Transit Company naturally had a slight influence on that stock, even though it is not considered likely that this movement will meet with any more success than have similar ones made in the past. More effective in causing recessions in Brooklyn Rapid Transit stock were the fears entertained that, beginning with the opening of the Brooklyn subway on May 1, earnings of that company may be considerably cut into by the Interborough Rapid Transit Company. The shares of the latter were affected in small degree by the movement on the part of the Public Service Commissioners to compel the company to provide better facilities for passengers on several of its lines. However, as before stated, there was comparatively little disposition to sell any of the stocks in this category; on the contrary, there appeared to be a quiet absorption of them by both speculators and investors on any and all recessions.

Philadelphia

Although trading in the local traction shares was restricted on account of the Easter holidays, the dealings were accompanied by a decided show of strength, prices for many issues scoring substantial advances over those prevailing at the close a week ago. Frankfort & Southwark Passenger, for instance, rose 5 points to 385, the highest figure recorded for the stock for a long time, while Philadelphia Traction moved up 2 points to 89, on the purchase of small amounts. The Philadelphia Company's shares were strong, the common advancing from 37 to 38½, later reacting to 38, while the preferred moved up a point to 38½. Union Traction sold at 53½ and 54. Philadelphia Rapid Transit sold as high as 17⅞, but subsequently reacted to 17½ on profit-taking. American Railways sold at 43 and United Companies of New Jersey at 240.

Baltimore

Dealings in the Baltimore traction shares also were comparatively small, but prices for practically all issues made advances. United Railway 4s advanced to 86, and the incomes to 52. The refunding 5s, after an advance to 77½, reacted to 76¾. United Railway stock sold at 11½, and Baltimore Traction 5s brought 109¾.

Other Traction Securities

In the Chicago market trading was light, but prices generally held steady. North Chicago sold at 44, and West Chicago at 29 @ 29¼. Union Traction receipts brought 2½. Chicago & Oak Park Elevated common was unchanged at 2, and the preferred sold at 7. The Boston market was very quiet. Boston Elevated sold at 137½, Massachusetts Electric at 46, West End common at 87 and the preferred at 103 @ 102½.

Security Quotations

The following table shows the present quotations for the leading traction stocks and the active bonds as compared with last week:

	Apr. 14.	Apr. 21.
American Railways	42½	43
Boston Elevated	129	136
Brooklyn Rapid Transit	46⅞	46½
Chicago City	155	155
Cleveland Electric	—	—
Consolidated Traction of New Jersey	64½	—
Detroit United	31	31½
Interborough-Metropolitan	10⅝	10½
Interborough-Metropolitan (preferred)	28⅜	27¾
International Traction (common)	33	33
International Traction (preferred)	55	61
Manhattan Railway	125	128
Massachusetts Elec. Co. (common)	11	11
Massachusetts Elec. Co. (preferred)	45	45
Metropolitan Elevated, Chicago (common)	16	a 17
Metropolitan Elevated, Chicago (preferred)	47	47½
Metropolitan Street	33	29
North American	52⅜	52½
Philadelphia Company (Common)	36½	38
Philadelphia Rapid Transit	17½	17½
Philadelphia Traction	—	87
Public Service Corporation, certificates	65	65
Public Service Corporation, 5 per cent notes	90	90
South Side Elevated (Chicago)	60	59½
Twin City, Minneapolis (common)	85	86
Union Traction (Philadelphia)	53½	53¼

a Asked.

Metals

There has been no material change in the iron and steel situation. Thus far this month the sales of pig iron are somewhat larger than in the corresponding period last month, but the total is extremely small. In the steel trade some activity is reported in structural material, due to the low prices on fabricated and castings. The copper metal market continues practically lifeless. Consumers are not disposed to enter the market at this time, but at the same time the large producing

companies are holding steady at about 13 cents for electrolytic. Quotations on the Metal Exchange were: Lake, 12¾ @ 12⅞; Electrolytic at 12⅝ @ 12¾, and castings, 12⅜ @ 12½.

APPOINTMENT BY BONDHOLDERS' COMMITTEES

The Bondholders' Protective Committees of the Camden & Trenton Railway Company general mortgage, Trenton & New Brunswick Railroad Company first mortgage, and New Jersey Short Line Railroad first mortgage have retained the firm of Ford, Bacon & Davis, engineers, to prepare a report upon these properties, with their recommendations.

REPORT OF RUTLAND RAILWAY, LIGHT & POWER COMPANY

The Rutland Railway, Light & Power Company has issued a report covering its operations for the 12 months ended April 1, 1908, which shows it to have passed a financially prosperous year. This company is the successor to one which, two years ago, was in the hands of a receiver. It is a consolidation of the Rutland Street Railway Company, the People's Gas Light Company, the Chittenden Power Company, and the Vermont Internal Improvement Company. As a railroad it operates 25 miles of track.

The company's income account for the year ended April 1, 1908, shows as follows:

Receipts for 12 months	$254,835
Operating expenses	144,379
Net receipts	$110,455
Interest on funded debt	75,000
Surplus	$35,455

Surplus shows about 2.4 per cent was earned on the company's $1,500,000 of stock outstanding. Its operating expenses consumed 56 per cent of its gross income. The last consolidation of the various properties was completed in March, 1908. The consolidated balance sheet of all the companies as of April 1, 1908, follows:

ASSETS.

Property and investment		$3,243,436
Supplies, merchandise, material, etc		20,300
Accounts receivable		23,118
Taxes and insurance paid		1,016
Cash		9,314
Total		$3,302,187

LIABILITIES.

Capital stock		$1,500,000
First mortgage bonds		1,500,000
Accounts payable:		
Sundry accounts	$21,704	
New station equipment	14,004	
		35,709
Surplus		266,478
Total		$3,302,187

An interesting feature of the report is the profit and loss surplus of $200,478, which is equal to 17 per cent of the outstanding stock.

ANALYSIS OF ST. LOUIS REPORT

As compared with former years, the report of the United Railways Company, of St. Louis, for the fiscal year ended Dec. 31 last, published last week, was decidedly the most favorable yet issued. The gross earnings and other income of the company recorded an expansion of more than $500,000, or 5.25 per cent, as compared with the year previous. By reason of a substantial increase in cost of labor and material, provision for depreciation of the St. Louis & Suburban Railway, which was not taken into consideration in 1906, and large expenditures for improvements to that part of the system, etc., operating expenses, depreciation and charges for the year were some $642,000, or 10.14 per cent, in excess of the year previous. As a result, there was a falling off of $97,819, or 9.71 per cent, in the balance available for dividends. After paying 5 per cent dividends on the preferred stock, $357,672, or 1.43 per cent remained for the junior issue. The report notes the fact that the general financial and business depression during the latter part of 1907 somewhat reduced gross earnings, although the cost of operation remained practically the same as during the first three-quarters of that year.

The amount charged to operating expenses for depreciation in the last fiscal year was $540,182, as compared with $455,681 in 1906 and $421,752 in 1905. Previous to that time nothing was charged to operating expenses for such purposes. It will be noted in the following table that no longer ago than in 1903 a deficit was shown on the year's operations, which had been the case for several years prior to that time. However, in 1904 the company was able to meet all charges, preferred dividends, etc., and at the same time record a surplus of $1,182,182. It will be recalled that that year was the one in which the World's Fair was held in St. Louis, which naturally caused considerable expansion in the revenues of the company. The following table shows the gross earnings and other income, net earnings available for dividends and the surplus after all charges, dividends, etc., for a series of years:

	Gross earnings and other income.	Net available for dividends.	Surplus.
1907	$10,828,737	$1,006,832	$351,672
1906	10,287,889	1,104,651	455,491
1905	8,460,016	753,732	104,572
1904	9,977,564	1,780,205	1,182,182
1903	7,295,847	525,059	*62,787
1902	6,452,219	318,777	*268,083
1901	5,783,913	50,580	*525,630
1900	4,469,207	*1,118,057	*1,694,393

*Deficit.

The cause of the unusually large deficit in 1900 may be ascribed to the fact that in that year the management was compelled to contend with a strike of its employees, which resulted in serious losses, not only in gross, but net earnings as well. In 1906 the earnings of the St. Louis & Suburban were included for comparison.

A feature worthy of note in the last annual report was the fact that during the year the company effected a reduction of $300,000 in its funded debt. Well-informed interests with regard to the operations of the company say the management is well satisfied with the policy pursued during the past three years of charging 5 per cent of the gross earnings each month to the depreciation reserve fund to meet extraordinary replacement and renewal charges. In the last fiscal years the entire amount of depreciation charges from income, with the exception of $5,500, was expended upon the property. This remaining $5,500 was added to the previous balance of depreciation reserve fund, making the total amount on Dec. 31 last $183,620.

In the last fiscal year, the total number of revenue passengers carried was in excess of the previous year by 10,370,537, and the total number of transfers and passes issued was greater by 12,051,826, making the total passengers carried for the year greater by 22,422,363 than in 1906. The number of passengers availing themselves of the transfer privilege in 1907 was the largest in the history of the company, while the average fare received per passenger was less than in any year since the company was organized. The following table shows the percentage of passengers using transfers each year and the average fare received from 1900 to 1907, both years inclusive:

Year.	Per cent using transfers.	Average fare per passenger.	Year.	Per cent using transfers.	Average fare per passenger.
1907	42.34	3.39 cts.	1903	40.25	3.41 cts.
1906	38.83	3.47 cts.	1902	38.68	3.44 cts.
1905	41.48	3.41 cts.	1901	36.76	3.48 cts.
1904	39.64	3.46 cts.	1900	25.70	3.48 cts.

The profit and loss surplus of the company on Dec. 31 last was $1,063,251. There was a material increase, as compared with 1906, in the company's current liabilities—$734,023—while the current assets on Dec. 31 last were less than on the corresponding date of the year previous by $261,823.

The earnings of the company thus far in the present fiscal year are showing up most favorably. In February the gross earnings presented a gain of $10,774; operating expenses, taxes and depreciation recorded an actual decrease of $28,939, leaving the surplus, after all charges, deductions, etc., greater than in the previous year for February by $37,620. Up to the close of February last the gain in surplus was over $60,000 more than for the corresponding two months of 1907.

THE STREET RAILWAYS OF PENNSYLVANIA FOR THE YEAR

The report of Secretary Henry Houck, of the Department of Internal Affairs of Pennsylvania, which includes the report of Supt. James H. Craig, of the Bureau of Railways, for the year ended June 30, 1907, will be ready for distribution in a few weeks. While not quite so voluminous as preceding reports of this character, it covers the most active and prosperous period in the history of railroads in Pennsylvania.

That the street railways secured their share of this prosperity is evidenced in the following figures, showing the increases for the year 1907 as compared with 1906:

	Increase.
Capital stock outstanding	$29,231,030
Funded debt outstanding	19,541,702
Current liabilities	7,797,888
Capitalization and current liabilities	$56,570,620
Cost of road and equipment	$41,905,336
Stocks and bonds of other companies owned	13,586,174
Cash and current assets	1,857,468
Total assets	$57,348,978
Gross earnings from operations	$2,911,331
Income from other sources	646,502
Total income	$3,558,260
Operating expenses	$2,787,061
Taxes	79,861
Interest on debt	595,979
Rentals	426,165
Other expenses	176,682
Dividends	259,013
Total	$3,968,397
Miles of single track and branches operated	264.53
Length of all tracks operated	304.20
Total number of cars	690
Total number of employees	3,396
Total compensation	$2,093,537
Total passengers carried including transfers	87,935,058
Passengers killed	65
Passengers injured	2,828
Employees killed	9
Employees injured	624
Increase 1907 as compared with 1906.	
Others killed	47
Others injured	519
Total killed	60
Total injured	3,971
Capital stock outstanding	$33,255,019
Funded and unfunded indebtedness	$2,692,219
Cost of road and equipment	$28,112,956
Income through rental of road and other sources	$1,294,882
Dividends paid	$2,004,210
Other disbursements	$771,733

The total capitalization of the street railways of the State is given at $464,553,942; total capital stock outstanding, $144,890,438; total funded and unfunded debt, $79,439,443; total cost of roads and equipment, $225,798,775.

The new laws affecting transportation companies passed by the Legislature of 1907 are reviewed. Through the law requiring a resurvey of existing lines the records of the department now contain the exact distances in miles between the station and every other station, on every steam and electric railway in the State. This information will be especially valuable to the State Railroad Commission in its work. Concerning the new laws granting street railways the right of eminent domain and the privilege of carrying freight, the report states: "So far, there has been little to indicate that many of these corporations have availed themselves of these supposed advantages. It may be too soon to expect noticeable results as freight carriers, as considerable change in and addition to equipment would certainly be necessary to handle successfully even light freight in quantities. The right of eminent domain should greatly facilitate the construction and promotion of street railways. This law was passed in response to an unmistakable public demand and the public will certainly be interested in observing results. In connection with the regular annual reports required of these companies the Bureau of Railways will next year seek to obtain useful and interesting statistics relative to these subjects.

"There are a great many street railways in the commonwealth that exist only on paper. A large percentage of them, possibly, were undertaken with a genuine purpose of building; many, however, simply represent efforts to speculate in franchises and rights over promising routes. An effort should be made to distinguish between these corporations, and to compel the abandonment or vacation of the charters of such as have no prospects of completion."

The report continues: "It is pretty certain that a start will be made to correct the generally recognized abuse of loading new street railway undertakings with unwarranted and burdensome issues of stock and bonds. It is not a difficult matter to perceive that this practice is at the present time more prevalent among promoters of street railway companies than of steam railroads or other corporations. A false basis, we believe, has been used in the past in the reports of these corporations in respect to the item of 'Cost of Road and Equipment.' It is quite apparent that generally the aggregate of capital stock and funded and unfunded indebtedness has been returned instead of the actual or real cost. The cost of road and equipment, therefore, as returned to the bureau, cannot but be very different in many cases from the commercial value of the roads. This is consequently deceiving both to the public and prospective investors in the securities of the companies. That steps will be taken in the coming year to correct this condition may be expected, especially in the cases of new companies promoted and constructed. It is an important problem not devoid of difficulties in arriving at a correct solution. The possibilities of railroad construction as profitable enterprises are not yet exhausted. This is particularly true as to railways operated by electrical power. The work of developing the inland streams of the State for the purpose of furnishing cheap electrical power has just begun. It is a field of tremendous possibilities and should in time be productive of many electric railway enterprises. The part of wisdom would seem, therefore, to demand that no unnecessary impediments should be placed in the way of railway building."

Concerning the fear that complications may arise from the fact that the State now has two different departments with supervising powers over transportation companies, the report continues: "Plans are already being considered whereby the two departments can co-operate harmoniously and avoid any conflict of authority and jurisdiction."

The report presents a list of more than 300 street railways incorporated but not in operation, upon which sums varying from $10 to $1,642,270 have been expended. The following street railway corporations have been stricken from the department's list by reason of abandonment by decree of court, surrender of charters, forfeiture of corporate rights, annulment of charter, etc.: Allegheny & Westmoreland, Avalon & Glenfield; Baden, Ben Avon & Baden; Bethel; Borough; Broadway; Carnegie, Oakdale & McDonald; Carnegie & McDonald; Canonsburg, McDonald & Canonsburg; Conemaugh Valley; Creighton, New Kensington & Springdale; East Bank; Harmony; Harrisburg & Bridgeport; Kane Electric; Kilbrick; Laurel Hill; Leet Township; Lewisburg & Mifflinburg; Mercer County; Remington; Sewickley; Sewickley & Osborne; Spruce Run; Twin Creeks; Uniontown & Waynesburg; Vanport & Glasgow; Waynesburg.

REORGANIZATION OF PITTSBURG & ALLEGHENY VALLEY RAILWAY

A committee consisting of Samuel J. Graham, Walter J. Guthrie and George M. Hosack has prepared a plan of reorganization of the Pittsburg & Allegheny Valley Railway which is described as follows:

"The new company shall have an authorized bond issue of $250,000 in 30-year, 5 per cent, tax-free, mortgage gold bonds, which are to be sold (with a bonus of 25 per cent of common stock) at not less than 85 per cent; an authorized issue of $450,000 6 per cent cumulative preferred stock and an authorized issue of common capital stock of $250,000; par value of all shares $50 each, full paid and non-assessable. All bona fide holders of bonds and all persons who have actually paid in cash therefor shall have the right to participate in the reorganization, the agreements to be signed and deposited with the bonds with the Safe Deposit & Trust Company, of Pittsburg. The plan stipulates for a delivery by a large holder of bonds and a release of all his right and title in $300,000 worth of bonds and the delivery of the stock which he holds as collateral.

"For each $1,000 bond the holder shall receive $1,000 in preferred stock and $400 in common stock, full paid."

RECEIVER FOR LONDON UNDERGROUND ELECTRIC RAILWAYS

Speyer & Company have secured the appointment of Sir George Gibb as receiver on account of the company's inability to meet £7,000,000 of profit-sharing notes due June 1, and £300,000 temporary loan notes due May 15. This is the company promoted by the late C. T. Yerkes of Chicago. The failure of the company to earn greater returns is attributed to the competition of the London County Council Street Railway system and the motor omnibuses.

Details of the plans for the readjustment of the finances of the London Underground Electric Railways were made public in New York Tuesday, April 21. All the cash requirements are to be met through the sale to Speyer & Company of $5,000,000 12-year 5 per cent prior lien bonds, the bankers agreeing to provide up to $1,500,000 additional cash for any possible deficiency in fixed charges during the further development of the enterprise. The plan provides that against the pledge of a total of $72,500,000 face value of securities the company will issue $5,000,000 prior lien 5 per cent bonds, the issue which Speyer & Company are to purchase, $15,000,000 4½ per cent bonds due 1933 and $26,000,000 6 per cent income bonds due 1948. The present noteholders are to receive 40 per cent in 4½ per cent bonds and 70 per cent in 6 per cent income bonds, giving them $1,100 in bonds for each thousand-dollar note. In case the earnings of the properties develop sufficiently to enable the company to pay the full interest on the income bonds, the noteholders will get more than 5 per cent interest per annum, the rate which the notes carry now. The noteholders will, by accepting the income bonds, also have the controlling voice in the management, as the income bonds will be entitled to vote.

The Underground Electric Railways Company of London was incorporated in April, 1902. It has in operation in London and suburbs a system of both underground and surface electric passenger railways and an aggregate of 102 miles of double track. The company controls through stock ownership the Baker Street & Waterloo, Charing Cross, Euston & Hampton and Great Northern, Piccadilly & Brompton tube railways, and the London United Tramways (surface) and the Metropolitan District (tunnel) railways.

REPORT OF UNITED RAILWAYS OF ST. LOUIS FOR QUARTER

The report of the United Railways Company, of St. Louis, for the first quarter of this year exhibits a decrease of $32,401 in gross earnings, owing to a falling off in traffic, but an increase of $57,160 in net earnings, resulting from a decrease of $89,561 in operating expenses, taxes and depreciation. The report for March shows even more pronounced changes in the same items. The gross earnings for January, February and March were $2,461,761, the operating expenses $1,633,034, and the net earnings $828,727. The charges against net earnings were $700,163, an increase of $6,429. The net income was $128,564, an increase of $50,731. March indicated a heavy decline in passenger movement. The gross earnings for the month were $858,908, a decrease of $44,237 from March, 1907; the operating expenses, taxes and depreciation $559,135, a decrease of $37,112, and the net earnings $299,773, a decrease of $7,125. The charges against net earnings were $233,290, an increase of $2,422, and the net income amounted to $66,483, a decrease of $9,547. The following comparative statement of earnings was compiled by H. P. Taylor, acting auditor. The items of gross earnings include other income, and the items of expenses includes operating expenses, taxes and depreciation:

Three Months.	1908.	1907.
Gross receipts	$2,461,761	$2,494,162
Operating expenses	1,633,034	1,722,595
Net earnings	$828,727	$771,567
Fixed charges	700,163	693,734
Net income	$128,564	$77,833
March.		
Gross earnings	$858,908	$903,145
Operating expenses	559,135	596,247
Net earnings	$299,773	$306,898
Fixed charges	233,290	230,868
Net income	$66,483	$76,030

REPORT OF NEW ORLEANS COMPANY

The consolidated income account of the New Orleans Railway & Light Company for the years ending Dec. 31, 1907, and 1906, shows the income, etc., from the various departments as follows:

Income	1907.	1906.
Railroad department earnings	$3,987,733	$3,724,271
Electric and gas department earnings	1,893,685	1,875,400
Miscellaneous earnings	159,882	173,518
Total earnings	$6,041,301	$5,773,190
Expenses:		
Railroad department operating	$2,411,758	$2,225,580
Electric and gas department operating	858,637	848,434
Total operating expenses	$3,270,396	$3,074,015
Net earnings from operation	$2,770,904	$2,699,175
Int. on funded debt, taxes and miscellaneous	2,025,637	1,900,900
Net income	$745,266	$798,274
Dividends on preferred stock	312,500	500,000
Surplus	$432,766	$298,274
Percentage of operating expenses to earnings	54.1	53.2

The statement of assets and liabilities is as follows:

ASSETS.

Plant, property, franchise and securities		$84,701,679
Securities owned		2,478,000
Stocks and bonds investments		85,685
Material and supplies		271,581
Cash		530,949
Accounts receivable		404,934
Suspense items, insurance, rents, etc		89,539
Total		$88,562,370

LIABILITIES.

Capital stock N. O. Railway & Light Company, preferred		$10,000,000
Capital stock N. O. Railway & Light Company, common		20,000,000
Capital stock affiliated companies, preferred		7,100,000
Capital stock affiliated companies, common		14,297,800
Funded debt:		
4½ per cent general mortgage gold bonds authorized issue	$30,000,000	
Reserved to retire underlying bonds	12,603,000	
Issued and outstanding		17,397,000
6 per cent gold debenture notes, authorized issue	$5,000,000	
Reserved for general purposes	3,700,000	
Issued and outstanding		1,300,000
Funded debt of underlying companies		12,902,000
Bills payable		1,777,588
Accounts payable		399,530
Coupon interest payable and accrued		677,066
Unpaid dividends		124,546
Customers and employees' deposits		250,157
Reserves for litigation, bad debts, etc		73,243
Deferred and current liabilities		110,672
Profit and loss		2,152,765
Total		$88,562,370

EXTENDING THE PAY-AS-YOU-ENTER SERVICE IN BUFFALO

The Grant Street line of the International Railway Company, of Buffalo, will be the next to be equipped with the pay-as-you-enter cars. Some of the cars which were taken off Niagara Street to make room for the pay-as-you-enters and were run temporarily on Grant Street, will be rebuilt into the pay-as-you-enter type for that line. With a rearrangement of doors at the ends and by enlarging the platforms about 2 ft. in length, the Grant Street cars will be identical with the ones on Niagara Street. Statistics which the company has gathered are said to show that the pay-as-you-enter cars on Niagara Street have reduced the time of the stops 25 per cent by having the conductor on the platform all the time to stop and start the car promptly, and in consequence the schedule on the line has been reduced by five minutes. The cars have also proved very popular with the public. The company has not yet made public figures as to any increase in earnings due to the cars.

BUFFALO, LOCKPORT & ROCHESTER NEARING COMPLETION

It is expected that the Buffalo, Lockport & Rochester Electric Railway will be placed in partial operation within a few weeks. The track has been laid and graded and the overhead work completed between Rochester and Lockport, except for a small break at Middleport and about 12 miles between Middleport and Lockport. The railway enters Rochester on Lyell Avenue and Kossuth Street. The car barns are located about a half mile out on the road's right of way beyond Lyell Avenue, and just west of the Charlotte branch of the Buffalo, Rochester & Pittsburg Railway. The building is 165 feet square, of cement and is divided into four sections. These include the storage barn, the machine shop, paint and carpenter shops and the offices for the dispatching and operating staff. The new cars are being wired by I. R. Nelson & Company, of Newark, N. J. The first installment of rolling stock includes 15 coaches and two express cars, built by the Niles Car Company. Each passenger car has a seating capacity of 50 and is divided into a smoking compartment, upholstered in leather, and the regular day coach compartment, upholstered in green plush to match the color of the car, which is the standard Pullman dark green. The entrance to the cars will be at one end. The line will be operated by power furnished by the Niagara Falls & Lake Ontario Power Company, connection being made with the power company's lines at Gasport and South Greece. There are five power substations on the road, located at South Greece, Brockport, Albion, Knowlesville and Gasport. The road is graded for double track its entire distance of 56 miles, with bridges and culverts built to accommodate the second track should business demand it. Trains will be dispatched by telephone. The completion of the Buffalo, Lockport & Rochester Electric Railway will give a direct electric connection between Rochester and Buffalo, and, by connecting with the Rochester & Syracuse, between Syracuse and Buffalo.

LONG ISLAND RAILROAD REPORT

The Long Island Railroad Company reports earnings as follows for the year ended Dec. 31:

	1907.	1906.
Gross receipts	$10,130,407	$9,595,596
Operating expenses	8,526,584	7,481,142
Earnings from operation	$1,603,823	$2,114,454
Fixed charges, rentals, etc.	545,326	427,356
Net earnings	$1,058,497	$1,687,098
Special income	332,069	406,507
Total net earnings	$1,390,566	$2,093,605
Interest and rentals	2,249,395	2,121,944
Deficit	$858,829	$28,339

The increase in operating expenses was due to advance in rates of pay, increase in payments on account of personal injuries, loss and damage, advance in prices of material used, larger taxes and extraordinary repairs in maintenance of way, etc. The increase in fixed charges was due largely to payment of interest on equipment trust certificates and interest on advances made by the Pennsylvania Railroad Company for the purpose of carrying on improvements. The following charges to capital account for improvements were made: Atlantic Avenue improvement, $606,731; Atlantic Avenue trolley, $12,728; Bay Ridge improvement and elimination of Brooklyn grade crossings, $967,433; electrification of lines, $15,164, a total of $1,602,056. The report states that the passenger terminal is practically completed and all arrangements made for transfer of passengers to and from the Interborough Rapid Transit Subway, which will be completed and in operation to the Long Island terminal before July 1, 1908. No new work was undertaken in the further electrification of the company's lines. Other charges to capital account for right of way, new stations and general improvements were made to the net amount of $755,006. The funds to meet capital expenditures were provided through advances made to the Long Island Railroad by the Pennsylvania Railroad Company.

The report says: "The Long Island Consolidated Electric Companies, the organization of which was mentioned in the two previous reports, has secured all the franchises, rights of way, etc., for the cross-island line from Huntington to Babylon via Farmingdale and Amityville and has graded and laid track covering about seven miles of the route between Huntington and Amityville. That company has not sold any of its bonds yet, the funds for the above work having been advanced by your company until such time as securities can be sold to advantage."

President Ralph Peters also says in conclusion: "While the general condition of the property has been greatly improved and increased safety and economy in operation assured, results for the year have been far from satisfactory and are largely due to the effort made to provide greater accommodation for the public than the revenues justify. Late in the year radical reductions were made in the train service and every effort made to bring down the operating expenses, but not in time to produce any marked effect upon the general results. The early completion of the Rapid Transit Subway from the Battery to the Flatbush Avenue station in Brooklyn will greatly increase the traffic upon the Atlantic Avenue and other lines that have been electrified and will also shorten the time from all stations east of Jamaica to New York City. This should bring larger revenues without increased expense and give a return upon the heavy outlay made in electrifying portions of the road. While the traffic via Brooklyn will be greatly increased, that via Long Island City and Thirty-fourth Street will be necessarily reduced but not sufficiently to justify a very large reduction in the steam service to the latter point."

At the annual meeting of the stockholders of the Long Island Railroad Company, the retiring directors were re-elected and Frederick G. Bourne was chosen to take the place of Franklin B. Lord, deceased.

It was announced Tuesday, April 21, that the Pennsylvania Railroad Company would formally make known within a few days the details of a bond issue of $40,000,000, the proceeds of which are to be used for improvements in New York.

LEGISLATION IN OHIO

While the Ohio Legislature looked with favor upon the Schmidt bill, making it possible to grant franchises to new companies in streets where railway routes have been in operation in the past without the consents of abutting property owners, two other alleged Johnson measures have not been received so kindly. This indicates that the majority of the members of both branches, instead of yielding to the pleadings of the Cuyahoga County delegation, have acted in the direction of making such laws as they believe are good for the people at large. While the Governor was hearing the arguments of the Mayor and other officials from Cleveland, the Senate defeated the Howe franchise tax bill, which provided for the valuation of corporations by taking into account the market value of the stock, the bonded indebtedness and the capitalization of the net earnings.

In the House of Representatives the Stockwell bill, providing for making short-time street railway grants without competition, advertising or consents, was also defeated. This is said to have been a companion bill to the Schmidt bill, and one that would have aided Mayor Johnson, of Cleveland, to accomplish his purpose in that city.

The Wertz bill, referred to in the review of the Cleveland situation elsewhere in this issue, was passed by the House of Representatives, but has been held up in a committee of the Senate, of which Senator Frederick C. Howe, of Cleveland, is chairman. Certain members of the Legislature and others are now urging that it be reported out at once. A second Schmidt bill, passed by the Senate nearly two months ago, has been placed upon the house calendar for consideration. It provides that on petition of 10 per cent of the voters all franchise ordinances shall be submitted to a vote of the people.

The McCord bill is an important measure that has not yet been considered. It provides that interurban railway companies shall have the right to maintain, purchase, construct and operate railways in municipalities, subject to railway laws. This is intended to give them an opportunity for securing terminals in the cities without being subject to terms dictated by the local street railway companies. In an interview the other day, Mayor Johnson, of Cleveland, said he would oppose the passage of a measure of this kind, because it would give the interurbans the right to operate any place they saw fit in the cities, without the consent of the councils, and that it would repeal the Schmidt law.

AFFAIRS IN NEW YORK

Orders issued by the Public Service Commission of the First District of New York, to take effect April 27, call for sufficient cars to provide "a seat for every passenger" except in the rush hours. The lines which will be affected at once are the Twenty-third Street Crosstown line, the Lexington Avenue line and the Grand Street line. The order for the Twenty-third Street Crosstown line, which is similar to the orders for the other lines mentioned, contains the following provisions:

That the service of the New York City Railway Company and of Douglas Robinson and Adrian H. Joline, its receivers, on the Twenty-third Street Crosstown line be increased, supplemented, and changed in the following manner, that is to say:

1. By discontinuing the operation of all cars operated between the westerly end of Twenty-third Street and the Grand Central Station via Twenty-third Street and Fourth Avenue.

2. By operating daily, including Sunday, over every point on the Twenty-third Street Crosstown line, including the branch running to the East Thirty-fourth Street Ferry, either (a) a sufficient number of cars in each direction past any point of observation, to provide during every fifteen-minute period of the day or night a number of seats at least 10 per cent in excess of the number of passengers at that point, the number of cars passing any point to be, however, not less than six per hour in each direction, or (b) a minimum number of twenty-five cars in one direction in each fifteen-minute period, in which the provisions of subdivision (a) are not complied with.

The commission has made public the following record of accidents, table comparing the March record with the records for January and February.

	Jan.	Feb.	March.
Car collisions	170	203	148
Persons and vehicles struck by cars	934	945	905
Boarding	479	412	574
Alighting	416	286	454
Contact with electricity	34	36	27
Other accidents	1,888	2,069	2,245
Total	3,921	3,951	4,353
Of the above the injuries are classified as follows:			
Passengers	1,444	1,219	1,525
Persons not passengers	570	462	632
Employees	486	476	474
Total	2,500	2,157	2,631
Of the above injuries the following were serious:			
Killed	44	26	44
Fractured skulls	15	15	8
Amputated limbs	6	5	1
Broken limbs	32	24	33
Others	91	61	101
Total	188	139	187

It is stated that formal announcement of the Interborough Rapid Transit Company financing will be made in the near future. There was a persistent report that J. P. Morgan & Company will have the handling of $25,000,000 bonds, or notes, which the Interborough Company proposes to issue.

The Brooklyn League's committee on bridges and tunnels has completed its investigation regarding traffic conditions on the Brooklyn Bridge and the construction of the subway loop connecting all the bridges. Concerning the proposed subway construction the committee's report says:

> After these bridges have been connected we must have trains running over them by way of the subway loop, and the Public Service Commission should be urged to begin negotiations at once with the transit companies, with the view of having the loop used by them. Obviously the Brooklyn Rapid Transit is the logical company to use it, because they could, with their Brooklyn roads, form a complete and perfect loop service, circling the bridges continuously by way of Broadway over the Williamsburg Bridge, through the Manhattan subway loop and over the Brooklyn Bridge up by way of the Fulton Street L to Broadway, East New York, etc. This would be a perfect loop system and could be run as soon as connection was made with the bridges.
>
> This would leave two tracks in the Manhattan subway loop to be used by the company which eventually will utilize the Broadway and Lafayette Avenue loop, and there are two tracks on the Williamsburg Bridge that could be used to complete this smaller loop.
>
> The Bridge Department has certainly done its share. It rests with the railroad companies and the Public Service Commission to finish this important work for the city.

The distance from the rail to the step of the pay-as-you-enter cars, which at first was 19 inches, had been reduced to 16⅞ in. The step is now lower than the step of the open cars and only slightly higher than that of the closed cars.

President William G. McAdoo, of the Hudson & Manhattan Railroad Company, is quoted as saying: "The results and operations of the portion of the tunnels opened from Hoboken to Fourteenth Street and Sixth Avenue have been so far very satisfactory and the traffic over it has fully realized expectations. The extension of the tunnels under Sixth Avenue, Manhattan, to Twenty-third Street with the station at that point will be opened June 1, while the entire system, including the lower tubes at Cortlandt Street and all terminals will be in operation by Jan. 1 next."

The time table just issued by the company gives the running time between Fourteenth Street and Sixth Avenue and Hoboken, a distance of three miles, as ten minutes and between Christopher Street and Hoboken as seven minutes. The trains are run every three minutes during the rush hours and every five minutes throughout the rest of the day up to 8 p. m., when they run every ten minutes until midnight and then every twenty minutes to 5 a. m.

The Senate Committee on Railroads has voted not to report the Coney Island 5-cent fare bill, and it is said that the committee will be discharged from further consideration of the bill. Former Judge Hatch, appearing for the Brooklyn Rapid Transit, told the committee that the enactment of a 5-cent fare bill would lead to further riots, intimating that the company would refuse to obey such a law as being unconstitutional.

The Senate cities committee has so amended the Rapid Transit Bill as to provide that in purchasing a subway built by private capital, and owned by a private corporation, the city may use directly the money received on a resale of the subway to another corporation, which purchase and resale may be made in one transaction. The corresponding bill introduced in the Assembly has been reported with the same amendment.

The bill providing for amendments to the Elsberg rapid transit law, which would permit construction of subways in New York City by private capital, was passed in the Assembly April 21, by a vote of 99 to 16. The negative votes in the Assembly were cast by Democratic members of the House. The bill provides two methods to facilitate the building of subways. The first method involves the construction of subways by private corporations under franchises for a period of not more than 50 years, when the city at its own discretion may take over the system at a price not to exceed the actual cost of construction and equipment. The other method contemplates the construction of subways by the city, and their lease to private corporations for a period of not more than 35 years, when the city may take them over by paying the cost of the equipment, put in by the lessee corporation.

CURTIS TURBINE BUSINESS

The General Electric Company has made public a statement of Curtis turbine sales, as follows:

Orders to Dec. 31, '07	Number of plants Capacity 1000 kw and less	Number of plants Capacity above 1000 kw	Total number of plants	Average kw capacity of plants	Total kw capacity
Central Station and Railway Traction	71	190	261	3,778	986,020
Industrial Plants and Miscellaneous	243	45	288	305	87,675
Totals	314	235	549	1,956	1,073,695

	Number of machines	Average kw capacity per machine	Total kw capacity
Installations to Dec. 31, '07	943	857	807,610
Orders on hand Dec. 31, '07	153	1,739	266,085
Total sales to Dec. 31, '07	1,096	980	1,073,695
Orders for fiscal year ending Feb. 1, '08	325	890	286,320

The most noticeable single item is the total capacity sold to Dec. 31, 1907—1,073,695 kw, or about 1,556,000 brake hp. The amount of the sales of Curtis turbine generators for the past fiscal year of the General Electric Company, was 286,320 kw capacity, or more than 25 per cent of the total sales since the Curtis turbine was introduced.

Another fact of considerable interest is the large number of plants for which the Curtis turbine has been selected as prime mover. The large range of sizes in which this turbine is sold is probably responsible for the great variation in average sizes of plants in which it is used. The large central stations and electric traction enterprises with an average size of 3778 kw plant capacity strikingly differ from the industrial plant of 305 kw average capacity.

THE CLEVELAND SITUATION

In an effort to act before any possible change could be made in the Schmidt street railway law, signed by the Governor a few days ago, the City Council suspended the rules Thursday evening and granted the Forest City Railway Company franchises on Woodland Avenue and the greater part of the west side, now occupied by the Cleveland Electric Railway Company, without considering what the effect might be of this action on the negotiations under way for a settlement between the city and the Cleveland Electric Railway Company.

The grant for Woodland Avenue contains a provision for a reduction of fare below 3 cents in case the company should show an earning power of more than 6 per cent on the cost of acquiring and maintaining the lines. This is an extension of the old Green franchise and provides for 3-cent fare.

The rights given in the grant expire Sept. 9, 1923, with the exception of streets where joint use of tracks was given. Single track roads are to be built on Lorain Bridge and Madison Avenues, and on Buckeye Road, from Woodland Avenue. From the Superior Viaduct to the Public Square, Superior Avenue is to have a four-track road. On all other streets the route will be double track. Joint use is given to the Cleveland Electric on the Superior Avenue and Public Square track and loops and about the Broadway intersection. The Council reserves the right to grant joint use of tracks to any person or corporation on the Superior and Central Viaduct tracks.

It is provided in the case of those grants of the Cleveland Electric which did not expire on April 14, that the franchise shall be operative when they do expire, provided the time is not more than two years after the passage of the ordinance. In case the grants on a portion of the system should not expire in two years, these grants will be invalid as to those portions but shall not affect the franchise as to other streets. Eighteen months is given to put the grant into operation actively, exclusive of the time taken up in litigation.

The Schmidt law, under which the grants were made, was reported to have been signed by Governor Harris several days ago, but as a matter of fact he did not put his name to the new law until Wednesday, having waited until that time to hear from those interested in the bill. Mayor Johnson believes that the new law will be a great advantage to the Forest City Railway Company because it does away with the necessity of securing consents of property owners on streets where railway routes have been in operation in the past, and provides that the franchise shall be awarded to the company or individual making the lowest rate of fare and then shall be submitted to a vote of the people if 15 per cent of the voters so petition.

On Thursday, Mr. Goff sent a short note to Mayor Johnson stating that he was ready to resume negotiations at any time, with the result that a meeting was set for Friday. At that meeting several questions were discussed by Mayor Johnson and Mr. Goff, but neither of them expressed any intention of changing the propositions made some time ago and at the end of the week there were no indications that the men were any closer together than they had been. The Mayor evidently believes that he is now fortified by the new Schmidt law and the fact that the Forest City Railway Company has been granted franchises over the routes which it desires.

In discussing the various questions, Mr. Goff said that in reality they were $5,000,000 apart, but of this he had swept away $3,000,000 and the remainder is now up to the officials of the company. In reality the difference is now $2,340,000, which Mr. Goff says is a small matter to stand in the way of a settlement, but at the same time he does not feel that he is in position to yield anything further.

It is said that an attempt is being made to secure the passage of the Wertz bill, which will provide for an initiative as well as a referendum principal in granting franchises. This would enable the local company to bring its own proposition to a vote of the people through a petition signed by the voters.

The Forest City Railway Company has increased its capital stock from $2,000,000 to $6,000,000, and Sunday morning large advertisements appeared in the papers for the sale of the stock. From this it would seem that the company expects to proceed with the development of the streets upon which franchises were granted last week, if money can be secured. Bankers and financiers argue that money cannot be secured in such large amounts upon an enterprise as doubtful as this, but Mayor Johnson seems confident of inducing the people who have savings deposits to take their money from the banks and place it with the new companies.

HEARING ON BOSTON & EASTERN REVISED PLANS

A hearing on the Boston & Eastern Electric Railroad Company's revised plans for a terminus in Post Office Square, Boston, was held by the Massachusetts Railroad Commission on April 16. Chief Engineer Bickford explained the proposed changes at length, stating that the new route deviates from the old one at the rear of the Revere Town Hall, and passes through a part of Chelsea to East Boston, and thence under the harbor and up Milk or Water Street to Post Office Square. A branch line is provided to serve the Powder Horn Hill district in Chelsea. The tunnel is planned to cross the harbor 18 ft. below the 40-ft. dredging line, and the unofficial approval of the War Department has already been secured. Mr. Bickford stated that the tunnel would be of reinforced concrete construction, and its walls would therefore be thinner than the East Boston tunnel walls, giving for the same cost a larger inside diameter. The East Boston tunnel walls are 33 in. thick against 24 in. in the Boston & Eastern plans. The plan is to arrange the train schedules so that only one train is in the tunnel on each track at a single time.

Mr. Bickford stated that better service would be given by the new route, for by it passengers would be carried from Salem and Lynn to the heart of Boston without change in a shorter time than would have been possible by the original Sullivan Square route. The train sheet has had to be revised but slightly in planning for the new terminus. In regard to using the present East Boston tunnel, Mr. Bickford stated that its traffic now and to be handled in the future would not permit this course, and, aside from the platforms not being long enough for the Boston & Eastern trains, there would be a defeat of rapid transit if high-speed trains and surface cars should be run on the same tracks. He had counted cars in the tunnel in the rush hours on 55-second intervals in each direction, and every car added cuts down the speed which the other cars can make. It is expected that the company's earnings under the new route will be increased by two cents per passenger, amounting to $200,000 per year, which will pay the fixed charges on the necessary terminal property. A letter was read from Mr. H. M. Brinckerhoff, consulting engineer with W. B. Parsons, of New York, approving the revised plans and estimates.

The revised estimates show a cost increase of about $2,000,000 for the Post Office Square route compared with the Sullivan Square route. The principal differences are as follows:

Real estate, increase	$115,843
Grading, surfacing and tunneling, decrease	151,842
Side and retaining walls, decrease	138,600
Ballasting with stone, increase	16,000
Crossings over other railroads, decrease	23,800
Crossings at streets and ways, decrease	130,055
Track and track equipment, increase	18,650
Stations, exclusive of Boston terminal, decrease	22,000
Power distributing system, increase	11,950
Harbor, tunnel, subway and terminal, new work	2,190,060

This item is estimated by using the cost of the present East Boston tunnel as a basis, omitting the items chargeable to the existing passenger stations at Atlantic Avenue, Old State House and Scollay Square, and adding the estimated cost of the proposed terminal at Post Office Square, exclusive of the land damage, which is included under real estate. The cost of the water section of the East Boston tunnel, exclusive of interest, engineering and general expenses, was about $260 per linear foot. The East Boston tunnel cost $650 per linear foot total, but the proposed allowance for the Boston & Eastern tunnel, exclusive of the water section, is $750 per linear foot. Engineering, interest and miscellaneous would increase the sum, $274,000.

CHART OF INTERBOROUGH-METROPOLITAN COMPANY

Kountze Brothers, bankers, of New York, have issued a large chart showing the organization and corporate relations of the various companies comprised in the Interborough-Metropolitan system. The chart states the capitalization of each company in the group, and will assist greatly in an understanding of the situation.

One of New York's enterprising department stores is now advertising a belt with an attached purse containing compartments for nickels, dimes and quarters. The belt is called the "pay-as-you-enter," and is for the convenience of shoppers using the prepayment cars. It is to be hoped that this commendable fashion will become popular and thereby save conductors and passengers much inconvenience.

EXPENDITURES DECIDED UPON FOR CHICAGO

At the meeting of the supervising engineers last week it was decided to spend about $14,500,000 during 1908 in the rehabilitation of the two street railway systems. Chicago City Railway and the Chicago Railways Company will spend $3,000,000 each in track laying. The Chicago Railways Company will also spend $2,500,000 in underground conduit work. There will be large expenditure for new car houses, power houses, substations and overhead trolleys. The controversy raised some weeks ago as to whether steam railways or street railways should pay for the raising of tracks necessary for the new cars in passing under the steam roads has not been definitely settled, but it was decided last week that the traction companies shall pay the expense of removing obstacles in establishing through routes, and it is believed that the traction companies will also be required to pay the expense of raising the tracks.

At a meeting of the trustees of the Chicago Railways Company the following directors were elected: Henry A. Blair, chairman; John M. Roach, F. H. Rawson, W. M. Eisendrath, Hempstead Washburne, A. B. Jones, J. W. Gary and Wallace Heckman. The finance committee consists of Henry A. Blair, Chauncey Keep and B. A. Eckhart. The executive committee is composed of Henry A. Blair, J. M. Roach and Wallace Heckman. The board of directors will meet soon to elect the officers of the company.

The Chicago Title & Trust Company reports that it is expecting the participation certificates to be exchanged for the receipts of the various stocks of the old companies soon. They are to be listed on the New York Stock Exchange, and are now being examined by the committee. On the arrival of these certificates there is expected to be greater activity in the local market for traction securities.

MONOPOLY CARRIES OBLIGATION IN MASSACHUSETTS

In its decision just given, approving an extension of the Springfield Street Railway Company's line in St. James Avenue, Springfield, to the Springfield-Chicopee boundary, the Massachusetts Railroad Commission affirmed the principle that monopoly of street railway business in a given center of population carries with it the obligation to make reasonably early provision for extensions to keep pace with the real estate development of its proper territory. It also confirms a location that was granted by local authorities virtually in opposition to the wishes of the street railway company for which it was intended.

At the hearings on this matter the company put in testimony to show that very few houses or other buildings along the proposed extension were now made use of in any way that would assure to the company a traffic over the extension sufficient to warrant its construction and operation. The company also undertook to show that the district was not one for which any great increase in number of houses and population could reasonably be looked for before the end of a considerable period of years. This was the attitude taken before the city authorities; but eventually the Board of Aldermen and Mayor originated an order giving the company the location which the city believed it ought to build upon, and this location, passed by the local board, has been long pending before the Railroad Commission. When the board went to Springfield a fortnight ago it took a view of the territory in dispute, and became convinced that the extension, if accepted by the company and constructed, would afford a new line for service from the present track terminus in St. James Avenue to the boundary line between the cities of Springfield and Chicopee. At that point its terminus will be but a short distance from an existing through line of the company from Chicopee Falls to Springfield. If the proposed extension is ultimately further extended for this short distance, it will connect with this line, and thus create a new through line, affording a direct and convenient means of transportation between Chicopee Falls and the business center of Springfield. The board believes that the proposed extension will develop territory in Springfield, and also, if the through line is eventually constructed, a portion of territory in Chicopee, each well adapted for residential and other purposes.

As bearing on the transportation conditions in Springfield, the board cites its decision on Springfield, Ludlow, and Wilbraham locations for the Springfield Suburban Street Railway Company, Nov. 25, 1903, where it said:

"The operation of street railways in the larger municipalities has shown that the traffic within city limits can be handled with greater success and greater safety by one than by several companies. It will not do, however, for a company which receives the privileges of a monopoly to forget the obligations which go with them. The public, in such case, can look to the one company only for needful extensions and additional accommodations. In response such company must be quick to meet all reasonable demands. When it undertakes to perform the entire public service it must carry out the task."

The decision given March 5, of the current year, as to fares and service on the Springfield Street Railway, favoring the company as against the Mayor and Aldermen, contained another declaration now cited, as follows:

"The board is convinced from both the evidence and the reports of these investigations that improvement is being made, and that the company is endeavoring to give to Springfield citizens the first-class service to which they are entitled, but this endeavor is hampered by existing track conditions. It would obviously be improper for the board, in view of its statutory duties as to approval of location grants, to make any suggestion relative thereto; but it is our conviction that the only remedy for much of the inadequacy of accommodation is additional trackage, and we, therefore, so far as we may with propriety do so, urge the petitioners and the company to give attention to this phase of the situation."

In the present case, the board, therefore, says:

"Congested traffic conditions have caused complaints of service in Springfield as elsewhere, and every reasonable method to remedy inadequate facilities should be adopted. A prosperous street railway in the hands of a progressive management should furnish rapid transit and prompt service, and meet all legitimate demands therefor in a spirit of co-operation. Such a company best fulfils its functions as a servant of the public by anticipating reasonable requirements for increased facilities for transportation."

The board therefore orders a certificate that the St. James Avenue extension, as established under an order of the Springfield Aldermen, dated July 22, 1907, and accompanying plan, is consistent with the public interests.

ANNUAL MEETING IN NEW ORLEANS

At the annual meeting of the stockholders of the New Orleans Railway & Light Company, April 13, Hugh McCloskey was elected president of the company to succeed E. C. Foster, to whom has been assigned the office of first vice-president.

Mr. McCloskey's election to the presidency was approved by the directors and stockholders. Mr. McCloskey is identified with the financial interests of the city, and it is generally understood that his duties as president of the company will consist chiefly in the handling of the finances of the corporation. He is one of the best known merchants of New Orleans, but is more widely known as president of the Board of Port Commissioners, having been at the head of that board since its organization. He is also president of the firm of McCloskey Brothers, wholesale grocers, and is vice-president of the Hibernia Bank & Trust Company and the Hibernia National Bank.

At the meeting the entire board of directors that has looked after the company's affairs during the past year was re-elected unaminously. The board consists of Hugh McCloskey, chairman; E. C. Foster, R. M. Walmsley, Maurice Stern, John J. Gannon, Charles Godchaux, Pearl Wight, Frank B. Hayne, T. H. McCarthy, Albert Baldwin, Jr., W. R. Stauffer, R. W. Wilmot, Joseph H. DeGrange and A. M. Young.

THE PENSACOLA AND CHESTER STRIKES

After a week of quiet at Pensacola, during which the regular day schedule had been maintained by the Pensacola Electric Company, a mob attacked a car in the suburbs and injured several passengers, one of them perhaps fatally. The attack, it is generally believed, was a matter of last resort by the strike sympathizers, who see the movement foredoomed to failure. No trouble has been experienced in operating regularly, the company having all the men it needs. The boycott has, of course, affected receipts, but the power of the union to intimidate the public is waning rapidly.

The Chester Traction Company issued an ultimatum to its employees to return to work April 21, on which date it began to operate cars with new men. The cars are manned by four operatives, two on the rear platform and two on the front.

ENGINEERS ON CONSERVATION

As announced last week, a meeting of the engineering profession was held April 14, in the auditorium of the Engineering Societies Building, New York, under the auspices of the American Society of Mechanical Engineers, in response to the invitation of President Roosevelt to engineers to co-operate in securing the conservation of our natural resources. A letter was read from the President expressing gratification at the zeal with which engineers had taken up this problem.

J. W. Lieb, Jr., vice-president of the society, presided and called attention to the fact that the first President of the United States was an engineer, who was interested in the development of water ways. Dr. W. J. McGee, chief of the Bureau of Soils, Washington, D. C., followed with an address on the "Conservation of the Water and Woods," calling this the most important subject now before the people. The country began with a revolution in which there was war, but it is now time for a great revolution without war, in which there shall be an awakening of a moral sense of obligation for the preservation of natural resources. One of the losses confronting the people of the United States is the loss of ground water. Too much flows away in torrents, because of the destruction of the forests. Instead of acting like a sponge, the earth, when stripped of its timber, sheds water like the roof of a building. The fertile soil washed away in the United States represents an annual loss of over $1,000,0000,000.

Dr. W. F. M. Goss, dean of the College of Engineering, University of Illinois, spoke upon the "Conservation of the Nation's Fuel Supply," saying that economy in its production and use is to be enforced by a four-fold process. The necessary steps are: Scientific research for the establishment of facts; practical demonstrations of facts thus developed on a scale which will convince men that there is profit, direct or indirect, in a better practice; restrictive legislation which will protect the public from the competition of unscrupulous men; and, finally, effective inspection which will secure an enforcement of law. The process cannot successfully begin with coercion; it must begin with education.

Prof. George F. Swain, of the Massachusetts Institute of Technology, Boston, presented the subject of "Stream Flow, Water Power and Navigation." The most effective way of regulating stream flow is by preservation of the forests, and this produces three effects of great importance. It conserves one of our greatest natural resources — water power; it prevents erosion of the soil, and it prevents the silting of navigable rivers and harbors, as well as of reservoirs.

The concluding address, by Dr. Henry S. Pritchett, president of the Carnegie Foundation, treated of the attitude of the engineer toward the public. Engineering has grown into a profession that must consider public interests. The practical demonstration of professional ideals lies in the use of fair judgment, a sound sense of justice, and quick appreciation of the larger public causes. The engineer not only plans, but carries out great enterprises. If he is a true member of his profession, he will, while serving loyally his employer, keep in mind the honor of his profession, the debt he owes to it and the service to the larger interests of humanity.

STREET RAILWAY PATENTS

UNITED STATES PATENTS ISSUED APRIL 14, 1908.

[This department is conducted by Rosenbaum & Stockbridge, patent attorneys, 140 Nassau Street, New York.]

884,364. Compressed-air Brake; Alfred Chandeson, Jette St. Pierre, Belgium. App. filed Nov. 26, 1907. Relates to compressed air brakes for railway trains in which a fall of pressure in the train pipe puts auxiliary compressed air reservoirs in communication with the brake cylinders in such a way that the pistons of these cylinders actuated by the compressed air from the reservoirs bring about the application of the brake shoes or blocks.

884,382. Rail Joint Truss; Robert S. Handford, Batesville, Ark. App. filed June 13, 1907. Provides a truss frame to be secured at its opposite ends to the rails at opposite sides of the joints and to pass under a pair of ties which support the rails near the joint.

884,397. Overhead Trolley; Allen P. Lord and Nathaniel Wilkins, Bradford, Pa. App. filed Jan. 11, 1907. Fixed webs or flanges on the harp which extend above the rim of the trolley wheel to serve in place of the usual guiding flanges on the wheel.

884,420. Articulated Car; Myron Rounds, Boston, Mass. App. filed Jan. 18, 1907. The adjacent ends of the sections of the articulated car are pivotally supported on a common truck extended beneath the said sections below the level of the floors thereof, while the opposite ends of the sections are supported on separate trucks.

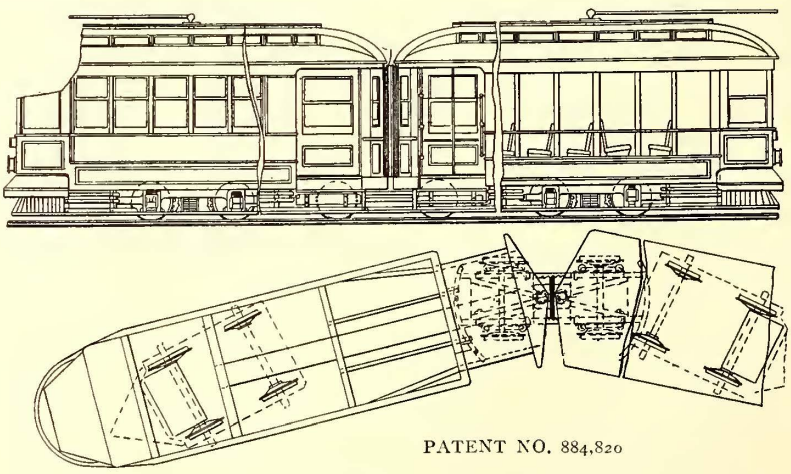
884,443. Brake Head; Charles H. Williams, Jr., Chicago, Ill. App. filed July 3, 1907. A cast metal brake head having a concaved front face provided with a pair of integral lugs of approximately inverted U-shape, said lugs being spaced away from each other, and reinforcing webs bridging the space between the lugs.

884,444. Brake Beam; Charles H. Williams, Jr., Chicago, Ill. App. filed Nov. 15, 1907. Comprises an end casting extending over the end of the brake beam and having a portion capable of being notched at different points so as to impart different throws to the brake head, and a brake head provided with a rigid lug or projection that enters the notches in the end casting.

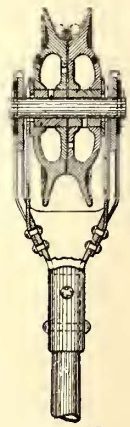
884,517. Conduit Electric Railway; Lewis W. Musick, Crescent City, Cal. App. filed Aug. 9, 1906. Has specially constructed depending rollers on the car truck which engage a trolley supported in the form of a conduit beneath the track surface.

884,546. Trolley Wheel; Frederick G. Walker, Cleveland, O. App. filed May 18, 1906. The wheel consists of two longitudinally divided sections between which oil may exude from a chamber within the wheel, so as to keep the tread lubricated.

884,594. Scenic Railway; Gaston Lacomme, New York, N. Y. App. filed Feb. 7, 1908. Passenger cars are carried along a track toward and apparently into some set piece of scenery or illusion, before encountering which, however, the track is tilted by the weight of the car, so that the latter clears the illusion by plunging beneath the same.



PATENT NO. 884,820



PATENT NO. 884,546

884,630. Trolley Pole and Head; August F. Bauer, Philadelphia, Pa. App. filed Nov. 27, 1907. A fixed vertical pole on the car roof carries a pair of pivoted arms which are spring impelled toward one another and have trolley wheels thereon.

884,644. System for Electric Railways; Arthur C. Eastwood, Cleveland, O. App. filed Sept. 16, 1907. A control conductor arranged along the track and divided into insulated sections of such length that two trains cannot be operated upon the same section at the same time.

884,645. System for Electric Railways; Arthur C. Eastwood, Cleveland, O. App. filed Feb. 3, 1907. Each train is provided with its own electric power-generating plant, preferably located on a car at the rear of the train. A number of cars in the train are provided with electric driving motors and are supplied with power from the power plant, the motors being controllable from a single point.

884,646. Electric Railway; Arthur C. Eastwood, Cleveland, O. App. filed Feb. 23, 1907. Improvements on patent 884,644. Provides means whereby neighboring sections of the control conductor will be automatically coupled together while a train is passing from one section to the next and will be automatically uncoupled when the transition from one section to another is completed.

884,683. Car Fender; John F. Risdon, Seattle, Wash. App. filed Nov. 1, 1907. Details of construction.

884,684. Trolley Harp and Wheel; Edward D. Rockwell, Bristol, Conn. App. filed June 1, 1906. The harp has square journal boxes in which the bearings of the wheel are removably mounted. Special lubricating features for the wheel and spring blades to establish good contact between the wheel and journal boxes.

884,694. Air Brake; William A. Weant, Mocksville, N. C. App. filed Jan. 28, 1908. Provides a brake cylinder in which the usual piston head and packing are dispensed with, to thereby prevent leakage and render the brake more efficient in operation.

884,717. Movable Point Crossing; Warner B. Cooke, Jenkintown, Pa. App. filed April 26, 1907. Relates more particularly to a special construction of switch point.

884,737. Signaling System; Edward E. Kleinschmidt, New York, N. Y. App. filed March 7, 1906. A track signal with two circuits directly controlling and setting said signal, and a switch comprising rotatably mounted figures, and means to position said figures to close the corresponding circuit to set the signal at danger or safety.

884,736. Signaling System; Edward E. Kleinschmidt, New York, N. Y. App. filed Sept. 1, 1906. Selective switches are included in a single line circuit and are only set by the controller at the despatcher's office, instead of being both set and cleared as in previous systems. When a given signal is set the motorman receives his instructions by telephone and manually clears the signal when told to do so, provision being made to advise the despatcher when the track signal has been cleared.

884,750. Trolley; Louis C. W. Mitchell and John A. Fretz, Philadelphia, Pa. App. filed March 27, 1906. The harp is swiveled on a vertical axis at the top of the pole by a ball bearing connection.

884,783. Signal System for Railways; Maximillian G. Voigtlander, Harrison, O. App. filed Aug. 9, 1906. A signal alarm system for use with an installation in which contacts on the car make periodical contacting engagement with conductors along the track.

884,784. Signal System for Railways; Maximillian G. Voigtlander, Harrison, O. App. filed Aug. 9, 1906. Modifications of the above.

884,788. Semi-convertible Car; William S. Wright, Newark, O. App. filed Nov. 7, 1906. Relates to the storing of the windows.

PERSONAL MENTION

MR. FRED W. SMITH, of Chicago, has been elected a director of the Metropolitan West Side Elevated Railway, of Chicago, to succeed Mr. Byron L. Smith, resigned.

MR. C. F. BURNS has resigned as a director of the United Traction Company and the Hudson Valley Railway Company, controlled by the Delaware & Hudson Company.

MR. G. DOUGLAS WINNE has been appointed joint agent, in Albany, of the express department of the Schenectady and United Traction Electric Express Companies, which have been consolidated under one management.

MR. SAMUEL M. CURWEN, who has been second vice-president and general manager of the J. G. Brill Company, has been elected first vice-president of the company, to take the place made vacant by the death of Mr. John A. Brill.

MR. ROBERT C. PRUYN, president of the Consolidated Car Heating Company, and Mr. Francis C. Green, general manager, have declined re-election to their offices in the company. Their successors will be elected at the annual meeting in June.

MR. L. H. McCRAY, superintendent and electrical engineer of the Sterling, Dixon & Eastern Electric Railway Company, of Dixon, Ill., has been appointed assistant general manager of the Atlantic Shore Line Railway, and will make his headquarters at Kennebunkport, Me.

MR. BLAKE A. MAPLEDORAM has resigned as chief engineer of the Coöperative Construction Company, owing to the cessation of work by that company on the Chicago-New York Electric Air Line. Only a few miles have been built in the neighborhood of La Porte, Ind.

MR. HOSMER BUCKINGHAM PARSONS, president of the Wells, Fargo & Company's Bank, and director in the Knickerbocker Trust Company and other financial corporations of prominence, is dead. Mr. Parsons was also a director of the Augusta-Aiken Electric Railway Company and the North Augusta Electric & Improvement Company.

MR. W. O. WOODWARD, division passenger and freight agent of the Ohio Electric Railway at Dayton, Ohio, and Mr. J. O. Larson, division passenger and freight agent at Springfield, Ohio, have resigned and the positions have been abolished. As previously noted, Mr. F. A. Burkhart has been appointed assistant general passenger and freight agent with headquarters at Lima and Toledo.

MR. R. W. HARRIS, general superintendent of the Joplin & Pittsburg Railway, Pittsburg, Kan., has been appointed general manager of the company, to succeed Mr. P. P. Crafts, resigned. Mr. Harris formerly was general manager and purchasing agent of the Illinois Light & Traction Company, at Streator, Ill., resigning last December to become general superintendent of the Joplin & Pittsburg Railway.

MR. MARTIN ACKERMAN, heretofore superintendent of the Youngstown & Ohio River Railroad, at Salem, Ohio, has been appointed general manager of the Springfield & Xenia Railway, Springfield, Ohio, to succeed Mr. R. R. Strehlau, resigned. Mr. Ackerman formerly was trainmaster of the Lake Shore Electric Railway, from which he resigned Jan. 1 to become superintendent of the Youngstown & Ohio River.

MR. WILLIS A. HOLDEN will succeed the late Mr. Albert K. Hiscock as treasurer, and Mr. Fidelio K. Hiscock will succeed him as director of the electric railways owned by the Beebe interests. At a special meeting of the Auburn & Syracuse, the Rochester, Syracuse & Eastern, and the Syracuse, Lake Shore & Northern Railway Companies, Mr. Holden was elected treasurer of each of the companies, and Mr. Hiscock director, to succeed his brother.

MR. EDGAR H. HYMAN, who has been appointed general manager of the Electric Package Agency, of Cleveland, Ohio, has been connected with the company since June, 1898, a few months after its formation to operate over the lines of the Lake Shore Electric Railway and other properties of the Everett-Moore syndicate. Since that time Mr. Hyman has been in continuous service with the company, holding successively the positions of assistant auditor, auditor and treasurer. Since April 1, 1908, he has been general manager of the company, succeeding the late Mr. Charles A. Kenworthy. Mr. Hyman still retains his position as treasurer and auditor.

MR. A. H. HAYWARD, vice-president, and Mr. Joseph E. Wayne, general superintendent of the York Railways Company, have resigned from the company and will retire from their positions on May 1. Mr. Hayward was general manager of the York Street Railway Company, having held that position until Brown Brothers & Company secured a controlling interest. He was succeeded by Mr. David Young, Jr., and given the office of vice-president, which he has since held. Mr. Wayne came to York from San Francisco, and for two years has been superintendent of the York Railways Company. He will now assume the position of general manager of the Waynesboro, Greencastle & Chambersburg Electric Railway system.

MR. HORATIO A. FOSTER, resident engineer in Baltimore for L. B. Stillwell, has been transferred to the New York office. He will still continue to look after the work in Baltimore, spending such time there as may be necessary and sharing this supervision with Mr. H. S. Putnam in the electrical work and with Mr. John Van Vleck on the steam end. Mr. Foster has been in charge of the work in Baltimore since it was started a year and a half ago, and has carried through to completion the many additions and changes made to the power plant of the United Railways & Electric Company under its contract with Mr. Stillwell. This included the construction of a power station at Bay Shore, a new summer resort, and of a new substation in the central part of the city; an addition to one of the outlying substations; the rearrangement and reinforcement of three existing substations and the reconstruction of the Pratt Street power station. During this period of building the operation of the power plants also came under his supervision and the forces were all thoroughly reorganized by him.

NEWS OF THE WEEK

CONSTRUCTION NOTES

Items in this department are classified geographically by States, with an alphabetical arrangement of cities under each State heading.

For the convenience of readers seeking information on particular subjects, the character of the individual item is indicated as follows:

* Proposed roads not previously reported.
o Additional information regarding new roads.
† Extensions and new equipment for operating roads.

Numerals preceding these signs indicate items referring to:

1. Track and roadway.
2. Cars, trucks and rolling stock equipment.
3. Power stations and substations.
4. Car houses and repair shops.
5. Parks and amusement attractions.

3†ENSLEY, ALA.—The Birmingham Railway, Light & Power Company has recently completed a new substation in Ensley. The station contains a rotary converter, also a transformer and switchboard for the regulation of the lighting system of Ensley and Wylam.

†ARGENTA, ARK.—The City Council has passed an ordinance granting an extension of time to the Argenta Street Railway Company, and the one providing for the opening of Willow Street from Washington to Eighth Street.

1†PASADENA, CAL.—The Pacific Electric Company is double-tracking its system in Pasadena at a cost of between $50,000 and $60,000. It is expected that the work will be completed within 60 days. The district being improved is between Broadway and Pasadena Avenue on Colorado Street and Vineyard and Union Streets on Fair Oaks and Raymond Avenues. Construction at present is in progress on Raymond Avenue.

1†PETALUMA, CAL.—It is reported that the Petaluma & Santa Rosa Railway Company is now planning to extend its electric railway to Healdsburg, thence through the Dry Creek Valley and on over to Cloverdale.

oREDLANDS, CAL.—The organization of the Yucaipa & Oakglen Railroad was effected here on April 14. The company will construct at once an electric railway from Redlands to a new colony established in the Yucaipa, seven miles distant. By fall the road will be completed to Oakglen, 22 miles from Redlands, and eventually will be extended to Beaumont and San Jacinto, to which points preliminary surveys have been completed. The officers elected are: President, J. F. Neeland, of Los Angeles; vice-president, C. S. Chestnut, of Redlands; treasurer, M. N. Newmark, of Los Angeles. The officers, with W. D. Larrabee, of Los Angeles, and A. P. Maginnis, of Los Angeles, form the board of directors.

1†SACRAMENTO, CAL.—It is understood that the $250,000 necessary to build the Marysville and Colusa branch of the Northern Electric Railway has been raised and work will begin within a few weeks. As soon as this work is well under way it is said work will begin on the extension of the road north to Red Bluff and Redding, probably on the west side of the Sacramento River.

†SAN FRANCISCO, CAL.—The Presidio & Ferries Railway Company has been granted a temporary permit by the Board of Supervisors to install overhead street railway service on seven blocks of Larkin, Vallejo and Franklin Streets, pending the advertisement and award of a franchise over the route expiring Dec. 10, 1913.

1†SAN FRANCISCO, CAL.—A new electric railway line to be known as the Jackson and Sutter Streets system is soon to be opened by the United Railroads. The route of the new line will be from Presidio Avenue on Jackson Street to Fillmore to Sutter, thence to the ferry via Market Street. The cars of the Jackson and Sutter Streets line will run on Sutter Street in conjunction with the cars of the Sutter and Sacramento and Sutter Streets line.

4†BRIDGEPORT, CONN.—It is expected that ground will be broken next week for the new car house to be erected by the Connecticut Company on Congress Street. It is estimated that the new structure will cost $500,000.

1†ROCKVILLE, CONN.—The first car over the new Stafford & Rockville Electric Railway left Rockville for Stafford Springs at 1:35 p. m. on April 17. Officials of the Connecticut Railway Company made the trip for an inspection of the road. The party included Manager Bristol, Superintendent Nettleton, Engineer Sumner and a number of other officials connected with the company. The new road is about 12 miles long, and regular cars were operated over the new line on April 20. It is expected that the running time will be 45 minutes.

1†ATLANTA, GA.—The Georgia Railway & Electric Company has ordered 300 poles for use on the Buckhead line, an extension of the Peachtree-Brookwood line. G. W. Brine is the general manager of the company.

†BELLEVILLE, ILL.—The Southern Illinois Traction Company is negotiating for the laying of a double track on South Spring Street from Fifth Street to Main Street with Hoeffken Brothers, the contractors who are paving the street. The company was granted a franchise several months ago for the construction of an electric railway through Bellville. The road is to enter along the right of way of the Illinois Central Railroad from the west, and the plan is to eventually build it southward to Cairo.

oEAST ST. LOUIS, ILL.—J. T. W. Rudisell writes that practically all the right of way and franchises have been secured for the electric railway which the Woodriver, East Alton & Bunker Hill Traction Company proposes to build between Woodriver, East Alton, Bethalto, Moro, Bunker Hill, Gillespie and Litchfield. The distance traversed by this line will be about 60 miles. Mr. Rudisell states that the company is planning to use the overhead trolley system, also to locate its power station and repair shops at Bethalto. In addition he says that power for lighting and other purposes will be furnished to towns along the route. The company is capitalized at $250,000, and its officers are as follows: J. T. W. Rudisell, president; R. A. Mavey, vice-president; S. B. Knepper, secretary; R. M. Smith, treasurer; Rude Engineering Company, engineers. The above officers are all residents of East St. Louis, Ill.

oSPRINGFIELD, ILL.—The Secretary of State has issued a license to incorporate the Woodstock & Sycamore Traction Company. The principal office is in Chicago and the capital stock is $1,000,000. The road is to be constructed from Woodstock, McHenry County, through the counties of McHenry, Kane and DeKalb to Sycamore, DeKalb County. The incorporators and directors are Clinton G. Lumley, E. C. Spinney, Irving V. Stephens, E. B. Harang, S. H. Rhodes, William L. Abbott, George W. Lyndon, George T. Goodrow, Henry P. Heiser, N. G. Schmitz and Charles A Spenny.

1†CONNERSVILLE, IND.—The officials of the Indianapolis & Cincinnati Traction Company announce that preparation is being made for the closing of the gap between Connersville and Hamilton, Ohio. The survey is now being made, and it is the intention to begin grading as soon as possible. The estimated cost of constructing the extension is $250,000.

5†DECATUR, IND.—It is said that the Fort Wayne & Springfield Railway Company will establish a park in the Sheiman woods, six miles north of Decatur, and equip it with swings, merry-go-round, bowling alleys and other amusement features.

oEVANSVILLE, IND.—We are advised by C. H. Battin that the Evansville Terminal Railway Company, incorporated on March 7, 1908, to construct an electric railway from Evansville to Newburg, will probably let the entire grading contract shortly. It is expected to start construction work May 1. It is to be a standard gage road and will be approximately 9 64 miles in length. Mr. Battin states that it is proposed to install the overhead trolley system, but no arrangements have been made in regard to the location of the power station. The company has an authorized and issued capital stock of $200,000, and on April 15 mortgaged all of its property to the American Trust & Savings Company to secure an issue of $300,000 5 per cent gold bonds. The officials of the company are as follows: A. F. Hayes, Evansville, president; A. P. Lahr, Evansville, vice-president; James V. Rush, Evansville, secretary; J. M. Andrews, Louisville, Ky., treasurer.

oGARY, IND.—The Gary Electric Railway Company has purchased a number of cars of the Danville Car Company, of Danville, Ill. The officials inspected the cars last week and were taken on a trial trip from Danville to Champaign in the cars purchased by the company.

*SOUTH BEND, IND.—The South Bend & Logansport Railway Company has filed articles of incorporation with the Secretary of State. The initial capital stock is $10,000. The object of the company is to survey, locate and acquire the right of way and construct and operate an electric railway from South Bend to Logansport, a distance of 70 miles. The directors are Allixis Coquillard, Thos. P. Moredock, H. C. Onell and P. J. Hanlihan.

oTERRE HAUTE, IND.—The City Council has decided to require a deposit of $15,000 of the Grand Central Traction Company, now asking for a franchise to enter the city with its Bloomington-Terre Haute branch, as a guarantee that work would be begun and completed within a reasonable time, and that the contract should contain a clause providing that the company shall not sell out.

oFORT DODGE, IOWA.—The business men of Fort Dodge have agreed to raise $100,000 to aid in the construction of the interurban railroad to be constructed by the Spirit Lake, Emmetsburg & Fort Dodge Railroad Company. It is believed that they will subscribe for stock in the company to the above amount rather than to make a gift. There is also a scheme on foot to have the citizens of Fort Dodge vote a tax of 5 per cent in aid of the construction of the line, although the officials of