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ELECTRIC RAILWAY JOURNAL

The Virginian Railway

Progress

The Virginian Railway Company, already noted for its progressive tendencies towards the use of the largest cars and locomotives, and the handling of the heaviest possible tonnages, has advanced still further in this direction by the electrification of 213 track miles of its lines with the—

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The equipment, which has been ordered in its entirety from the Westinghouse Electric Co., will enable the Virginian Railway to concentrate 20,000 hp. to move their heavy trains up the mountain grades at 14 miles per hour.

Westinghouse Electric & Manufacturing Company
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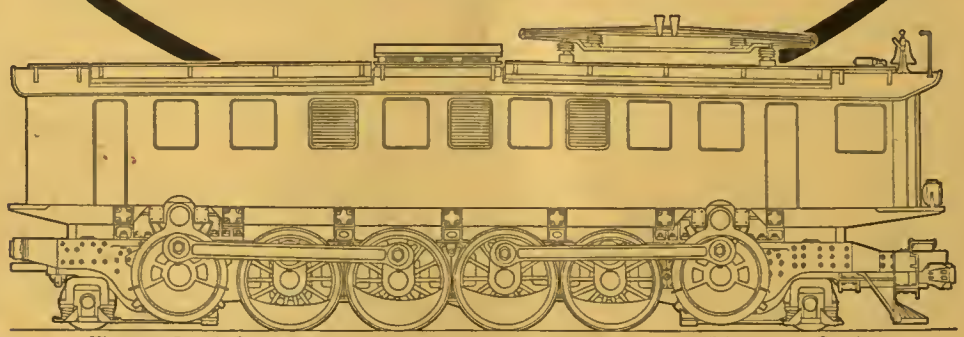

Type of Single-Phase Motive-Power Unit to be built for the Virginian Railway

Westinghouse

Vol. 61, No. 23 New York, June 9, 1923 Pages 949-990

ELECTRIC RAILWAY JOURNAL

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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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

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Number 23

The Double-Deck Vehicle Has Its Limitations

A COMPARISON of the street space occupied by street cars and buses, as determined for British and American designs, is given in the report of Daniel L. Turner, consulting engineer to the New York Transit Commission, abstracted in this week's issue. Mr. Turner states: "With us, the policy of carrying standing passengers to the limit has resulted in a type of vehicle most extravagant in the use of street space." He argues that it is time to change this policy and compel the production of a type of car that will utilize the roadway space more economically, such as the New York Railways double-deck car.

There is no question that a given area divided between two floors takes less ground space than with a single floor. While space must be reserved for stairways, more usable area can, in general, be obtained by double-decking, so that more seats, or more standing room, or both, can be provided in a double-deck design. Those who are familiar with the New York double-deck car, however, may take issue as to this being a desirable type for general use with frequent stops in congested streets.

The real limitation in two-story designs is in getting people in or out. Considerable difficulty is encountered in nearly all the designs, as only a limited amount of space can be allotted to doors and stairways. There is a limit to what the car patron will stand for in boarding and alighting time—the standing time of the car at stops. Each passenger wants to get off without delay at his stop, and those desiring to get on do not want to wait until the others are off. A more or less definite time per passenger is required, dependent on the design of doors, stairways and steps.

The speed of vehicle movement is limited very distinctly by the time consumed in this way in loading and unloading. Our British cousins, more leisurely in their habits, do not object to the use of a little extra time, while the same thing would bring vociferous protests in this country.

Then, too, it is possible in Great Britain to limit the number of passengers on a vehicle to its seating capacity. By this means there is no crowding about the doors, with the attendant confusion and congestion. Some few American systems have tried the "car full' method, but it never has been popular, and where adopted it has been impossible to prevent passengers from disregarding it almost at will. In the few cases in this country where double-deck buses have been used for so-called de luxe transportation, with the carrying capacity limited strictly to the seats, no difficulty has been encountered.

The passenger capacity figured by Mr. Turner for a double-deck open-top vehicle is based on the seats being available at all times. Experience in this country shows that passengers will not ride on an open upper deck in bad weather, so that as an all-year proposition this figure for seating capacity does not give a fair comparison with inclosed single-deck designs.

Neither the square feet of ground space per seat nor the length occupied in the traffic stream gives a fair comparison of congestion on the street produced by various types of vehicles. With a double-deck design the running time undoubtedly is increased on account of delays due to the time used by passengers climbing the stairs, and by the greater number of persons who must use the limited door space. And the standing of cars tends to increase the traffic congestion.

If the element of time were introduced into Mr. Turner's factor, the comparison would not be so much against the single-deck design in the matter of congestion.

Surface Car Subways Not an Economic Advantage

AN IMPORTANT question of economic feasibility is raised by the discussion in Detroit, Chicago and other cities of building subways for the use of the street cars in the congested business districts. If this is done, it will be for the sake primarily of relieving surface traffic congestion and to speed up service somewhat, and not because it makes a saving in the cost of transportation.

For normal surface roads the investment varies between $2 and $5 for each dollar of annual revenue, while for rapid transit lines it may be as high as $10. A few subway lines show an even higher investment.

With $3.50 invested per dollar of annual gross business and a 7 per cent rate of return, 24½ cents out of each dollar of gross must be paid out for the use of the capital. With $10 invested per dollar of gross and a 5 per cent return—a rate possible only on a pre-war investment or when the enterprise is financed by some governmental agency, at least for the roadway and structures—some 50 cents out of each dollar must go to capital charges.

A rapid transit line should have two advantages over the surface road to make possible the payment of the increased charges, namely, greater density of business and lower costs of operation per passenger hauled. These things, generally speaking, are inseparable. The lower unit costs possible with dense traffic come about through train operation, with few stops and small labor charges.

When a rapid transit structure, whether elevated or subway, is used for the operation of surface cars, especially when the cars are run as single units, it is not possible to crowd enough of them in, or to carry enough passengers in each of them, to keep the cost of operation sufficiently low to allow a fair return on the high investment; for as the density of business goes down the investment per dollar of business goes up. In prac-

tice, even with economies of all sorts, it has not been found possible to lower the operating ratio, including taxes, under present conditions to much less than 75 per cent for normal surface lines and 50 per cent for rapid transit lines, and this is with a fare generally higher than the traditional nickel of pre-war days. Thus each class of road is just about able to earn the permitted rate of return on its investment.

If surface cars are put into a subway and operated in the usual manner, the high operating ratio remains, as there are few economies that can be realized by virtue of this kind of operation. The result is that to operating costs of some 75 cents per dollar of gross business must be added a return on capital of nearly 50 cents. No means has yet been found to pay $1.25 out of receipts of $1, at least for any length of time. Mayor Hylan has essayed to do it, but the car rider does not realize—or care—that the taxpayer is contributing about 1 cent for each nickel paid the railway as carfare, in order to carry the interest charges on the subways.

Special conditions may arise where it is considered desirable for the good of the community to take surface cars off the streets. This was pointed out in this column last week. But it should also be remembered that it is an expensive proposition, since the diversion of the surface cars from the thoroughfares for short distances does not enable them to earn any more. True, they can get through the congested district with greater ease, and so reduce operating costs slightly, but this is perhaps offset by a loss in revenue due to the less advantageous location for short-haul riders. Passengers of this class cannot be induced to go out of their way, to or from a station, even for a few hundred feet, and the necessity to climb stairs acts as a deterrent to riding when the walking is good.

In Boston, which was referred to in last week's editorial, the street cars were taken off the surface and put in expensive subways. This was a main contributing cause leading to the increase of the fare from 5 cents to 10 cents, as it was shown in 1917 that the cost of hauling a surface car passenger was less than 5 cents, of a rapid transit passenger was 7½ cents and of a passenger on a subway-surface car 8⅓ cents. It does not follow that the same ratio will hold in the other cities contemplating subways, but there will be an increase in the cost of handling passengers. That it must be borne by some one is evident and those who urge surface car subways should realize that the railway company cannot be expected to carry the burden without some special concession in the way of increased revenue or reduced expenses.

Safety on Walkway Surfaces Is a Big Problem

THE formulation of a safety code for walkway surfaces, mentioned elsewhere in this issue, is a subject in which electric railways should have a keen interest. Great effort has been made to reduce the huge sums paid in accident claims, but the serious nature of the slipping hazard has often been overlooked. A slight danger to thousands of people is worse than a far greater danger to only one or two people. Statistics show that there is no other single hazard so serious as that of falls, and that most falls are caused by slipping. Falls are not confined to industry. On the contrary, the hazard to the general public is even more serious. In New York City, for example, it is exceeded only by that attributable to automobiles.

On an electric railway property there are many chances for people to fall. Platforms, stairs, ramps, car steps, door sills, and car floors may be safe or hazardous, depending on whether or not anti-slipping precautions have been carefully taken. It is not enough to slap down any so-called "safe walkway surface" and let it go at that. An improper stair tread, for example, may be more hazardous than no tread at all. The plan now under way to establish a national code of specifications for safe walkway surfaces, therefore, should be a big help in determining the sort of protection most suitable in any given situation.

Utility Publicity Prominent in Two Programs This Week

THIS has been a notable week for utility publicity, which at last is becoming recognized as one of the most important phases of the business of public service corporations. It is hard to realize that a few years ago some street railway managers looked upon the advertising of their facilities and even of their methods and policies as unnecessary. "What have we to advertise?" they would say. "People will have to ride on our cars whether we advertise or not, and advertising is a waste of money in these circumstances." This week the Associated Public Utilities Advertising Association held a two-day session at Atlantic City, as part of the convention of the Associated Advertising Clubs of the World, and a considerable portion of the meeting of the National Electric Light Association this week was set aside to the subject of public relations.

Undoubtedly the extension of state public utility information bureaus has had a great deal to do with the better understanding now had by utility companies of the need and proper method of public utility publicity. The first of these bureaus was started only about four years ago, but they have effectively taught the lesson that the utilities have a responsibility in the matter of publicity which they should not shirk. The burden falls on them because there is no one else sufficiently interested to do it. Some of this work can most economically be carried on through a state organization in which all of the utilities have a share, and much duplication of work which would otherwise occur is avoided, and some part can be done by the national association.

Of course the scope of a proper policy of publicity is much broader than the activities usually associated with the work of the information bureaus or that expressed by the word "advertising," unless the latter term is understood in its most comprehensive sense. Thus, the committees reporting at the first public relations session of the N. E. L. A. included those on co-operation with educational institutions, employee relations with the public, information bureau organizations, manufacturers' advertising, public speaking, relations with financial institutions and women's public information. Still, the testimony at both conventions clearly brought out the fact that any successful publicity policy must include considerable direct advertising as one of the most effective means of carrying the desired message to the public, and that this advertising should be continuous, not used only when some crisis arises in the company's affairs. In this connection it is interesting to note that W. C. Strandborg of the Portland Railway, Light & Power Company and president of the Public Utilities Advertising Association has estimated that on a minimum basis of 2 per cent of their annual gross business the four major utilities, electric railways, gas companies, light and power companies and telephone companies, should be spending about $60,000,000 a year for advertising instead of $7,500,000 as at present.

Turnback Loop Recently Installed on Purchased Property, Yonge Street Line. The Right-Hand View Shows in Greater Detail the Loading Platform on the Loop

Speeding Up Traffic in Toronto

By Judicious Spacing of Stops, the Schedule Speed Has Been Increased 4.5 per Cent in Normal Service and 10.3 per Cent in Rush-Hour Service—Other Traffic Studies Made

THE Toronto Transportation Commission has an official known as engineer of traffic study, one of whose principal duties is to study the possible needs of changes in routing because of changes in passenger movement. This official, N. D. Wilson, has a force of six men constantly in the field making periodical audits of traffic, besides an office force working up the results obtained by these checkers. His department is entirely distinct from the traffic department, whose traffic checking as a basis for car service consists largely in tabulating the loads at the peak-load points, which are mainly downtown.

The checkers of the traffic engineer, on the other hand, work mostly outside the downtown area, to determine how service might be improved and car-mileage saved by changes in routing or by turnbacks. The department also has to do with stop locations and probable extensions, and other questions arising from the street plan, or from the lack of grade separation, etc. Among its records it maintains up to date a spot population map of the city and suburbs, as well as monthly traffic charts of each line showing the growth of each relative to the growth of traffic on the whole system. Investigations as to the merits of complaints regarding the inadequacy of service from individuals or districts is handled by the traffic study department. It also advises in regard to special trackwork to be installed, in so far as the design would be affected by rerouting.

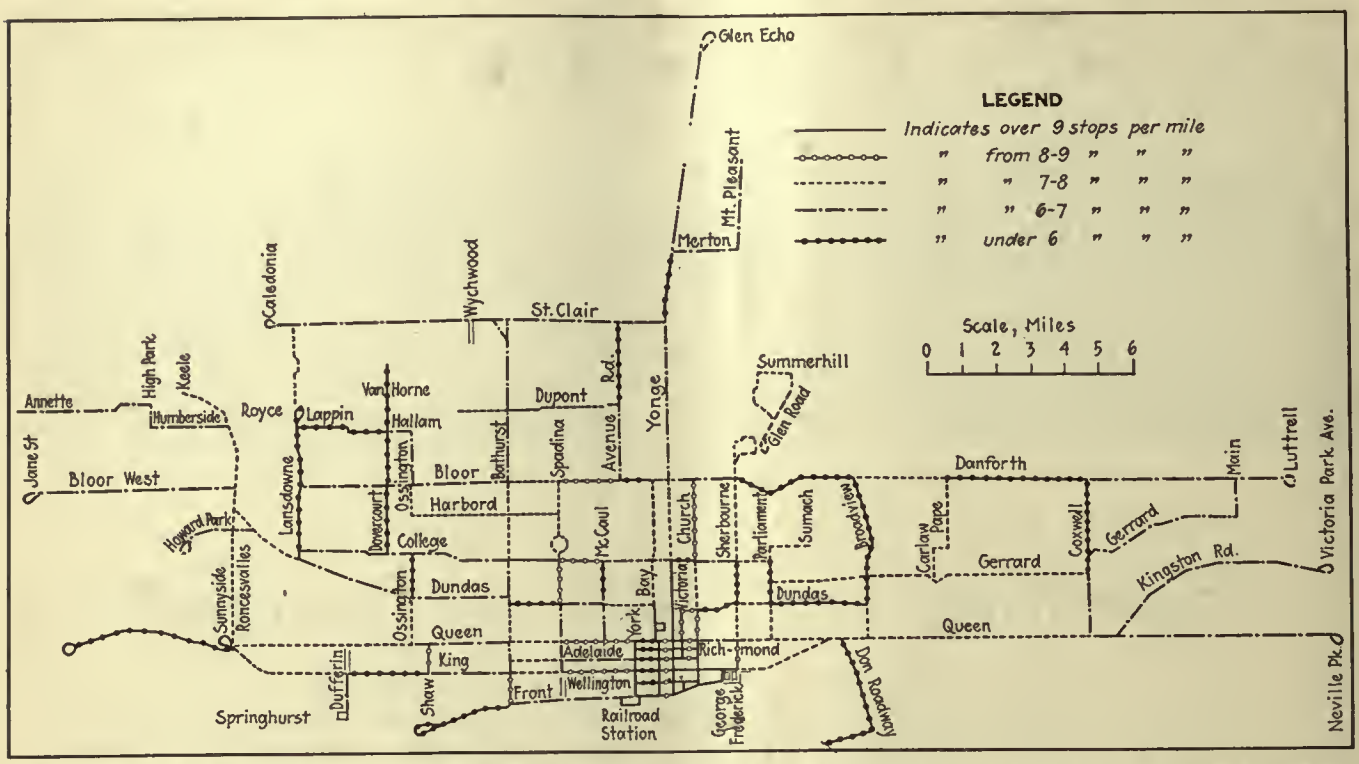
The street system of Toronto is rectangular and almost all of the streets are 66 ft. wide. This feature has at least the merit that special trackwork is standardized to an unusual degree. One great difficulty is that the cross streets do not directly cross the main thoroughfare but frequently jog 30 to 100 ft. or more, so that the cross-street traffic has to travel that distance on the main thoroughfare. It is partly for this reason that as traffic, both vehicular and street railway, has increased, endeavor has been made to develop U-shaped routes for the districts in the northeast and northwest parts of the city rather than routes which would send the passengers over the two principal north and south lines, which are overtaxed now. In this rerouting also the management has made an effort to develop certain main routes where two-car trains could be operated for most of the day.

COMPARATIVE STATEMENT OF ROUTE LENGTHS, STOPS PER MILE, AND SCHEDULE SPEEDS, TORONTO

Route	Length in Miles		Stops per Mile		Schedule Speeds, Miles per Hour Normal Hours		Rush Hours	
	Sept. 1, 1921	Jan. 11, 1923	Sept. 1, 1921	Jan. 11, 1923	Sept. 1, 1921	Jan. 11, 1923	Sept. 1, 1921	Jan. 11, 1923
Ashbridges	2.36	2.36	5.10	5.10	9.44	9.44	9.44	9.44
Avenue Road	6.90	12.41	10.30	7.90	8.62	9.80	7.96	9.08
Bathurst	8.84	9.64N		8.00N				
		12.36R	8.80	7.30R	9.46	9.98	8.84	9.76
Bloor	8.98	9.03N		6.21N				
		12.75R	8.13	6.12R	9.98	10.05	8.70	9.57
Bloor West	2.46	3.30	8.13	7.87	9.24	9.00	9.24	8.25
Broadview	5.72	12.45	9.10	6.41	9.02	10.37	8.16	9.57
Carlton	11.77	10.82	9.25	7.12	9.82	9.57	9.28	9.57
Church	6.15	6.15	9.75	8.95	8.38	8.80	8.03	8.03
Church Tripper		13.10		6.80				9.83
College	10.45	10.42	9.17	7.30	9.50	9.20	8.96	8.94
Coxwell		2.40		5.82		8.00		8.00
Danforth	6.80	See Broad.	7.50	See Broad.	9.72	See Broad.	9.72	See Broad.
Dovercourt	4.97	4.97	7.25	6.45	9.32	9.95	9.04	9.32
Dundas	10.62	10.01	8.85	7.26	9.38	10.36	8.85	9.70
Dupont	7.32	6.79	10.22	7.80	8.78	9.70	8.13	8.86
Gerrard	3.64	5.13	8.52	6.63	9.93	10.26	9.93	9.63
Harbord	10.39	10.54	7.80	7.20	10.05	10.54	9.45	9.90
Humberside (double-deck gas bus)		3.68		7.06		9.20		8.50
King	17.83	20.21	8.03	6.85	10.70	10.75	9.75	10.20
Kingston Road		3.86		6.74		9.65		8.92
Lansdowne	1.17	1.17	8.55	8.55	5.85	5.85	5.85	5.85
Mount Pleasant (trolley bus)		2.45		7.35		9.20		9.20
Pape		1.71		8.20		8.55		8.55
Queen	15.80	16.73N		7.45N				
		20.90R	8.87	7.28R	9.30	10.45	8.47	9.95
Queen Tripper		11.65		7.38				9.70
Rosedale (single-deck gas bus)		1.90		6.40		8.03		8.03
St. Clair	6.36	0.71	8.50	8.60	10.60	5.33	10.60	5.33
Sherbourne	5.88	5.88	8.68	7.65	8.83	9.05	8.61	9.05
Spadina	5.88	5.88	8.68	7.65	8.83	9.05	8.61	9.05
Winchester	3.96	3.60	9.85	7.50	8.50	9.00	7.92	8.30
Yonge	6.36		10.70		8.68		7.35	
Yonge-Scott Delcraine		12.60		7.15		10.21		8.80
Yonge-Station-Lawton		7.40		8.38		8.23		7.93
Average of all lines			8.70	7.25	9.38	9.81	8.81	9.72
				—16.7%		+4.5%		+10.3%

Note:—The average for all lines was secured by weighting the various items according to the length of route provided in normal hours, except in the case of rush hour schedule speeds, when the rush hour mileage was used.

N—stands for normal; R—for rush.

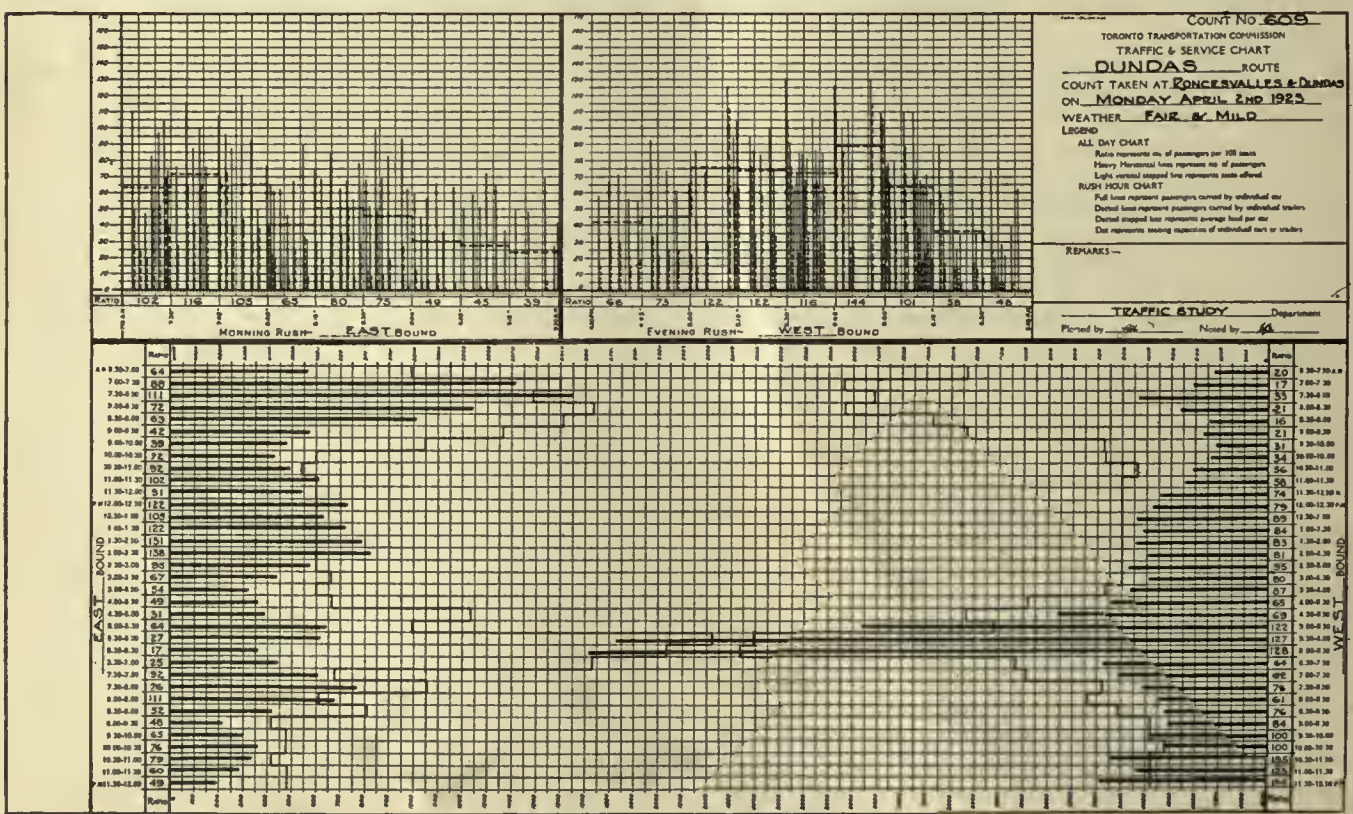


Map Showing the Layout of the Toronto Street Railway System, as of Jan. 1, 1923, with Number of Stops per Mile on Each Section

The comparative statement of route-lengths, stops per mile, etc., accompanying this article shows that the management has been quite successful in increasing schedule speed without increasing maximum speed. The chart shows the number of stops per mile in different parts of the city. In general, the aim has been to place stops in the outskirts not more than 1,000 ft. or less than 600 ft. apart, making an average of about seven to the mile. Downtown the stops are closer together.

For the system as a whole, between Sept. 1, 1921, and Jan. 11, 1923, the designated stops per mile have been decreased 16.7 per cent, while the schedule speed has so far been increased 4.5 per cent in normal hours and 10.3 per cent in rush hours.

In this same connection, since the lines of the Toronto Railway were taken over on Sept. 1, 1921, ten additional terminal and turnback loops have been installed, making twelve all told, and several more are projected.



Form Used by Traffic Study Department for Charting Traffic Service Data

The form on which the records of individual lines made by the inspectors are kept by the traffic study department is shown in the large chart on page 952. In the all-day chart, which is the lower record, "Ratio" represents the number of passengers per 100 seats, the heavy horizontal lines represent the number of passengers and the light stepped lines represent the number of seats offered.

The two upper charts show conditions in the rush hours. Here the full lines represent the passengers carried by individual cars, the dotted lines represent the passengers carried by individual trailers, the dotted stepped line represents the average load for the fifteen-minute period per motor car, and the circles represent the seating capacity of individual motor cars or trailers.

In the course of its rehabilitation of the property the commission has installed three bus routes, as shown on the map and also in the table. The bus equipment altogether consists of eight double-deck gas buses, three single-deck gas buses and four trolley buses. These buses have not yet been in operation long enough or under such conditions as to give definite figures of cost of operation, but some conclusions can be drawn. One of these is that the trolley bus shows slightly less operating cost than the one-man single-deck gas bus, and this difference, in the opinion of the management, will grow greater, as the maintenance cost of the gas bus will increase at a greater ratio than that of the trolley bus. Another conclusion drawn from the results of operation is that the two-man double-deck bus costs more to operate than a two-man trolley car.

Denver Tramway Valued at $31,330,568

Going Concern Value, Included at $4,000,000, Analyzed to Cover the Historical Development Costs, Which Have Many Phases in Denver

AFTER over two years in the hands of a receiver, during which time the Denver Tramway Company and the city of Denver have been unable to agree on a proper permanent fare, the matter is now coming up for settlement in the Federal Court.

The city of Denver is seeking to re-establish a 6-cent fare, and the company, through E. Stenger, receiver, is seeking a permanent injunction to restrain the city from enforcing its 6-cent fare ordinance of 1919, which he claims would be confiscatory. The company has operated under an 8-cent fare with 7½-cent ticket fare since March, 1921, under order of the Federal Court.

At the hearing before Special Master Henry A. Dubbs, appointed by the United States Court, A. L. Drum, consulting engineer, Chicago, submitted valuations of the property prepared on the following bases:

Present-Day Cost: Minimum amount of capital required actually to reproduce the physical property existing as of Dec. 31, 1922, derived by applying to the Dec. 31, 1922, inventory units, the prices of labor, material, apparatus and equipment which prevailed as of Dec. 31, 1922.

Three-Year Average Cost: Minimum amount of capital required actually to reproduce the physical property existing as of Dec. 31, 1922, derived by applying to the Dec. 31, 1922, inventory units, the average prices of labor, material, apparatus and equipment which prevailed during the three-year period, 1920 to 1922, inclusive.

The valuations submitted by Mr. Drum on these bases summarize as follows:

SUMMARY OF COST OF REPRODUCING AND DEVELOPING THE PROPERTY AS OF DEC. 31, 1922

Item	Present-Day Cost, Prices Current Dec. 31, 1922	Three-Year Average Cost, Average Prices 1920-1922
Total physical property	$27,330,568	$29,071,181
Going concern value	4,000,000	4,000,000
Total	$31,330,568	$33,071,181

The property covered by the valuation comprises the entire street railway system located within the corporate limits of Denver, with lines to Englewood, Aurora and Fairmount Cemetery, outside of the city limits but within the one-fare zone; and three rotary-converter substations with high-tension transmission lines leading to them located outside the city limits, from which direct-current power is sold to the interurban lines. The system consists principally of 201.7 miles of single track; lands; power distribution system, consisting of overhead trolley and feeder lines; high-tension transmission lines; cars and equipment; carhouses, general office building, shops and miscellaneous buildings; nine rotary-converter substations having an aggregate capacity of 7,000 kw., including the three substations outside the city limits; one power station with equipment having a generating capacity of 16,200 kw., and one 3,000-kw. rotary converter unit; shop equipment; tools; furniture; etc.

The presentation of the claim for "going concern value" was made by Mr. Drum generally on the basis that the Denver Tramway Company has passed through the following stages of development: (1) Construction period; (2) developmental period of construction; (3) period of unifying and creating the existing system; (4) the period of development into a successful going concern.

Mr. Drum testified that in reaching the figure of $4,000,000 for going value he had investigated the financial history of the company and ascertained the developmental cost of establishing the system as an efficient operating going concern, including the expenditures made for developmental equipment and construction, the cost of unifying the system, etc.

The report states that the developmental costs represent capital ascertained to have been prudently invested in the business, and necessarily expended in the early developmental and experimental years in overcoming initial difficulties incident to creating and developing the property of the company to its present state of efficiency. These capital expenditures were made for property during the several periods of evolution of the physical means of transportation, which property has since been superseded or abandoned, due to the development in the art of transportation. They represent capital invested in the property which has not been returned to the investor from earnings and therefore continues to be an inherent and proper part of the value of property now existing as a going concern.

Historical Development of the Tramway

The horse-car period in Denver began in 1871-1872 and continued until 1889, when all horse car lines and equipment were replaced by cable lines, with the exception of the Argo line, which was replaced by an electric line in 1900. The horse car system consisted of about 21 miles of narrow-gage track, three buildings and 110 horse cars.

CLASSIFIED SUMMARY OF THE COST TO REPRODUCE NEW THE PHYSICAL PROPERTY OF THE DENVER TRAMWAY COMPANY, AS OF DEC. 31, 1922

Division	Present-Day Cost, Prices Current Dec. 31, 1922	Three-Year Average Cost, Average Prices 1920-1922
Land and right-of-way	$1,333,456	$1,333,456
Track	5,347,255	5,745,873
Bridges, viaducts, trestles and culverts	856,231	856,662
Paving	1,412,005	1,438,403
Electrical distribution system	1,109,285	1,177,598
Rolling stock	4,445,233	4,873,867
Power station equipment	1,598,098	1,767,777
Substation equipment	303,156	342,026
Shop and miscellaneous equipment, tools, and supplies	391,514	453,373
Buildings	2,950,023	3,135,419
Furniture and fixtures	174,716	213,572
General stores	507,599	507,599
Cost of franchises	284,100	284,100
Engineering and superintendence	1,035,634	1,106,486
Administration, organization and legal expense	953,010	953,010
Taxes during construction	325,220	317,425
Interest during construction	2,763,184	2,940,799
Working capital	239,394	239,394
Cost of financing	1,301,455	1,384,342
Total physical property	$27,330,568	$29,071,181

HISTORICAL DEVELOPMENT COSTS FOR DENVER TRAMWAY COMPANY

Horse car lines	$224,825
Conduit electric lines	185,012
Cable lines	1,861,119
Initial electric development	1,431,546
Track superseded on account civic improvements	1,048,247
Total	$4,750,749
Cost to unify system	174,076
Cost of placing the physical property in successful operation	2,733,057
Total development costs	$7,657,882

Three steam motor lines were operated for a very short period and were electrified about 1890-1891.

A conduit electric system of the Short patent was constructed and operated on Fifteenth Street from Tremont to West Twenty-ninth Avenue from 1885 to 1887, but, on account of the electrical system not having been sufficiently developed at that early date, the operation was found unsatisfactory and it became necessary to abandon the conduit electric system and replace it with a cable system.

The construction of the cable lines, comprising 49.0 miles of cable track, started in 1888, and on account of the development of electric traction, the abandonment of cable lines was necessitated, 1895 to 1900, after but a short period of operation, notwithstanding the fact that over $4,000,000 of capital had been invested in their construction.

The initial development of electric traction commenced in 1890, and the early experimental stages continued until about 1903. During this period the company made five separate electric power station developments, the equipment of which was superseded within twelve years due to the rapid development in the electric art. All of the single-truck electric cars were replaced by modern double-truck cars, and 62.5 miles of track was removed and required replacement before the expiration of its useful life on account of new paving ordered by the city, or on account of the use of heavier and larger cars.

Cost to Unify and Place in Operation

The cost to unify the system, as set forth by the consultant, represents an estimate of the cost incident to creating and consolidating the thirty-one original companies into what now comprises the Denver Tramway Company, city lines only.

In addition to the cost of the component parts of the bare physical property, the cost of placing the physical property in successful operation, that is, the cost of converting the inert railway plant into a successful operating system, is an element of cost in creating a street railway system. In determining the amount of this item of cost, the fact is considered that the Denver Tramway Company is in active and successful operation and has passed through the period between the beginning of operation and the time when the business earns not only operating expenses and taxes, but also a return on the investment.

The business of the company has been built up, the service and equipment have been planned and perfected successfully to serve the business, an experienced and successful operating staff has been organized, trained and perfected in its duties, and extensions have been made into unpopulated territory requiring many years of operation before the increase in population, due to the construction of such extensions, has created traffic sufficient to pay the operating expenses and interest on the capital invested in such extensions.

This cost of placing the physical property in successful operation is estimated to be not less than 10 per cent of the cost of the component parts of the physical property.

Accrued Depreciation

The accrued depreciation of the property claimed by the engineer represents the amount of actual existing physical depreciation due to wear and use, as ascertained and determined by an inspection of the property in the field. The result of the inspection of the property indicates that the present service condition of the property is practically as good as new, and with a few exceptions such as some deferred maintenance on track, the actual existing depreciation as found does not materially affect the service condition of the property. The amount of accrued depreciation was shown as follows:

On basis of present-day cost, prices current as of Dec. 31, 1922, $2,516,563.

On basis of three-year average cost, average prices during the three-year period, 1920-1922, $2,711,533.

Metropolitan Railway Locomotive Reconstruction

Important English Railway Remodels Score of Locomotives to Permit More Efficient Handling of London Suburban Traffic

A LARGE electric locomotive reconstruction job has recently been undertaken for the Metropolitan Railway, England. It comprises the rebuilding of twenty machines, resulting in virtually new equipment.

Photo by International News Reel

Remodeled Electric Locomotive for Metropolitan Railway, England
One-hour rating is 1,200 hp. at 600 volts and 30 m.p.h.

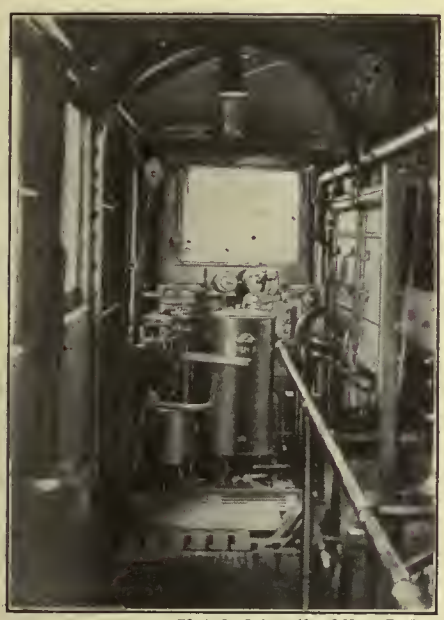


Photo by International News Reel

Engineer's Operating Position in Cab, Showing Also Some of the Control Apparatus in the Center of the Cab

The work is being done by Vickers, Ltd., the electrical apparatus being supplied by the Metropolitan-Vickers Electrical Company, Ltd. The locomotives are of simple construction, consisting of two trucks, carrying a steel cab mounted on a substantial steel underframe. This underframe takes the buffing stresses. The trucks carry each two motors, of 300 hp. capacity at 600 volts and at the one-hour rating. The one-hour rating of the locomotive as a whole is, therefore, 1,200 hp. The locomotive is provided with both vacuum and pressure brakes, the former being used in regular service and the latter for shifting purposes.

The control is of the Metropolitan-Vickers all-electric type, with automatic acceleration. All auxiliary apparatus is mounted in the center of the cab, leaving a passageway all around.

This road uses two contact rails, one for the positive and one for the negative current. The former is at the side of the track, the latter in the center. The locomotive, therefore, had to be supplied with two sets of collecting shoes. One set is connected to a positive busbar in a control cabinet at one end of the locomotive, while the other goes to a negative busbar at the other end of the locomotive.

The control is of the multiple-unit type, so that two or more locomotives can be operated from one master controller. Bus lines are also provided for connection with a power bus on the coaches, some of which are provided with auxiliary collecting shoes to insure continuity of contact with the conducting rails.

Particular interest attaches to the braking system, which is novel compared with American practice. To supply air for the pressure brakes, a compressor with a capacity of 38 cu.ft. displacement per minute, driven by an 8-hp. motor, is provided. For the vacuum brakes there are two exhausters, one to offset the effect of leaks in the vacuum train pipes and the other to provide sufficient capacity for releasing the brakes quickly. The brakes are interlocked with the motor control in such a way that current cannot be supplied to the motors unless the brakes are released. Similarly, the interlocks prevent operation of the motors unless one of the brake systems is ready for use.

The weight of the locomotive in working order is about 63 tons (2,000 lb.); its length over the buffers is 39½ ft., its length over the body is 35 ft., and its width over the body is 8 ft.

The Metropolitan Railway, the operator of these locomotives, is one of the underground railways in London.

Conductors Make Traffic Counts in Milwaukee

The Plan Has Been Found Entirely Practical Where Great Accuracy Is Not Required—Traffic Count Continues for Three Days

AT ONE TIME schedules on many roads were drafted largely by guesswork, and when once established they continued in force for a long time except for the usual seasonal and week-day variations. Now the principle is generally accepted that continuous study and revision of schedules is one of the most important duties of the transportation department, if efficiency and economy of operation are desired. This means that traffic checks frequently must be made on different lines, and the more often they are made, within reasonable limits, the better.

The general practice is to use special men for this

TRAFFIC RECORD

Conductor will look at watch and record ACTUAL TIME of leaving checking point and GREATEST LOAD on car at that point. See below for list of checking points, and seating capacity of cars.

INBOUND means toward center of town on lines running down town; southbound on 27th St. and 35th St.; and eastbound on North Ave. and Center St.

OUTBOUND means away from center of town on lines running down town; northbound on 27th St. and 35th St.; and westbound on North Ave. and Center St.

	CHECK POINT Biddle & Jackson		CHECK POINT 12th & Wells			CHECK POINT 12th & Wells		CHECK POINT Biddle & Jackson	
Car Number	Inbound		Outbound		Car Number	Inbound		Outbound	
	Time	No. of Pass.	Time	No. of Pass.		Time	No. of Pass.	Time	No. of Pass.
550	6⁰⁰ M	70	6²⁰ M	20		7²² M	75	7²⁵ M	15
	M		M			M		M	
	M		M			M		M	
	M		M			M		M	
	M		M			M		M	
	M		M			M		M	
	M		M			M		M	
	M		M			M		M	
	M		M			M		M	
	M		M			M		M	
	M		M			M		M	

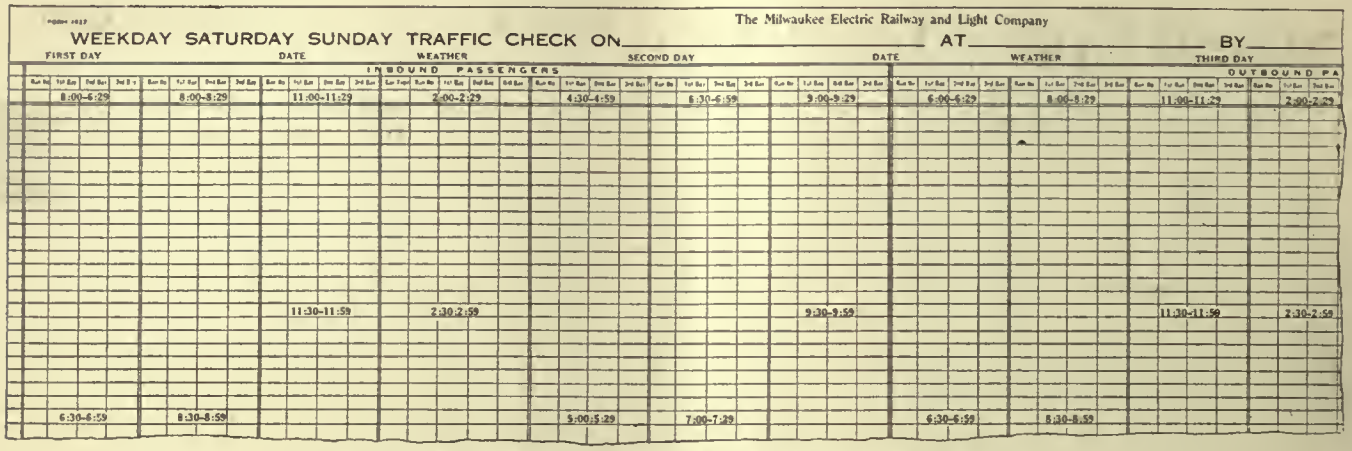
LINE	CHECKING POINT
Wells St.	12th and Wells
Downer Ave.	Biddle and Jackson
12th St.	12th and Cherry
State St.	13th and State
Clybourn St.	17th and Clybourn
Oakland Ave.	Case and Brady
Delaware Ave.	Kinnickinnic & Maple
Holton St.	Holton and Harmon
Mitchell St.	Reed and Mitchell
National	1st and National
Fond du Lac	13th and Fond du Lac
Walnut	13th and Walnut
Vliet St.	13th and Vliet

LINE	CHECKING POINT
Howell Ave.	Clinton and Maple
1st Ave.	Reed and Mitchell
3rd St.	3rd and Sherman
8th Ave.	Greenbush and Greenfield
Burnham	Greenbush and Greenfield
8th St.	7th and Germania
Muskego	11th and Walker
North Ave.	Teutonia and North
Center St.	4th and Center
35th St.	35th and Cherry
27th	27th and Prairie
North via 8th	8th and Garfield
12th Viaduct	16th and Clybourn

SEATING CAPACITY OF CARS

	SINGLE UNITS					TRAINS						
TYPE OF CAR	251 500	501 600	601 600	800 899	800 One Man	3 Truck	200–400		600–200		700–700	
							Motor	Trailer	Motor	Trailer	Motor	Trailer
STOVE IN	42	52	50	51	55	103	44	44	50	48	54	58
STOVE OUT	44	52	52	53	57	107	46	46	52	50	56	60

The Traffic Count Form Is Printed on the Back of the Conductor's Trip Sheet



The Milwaukee Electric Railway and Light Company

WEEKDAY SATURDAY SUNDAY TRAFFIC CHECK ON _____ AT _____ BY _____

FIRST DAY DATE WEATHER SECOND DAY DATE WEATHER THIRD DAY

INBOUND PASSENGERS OUTBOUND PA

8:00-6:29 8:00-8:29 11:00-11:29 2:00-2:29 4:30-4:59 6:30-6:59 9:00-9:29 6:00-6:29 8:00-8:29 11:00-11:29 2:00-2:29

11:30-11:59 2:30-2:59 9:30-9:59 11:30-11:59 2:30-2:59

6:30-6:59 8:30-8:59 5:00-5:29 7:00-7:29 6:30-6:59 8:30-8:59

The Figures from the Trip Sheet Are First Transferred to This Blank

purpose and to station them at points of maximum traffic and also at possible turn-back points to read the loadings of the cars. Obviously, unless a large force of men is employed for this purpose, observations of individual lines can be made only rarely. A better plan, in the opinion of the Milwaukee Electric Railway & Light Company, is to have the conductors make these traffic records when a count is desired. Outside checkers are used also to some extent in special cases, but a great deal of information can be obtained by the conductor's count, if the method followed is such that it is convenient for him to make them. Indeed, as he is on the car, he can survey his load and can determine the number of passengers in some respects better than an outside observer.

Back of Trip Sheet Is Used

In Milwaukee all the space and information required for the conductor in making and putting down the figures on traffic are provided on the back of the usual conductor's trip sheet, which, in this case, calls for the number of passengers on the car at the points of checking. The back of one of the Milwaukee trip sheets is reproduced with a few figures for a through line. For example, at Biddle and Jackson, inbound in the morning, the car carries seventy passengers, but going out, at the checking point on the other side of the city, the load is only twenty. In its return trip the car naturally carries a larger number of passengers at Twelfth and Wells than it does at Biddle and Jackson.

To simplify the work of the conductor, a table is printed at the bottom of the card showing the seating capacities of the different types of cars used. If all seats are filled, it is easy for the conductor to add the number of any standing passengers to the figure shown in this table as the seating capacity of his car.

It is the practice in Milwaukee to continue a traffic count of this kind for three days. The record of the three days is then transferred, with the run numbers, to a large sheet, divided into half-hour periods and with space for all of the information contained on the conductor's trip sheet. This sheet (Form 1822) measures 17 in. x 22 in. A part only is reproduced, but it is sufficient to give a general idea of the information which can be placed upon it. From this sheet a summary is made on Form 1813. Further information regarding seats and cars operated and scheduled is added in the office. From this sheet such charts are compiled as may seem desirable, either for the company's own use or the use of the Railroad Commission. As will be seen from the large blank, the record obtained by this method does not consist merely of occasional readings of cars at certain hours, but readings of all cars at two points throughout the entire day. To get this by street checkers would require at least two shifts of four men each for each day on each route observed.

Where great accuracy is required it is possible, of course, to have supervisors ride the cars and check individual runs, and this practice is quite often followed in Milwaukee, as it has been found by experience that conductors' counts of passengers are apt to be a little high, possibly from 8 to 10 per cent in a crowded car. For a great many purposes, however, such additional checking is considered hardly necessary, especially as too high a figure is on the conservative side as regards seating capacity to be furnished.

FORM 1813

The Milwaukee Electric Railway and Light Company

SUMMARY OF TRAFFIC CHECK No. _____

WEEKDAY
SATURDAY
SUNDAY

MAXIMUM LOAD CHECK OF _____ AT _____

FIRST DAY _____ DATE _____ WEATHER _____

SECOND DAY _____ DATE _____ WEATHER _____

THIRD DAY _____ DATE _____ WEATHER _____

PERIOD OF DAY	INBOUND									OUTBOUND								
	TOTAL PASSENGERS				SEATS		CARS			TOTAL PASSENGERS				SEATS		CARS		
	1st DAY	2nd DAY	3rd DAY	AVERAGE	FURNISHED	REQUIRED	OPERATED	SCHEDULED	REQUIRED	1st DAY	2nd DAY	3rd DAY	AVERAGE	FURNISHED	REQUIRED	OPERATED	SCHEDULED	REQUIRED
6:00–6:29																		
6:30–6:59																		
7:00–7:29																		
7:30–7:59																		
8:00–8:29																		
8:30–8:59																		
9:00–9:29																		
9:30–9:59																		

The Data Are Finally Summarized on This Blank

Street Space Occupied by Cars and Buses*

A Comparison of Various Types of Single-Deck and Double-Deck Street Cars and Buses in New York and Great Britain—On a Seat Basis Double-Deck Designs Show Up Well, but for American Conditions Cars Do Not Compare Unfavorably

By Daniel L. Turner
Consulting Engineer New York Transit Commission

ONE of the most interesting of all the features observed in England and Scotland was that the city transit companies are not as wasteful of roadway space in the public thoroughfares as they are in this country. In Liverpool, Glasgow and Edinburgh, and also in London, the vehicles used for city transportation, both cars and buses, were most economical in their use of roadway space. It is believed that the same conditions obtain practically throughout England and Scotland.

In order to compare the conditions in this city with those in England and Scotland, the general dimensions of about twenty buses and cars used in transporting city traffic have been analyzed. The results of this analysis are shown in the accompanying table.

British and American Street Cars Compared

First let us consider trolley or tramway cars. Eight types of cars are shown in the table. Three of these are Liverpool, Glasgow and London types; the other five are New York city cars. On the average the three British cars occupy 3.35 sq.ft. of roadway space per seated passenger, and in a single traffic stream occupy 0.46 lin.ft. per seated passenger. The New York cars, on the other hand, on the average occupy 6.39 sq.ft. of roadway space and 0.79 ft. in the traffic stream line per seated passenger. In other words, the New York city cars occupy almost twice as much street space as the English and Scotch cars.

But these average conditions do not tell the whole story. The average of the New York cars is brought down very materially by one car, No. 8 in the table. This car utilizes only 4.6 sq.ft. of roadway space and 0.56 lin.ft. per passenger. But of the most economical type in New York from the standpoint of street use there is only a single car.

A comparison of minimum and maximum types is interesting. The double-deck car in use on the London County Council tramway lines, No. 3 in the table, carries seventy-eight seated passengers, and it utilizes only 3.11 sq.ft. of roadway space and only 0.43 lin.ft. of traffic stream-line space per passenger. The New York double-deck car takes up 48 per cent more street space per passenger than the London car does, and 30 per cent more space in the traffic line. The new Brooklyn Peter Witt car, No. 7 in the table, is the most extravagant in street space on a seat basis in New York City, occupying 7.57 sq.ft. of roadway space and 0.94 lin.ft. per seated passenger. In other words, it uses 2.43 times more roadway space and 2.19 times more stream-line space per seated passenger than the most efficient London car.

A vehicle which would require no more street space per passenger than a pedestrian might be considered nearly ideal in design. A walking person requires 1.96, or say 2 sq.ft. of space. With this amount of space per individual, the crowding would be no greater than on the sidewalk of a very busy street.

Street Space Used by Buses

Now consider the question of buses. Eight buses are given in the table, two of which are used in London and the others in New York City. The most modern type of bus on the London General Omnibus Company's lines seats fifty-four passengers and occupies 3.24 sq.ft. of roadway space and 0.46 lin.ft. of stream-line space per seated passenger, comparing very favorably with the London County Council seventy-eight-seat tramway car. The single-deck London bus, No. 10, developed for street service, but not yet in general use, seats sixty passengers and occupies 3.91 sq.ft. of roadway space and 0.56 ft. of linear space per seated passenger.

The best types of buses in use in New York City do not compare unfavorably with the English buses. The most efficient utilizer of street space among the buses is the Leindorf bus, No. 16 in the table, which occupies 3.28 sq.ft. of roadway space and 0.41 lin.ft. of traffic stream-line space per seated passenger. The same corporation, I understand, is developing a seventy-seat bus, but its dimensions are not now available. The fifty-one-seat bus of the Fifth Avenue Coach Company also compares favorably with the English types. It occupies only 3.5 sq.ft. of roadway space and 0.48 ft. of linear space per seated passenger. The extravagant users of street space among the buses are the miscellaneous buses used on the city's bus lines, taking as high as 7.4 ft. of road space and 0.99 lin.ft. per seated passenger (see Mack bus, No. 13 in the table). Such a bus uses 2.38 times as much stream-line space as the London seventy-eight-seat car. Comparing it with the best bus type the corresponding figures are 2.28 and 2.15 times greater respectively.

The above comparisons are all on a seat basis, for the reason that abroad a relatively small number of passengers are permitted to stand, even during the rush hours, whereas with us the cars are designed to carry the maximum number of standing passengers during the rush hours. If 100 per cent overloads are considered as a maximum on the cars, and 50 per cent overloads as a maximum on the buses, the comparable figures would be somewhat different. Comparing the London County Council car with the new Peter Witt car for Brooklyn, and assuming 100 per cent overloads on the Peter Witt car, the figures would become for the London car 3.11 sq.ft. occupied per seated passenger as

*Abstracted from a report on European conditions presented to the Transit Commission May 9. The report also compared transit conditions in Liverpool, Glasgow, and Edinburgh, and an abstract of this portion of the report will appear in an early issue of this paper. For earlier reports on European conditions by Mr. Turner see issues of this paper for Jan. 13 and Jan. 27, 1923.

COMPARATIVE USE OF STREET SPACE BY VARIOUS TYPES OF BUSES AND SURFACE CARS

No.	Type	Length Ft.	Length In.	Width Ft.	Width In.	Height Above Top of Rail Ft.	Height Above Top of Rail In.	Seats*	Area Sq.Ft.	Sq.Ft. per Seat	Sq.Ft. per Pass. 100 Per Cent Overload	Lin.Ft. per Seat	Lin.Ft. per Pass. 100 Per Cent Overload
	SURFACE CARS												
1	Liverpool double-deck	30	2	7	4	..	...	64 { 42 up C, 22 low L	221.18	3.46	....	0.47	....
2	Glasgow double-deck	30	0	7	2	16	1	62 { 38 up C, 24 low L	215.10	3.47	....	0.48	....
3	London County Council double-deck	33	10	7	2	16	0	78 { 44 up C, 34 low L	242.50	3.11	....	0.43	....
4	Third Ave. cross-seat	43	0	8	3½	..	...	48	356.47	7.43	3.72	0.90	0.45
5	One-man	22	4	7	8	..	...	30	171.27	5.71	2.86	0.74	0.37
6	Brooklyn center-entrance	45	8	8	5½	11	0½	59	384.48	6.63	3.32	0.79	0.39
7	Brooklyn new Peter Witt	44	6	8	0	10	6	47	356.00	7.57	3.79	0.94	0.47
8	New York Rys. double-deck	44	0	8	3	12	11½	79 { 38 up L, 41 low C	363.00	4.60	2.30	0.56	0.28
	BUSES												
											Sq.Ft. per Pass. 50 Per Cent Overload		Lin.Ft. per Pass. 50 Per Cent Overload
9	London General Omnibus Co. double-deck bus	24	8½	7	1	12	3½	54 { 28 up C, 26 low C	174.95	3.24	....	0.46	....
10	London Special single-deck bus (Hickman Body Co.)	33	6	7	0	..	...	60	234.50	3.91	....	0.56	....
11	Municipal (N. Y. C.)	26	0	7	4	..	...	30	190.58	6.35	4.14	0.87	0.44
12	White bus	23	4	7	3	..	...	30	169.10	5.70	3.80	0.78	0.52
13	Mack bus	19	10	7	5	..	...	20	147.10	7.40	5.00	0.99	0.66
14	Stewart bus	15	4	6	7	..	...	17	101.00	6.00	4.00	0.90	0.60
15	Fifth Avenue double-deck bus	24	4½	7	4	13	6	51	178.78	3.50	....	0.48	....
16	Leindorf double-deck bus	25	0	8	0	..	...	61	200.00	3.28	2.19	0.41	0.27
	MISCELLANEOUS												
No.	Type	Length		Width		Height		Seats	Area Sq. Ft.	Sq. Ft. per Seat	Sq. Ft. per Pass. with Two Pass.	Lin. Ft. per Seat	Lin. Ft. per Pass. with Two Pass.
17	Packard touring	16	8	5	6	..	...	7	90.3	12.9	45.1	2.38	8.33
18	Cadillac touring	16	0	5	7	..	...	7	89.3	12.8	44.7	2.27	8.00
19	Ford touring	11	8	5	8	..	...	5	66.1	13.2	33.0	2.33	5.83
									Averages	12.97	40.9	2.49	7.36
20	Yellow taxi	14	6	5	6	..	...	5	79.8	15.9	39.9	2.90	7.25

Note 1.58 sq.ft. per standing person—crowded, but one can move through crowd.
1.96 sq.ft. per standing person—crowding no greater than on a sidewalk of a busy street.

*C, cross seats; L, longitudinal seats.

compared with 3.79 sq.ft. for the Peter Witt car, and 0.43 lin.ft. per seated passenger as compared with 0.47 lin.ft. per seated and standing passenger. In the case of the buses the corresponding figures 3.24 and 0.46 of the London General Omnibus type would be comparable with 2.19 and 0.27 respectively for the Leindorf bus. The Fifth Avenue bus figures would remain as 3.50 and 0.48 respectively, because no standing passengers are permitted.

Regulations in Great Britain require the minimum number of standing passengers, even during the rush hours, so the vehicles have been designed to carry the maximum number of seated passengers, which in turn has resulted in a type of vehicle that will utilize the minimum roadway space per passenger. With us, the policy of carrying standing passengers to the limit has resulted in a type of vehicle most extravagant in the use of street space. It seems to me that it is about time to change this policy and compel the production of a type of car that will utilize the roadway space more economically, such as the New York Railways double-deck car. Our best types of double-deck buses should be adhered to and developed for use in congestion, while the single-deck type should not be used under such conditions.

Consider other types of passenger vehicles using the streets, touring cars and taxicabs, for example, No. 17 to No. 20 in the table. On the average the touring cars occupy about 13 sq.ft. of roadway space per seated passenger, if we assume the cars to carry full loads, and approximately 2½ lin.ft. per passenger on the same assumption. But these vehicles are rarely fully loaded, and it is doubtful if their loads would average two passengers, certainly not more than three. On a two-passenger basis such cars would occupy 41 sq.ft. of roadway space per passenger, and on a three-passenger basis 27 sq.ft. per passenger, or these vehicles take up in our congested streets from nine to thirteen times as much roadway space as the most economical street car. It is such extravagant users of our streets that cause our most difficult traffic conditions.

The taxicab is worst of all, occupying approximately 16 sq.ft. of roadway space per passenger, assuming a full load of five passengers, and nearly 3 lin.ft. per passenger. The average load of a taxicab is probably not far from two, on which basis it would occupy about 40 sq.ft. per passenger, or thirteen times as much space as the most economically-designed passenger vehicle would occupy. The answer seems to be that one of the cures for our street traffic ills is to reduce the number of taxicabs and touring cars to a minimum and provide the most economical space-using type of passenger vehicle instead—double-deck cars and buses.

This study means that passengers in a touring car or taxicab are occupying the roadway space that ought to be available for the transportation of twenty-six passengers instead of two. Is there any wonder that our principal streets are congested when there are such a vast number of these two-passenger vehicles in use?

It is my judgment that a completely articulated system of uptown and downtown and crosstown 10-cent fare, seat service buses would be welcomed by a large number of people who now use touring cars, taxicabs, trolleys and rapid transit lines from necessity rather than from choice. This would take many of the extravagant space-using vehicles off the streets. In turn, by reducing the interference to surface cars, the latter would be able to provide 5-cent fare service in the interests of the people who desire to use them, or could not afford to use the 10-cent fare service. By these means, with a more extensive luxury bus service and a greatly improved surface car service resulting therefrom, everybody would be happier with their transit facilities.

New Cars for North Shore Branch Line

Reduced Weight, Low-Floor Height, Inclosed Vestibule Both Front and Rear, Are Features of New Cars for Libertyville Branch

EMBODYING many features characteristic of the latest practices in car design, the new cars recently placed in service on the Libertyville branch of the Chicago, North Shore & Milwaukee Railroad meet satisfactorily the requirements for this class of service.

The new cars are of the standard, double-truck, four-motor, curved side type, manufactured by the Cincinnati Car Company. They have a total weight of 40,000 lb., which compares with 70,000 lb. for the interurban cars replaced on this branch. The interior resembles that of the heavy North Shore cars in the Chicago-Milwaukee service. The car is divided into two sections with a toilet located on one side of the car at the dividing partition. Seats of the reversible cross-seat type, manufactured by Hale & Kilburn, of full spring construction, covered with the conventional North Shore green plush, are used in the main section of the car, while the same type, covered with a high grade of Fabrikoid, are used in the smoking compartment. Electric heating is used with thermostatic control provided by the Railway Utility Company, while Garland ventilators are used in order to insure the proper circulation of air.

A two-step entrance is made possible by the use of 26-in. wheels and a low clearance truck of the arch bar type with combination elliptic and coil spring construction. The trucks have a wheelbase of 5 ft. 4 in., and are each equipped with two 40-hp. motors and Smith-Ward automatic slack adjusters. The principal dimensions of the North Shore car are as follows:

Over-all length	47 ft. 2 in.
Length of platform	4 ft. 4 in.
Door opening	36 in.
Truck centers	28 ft. 6 in.
Width of aisle	22 in.
Width of seat	37 in.
Rail to first step	16½ in.
First step to platform	14 in.
Seating capacity	52

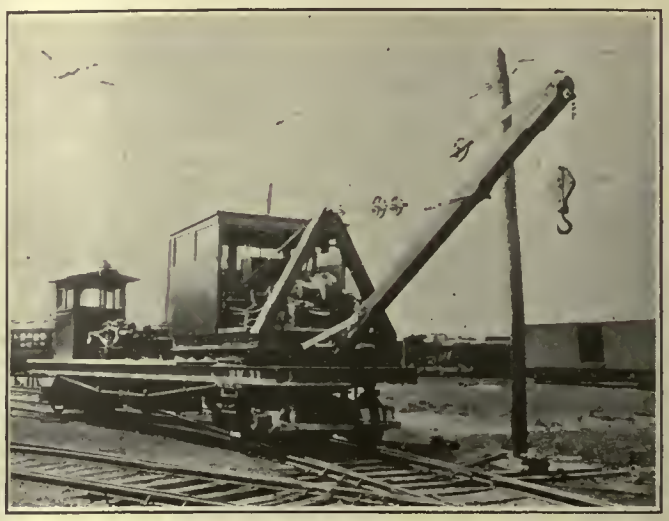
Two Compartments, Fabrikold and Green Plush Seats, Center Toilet, No Bulkheads and Platform Floors Flush with Body Floor

From the above it will be noted that the platforms are rather small, but this has been taken care of by the omission of bulkheads, thus making the car interior and platform one continuous compartment. The car has been designed for double-end, two-man operation. It is equipped with VanDorn automatic couplers and HL multiple-unit control for train operation. The car is not intended for one-man operation nor is it equipped with safety appliances.

The Libertyville branch, as it is known, connects the town of Area with the main line of the Chicago, North Shore & Milwaukee Railroad at Lake Bluff, passing through the towns of Libertyville and Roundout en route. Service is maintained on a thirty-minute headway, it requiring twenty minutes to make the run. Co-ordination of the schedules makes it possible to connect with the through trains for Chicago or Milwaukee at Lake Bluff. In this distance of 8.6 miles

40,000-Lb., 47-Ft., Fifty-two-Passenger Car for Branch Line Service

The Clamshell Is Used with the Long Boom



The Short Boom Has a 10-Ton Lifting Capacity

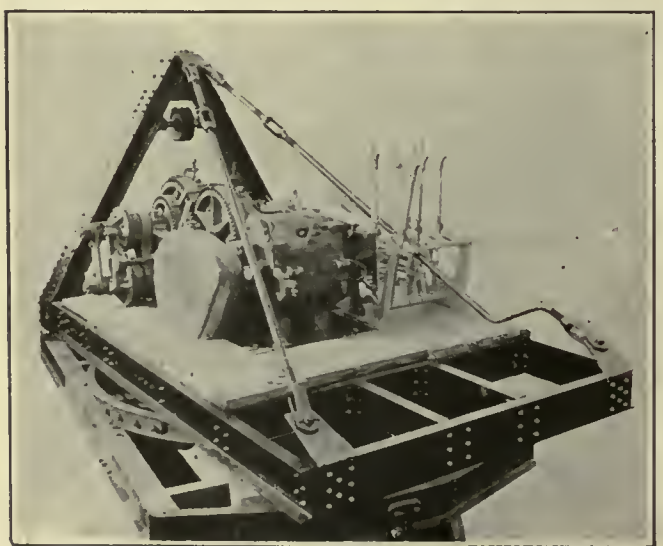
there are seventeen station stops. A schedule speed of 25 m.p.h. with a maximum speed of 40 m.p.h.. is provided.

There has been no change in service with the installation of the new cars, the only saving incurred by the investment being the saving in power and perhaps in maintenance. To provide patrons with an up-to-date, high-grade new car has been the main object of the company in making this installation.

Crane Car Has Interchangeable Hoisting Booms

Heavy Framework Is Feature of Crane Car Built by Buffalo & Lake Erie Traction Company—Attachments Add to Its Utility

SEVERAL departures from customary practice are embodied in the design of a crane car which has been built at the East Twelfth Street shops, Buffalo & Lake Erie Traction Company, Erie, Pa. This car is equipped with two wooden booms which are interchangeable, the shorter being 18 ft. in length and the longer one 35 ft. Both booms have the same general 12-in. x 12-in. cross-section, but the 18-ft. boom is made of long-leaf yellow pine, whereas the longer is of spruce.



The Carriage for the Crane-Operating Mechanism Is Made of 8-In. I-Beams

The car, which is 45 ft. long, has a frame of 10-in. I-beams with 8-in. intermediate sills. Archbar trucks with a 6-ft. 6-in. wheelbase were built at the company's own shop. Four GE-204 motors are used with K-34 control. The carriage for the crane-operating mechanism is composed of 8-in. I-beams and channels, with an A-frame at one end, as shown in an accompanying illustration.

The hoisting mechanism consists of a K-12 controller and one GE-80 motor geared to a drum. On the rear of the carriage is a counterweight of 8,000 lb. With the 18-ft. boom at an angle of 60 deg. the lifting capacity of the crane is about 10 tons. A clamshell of ½ cu.yd. capacity and a bucket of the same size for handling brick add greatly to the utility of the crane. The cost of construction was approximately $8,000, including labor and material. All second-hand material used was charged at market prices.

Reading Transit's Carsonia Park Rehabilitated

THE Reading Transit & Light Company, Reading, Pa., owns Carsonia Park, a popular summer amusement and picnic resort near the city, reached by the company's city lines. The company has newly leased the park site and has made preparations for handling a large increase in traffic this season. That this expectation is reasonable is indicated by the fact that on Sunday, May 6, the park attendance was greater than on any previous day, despite the fact that the regular amusement season had not yet begun. The company has refitted thirty summer cars in addition to its regular service and has built new stations and tracks at the park.

The Metropolitan Edison Company, which supplies power to the park and railway, has erected a fireproof substation near the park, 31 x 99 ft. in size. This will normally be fed by a 66,000-volt transmission line from the West Reading power plant of the Edison company, but will have other power connections to safeguard it against interruptions to service. This substation will also supply power to the communities of Mount Penn, Pennside, Stony Creek, Reisston, Jacksonwald and St. Lawrence.

Engineer Recommends Enlarging Platforms to Permit Double Doors—Would Equip Present Single-Truck Cars with Air Brakes and Safety Devices and Operate with One Man—Principal Objection to Them Is Overcrowding—Rescheduling Would Decrease Standees 60 per Cent—Various Ways of Improving the Service Are Suggested

Proposed Service Improvements in New Orleans

IMPROVEMENTS in service are considered in Section 4 of the report by John A. Beeler, for the city of New Orleans, on the local transportation situation. The section deals first with equipment. It is shown that two types of equipment are in general use here. These comprise 320 large double-truck cars averaging fifty seats, 330 smaller single-truck cars averaging thirty seats and forty-two trailers averaging sixty seats. Of the 320 large double-truck cars 100 are new and are equipped with double folding doors at both front and rear, affording quick loading and unloading facilities. The engineer comments that the doors of the other cars should be similarly arranged as rapidly as possible.

In connection with the small cars, the report states that much prejudice exists against these due to the high steps and narrow entrances and exits, but mainly because of heavy overloading. Checks and counts made show that during periods of heavy traffic loads of ninety to one hundred passengers were frequently encountered, where half as many would have made a full load. The arrangement of entrances and exits is bad. The platforms should be extended and lowered and the door capacity increased to permit flow in and out simultaneously. Equipped with air brakes, automatic door control and with modern automatic safety devices, an efficient one-man safety car would result. The outlay would be about one-fourth of what new safety cars would cost.

This type of car, rightly used in its proper sphere, would be a great advantage to the service. Trainmen need have no fear of losing their positions, as the engineer comments he has yet to find a single instance where safety cars have been used that it was necessary to discharge trainmen from the service. In fact, they will probably benefit, as operators of the one-man type car are usually paid a higher wage.

Of the trailers, the report states that those now in use are an obsolete type and should be replaced with modern cars at the earliest possible date. There are excellent opportunities on the heaviest lines where the street traffic is heavy for the employment of lightweight, inclosed type modern trailers, seating sixty to sixty-five. Their use will more nearly assure seats for all passengers than any other practical method. They will reduce maintenance costs, power consumption and accidents.

It is suggested that, with its climatic conditions, New Orleans is an ideal place to use double-deck trailers. In fact, with the wide gage, a low-hung type with inclosed upper deck is feasible. Such an arrangement would make possible a seating capacity of 100 to 125 per car, which would forever put at rest the seat question on all lines where trailers could be used.

Trailers are proposed for use on the St. Charles, Tulane-St. Claude and Canal Street lines. Seventy-five modern trailers would relieve an equal number of motor cars seating fifty-two passengers and at the same time increase appreciably the seats furnished. A trailer car-hour will cost to operate about $1.25 per hour less than for a motor car. This item alone would make a saving of $300 a day on these three lines.

The report also recommends a redistribution of equipment among the various lines in order to place each type of car in service under traffic conditions where it will most nearly provide the ideal service. The larger cars are specified for use where a combination of both good frequency and capacity is required. The small cars with their light weight and quicker acceleration are specified for use where the traffic is lighter, but where the frequent headway possible with their use will induce travel and reduce overcrowding. By this plan the headways will be, in general, increased on all of the important routes.

TABLE I—PRESENT AND PROPOSED SERVICE STANDARDS IN NEW ORLEANS

Cars	Car-Miles		Seat-Miles		Car-Hours		Car-Miles per Car-Hour	
	Present	Proposed	Present	Proposed	Present	Proposed	Present	Proposed
Large...	19,562	28,814	999,352	1,498,328	2,158	2,864	9.06	10.06
Small...	24,977	14,588	720,780	437,640	2,767	1,498	9.02	9.75
All.....	44,539	43,402	1,720,132	1,935,968	4,925	4,362	9.04	9.96

Similarly, schedules are to be improved through the straightening of routes, elimination of unnecessary stops, reduction of congestion and by taking slack out of present schedules, which are considered to be too slow. The report states that cars now run normally for a distance, then slow down to a crawl until a time point is reached, then resume the normal free running speed for a while. This extreme irregularity in running speed is most annoying to patrons and has been known to stimulate the purchase of flivvers by those who should be paying carfare. Layover time is not now generally provided at line terminals, the running time having been made slow enough to cover this. It would be better to make the running time faster and put the slack absolutely required in the layover.

Another feature that should not be overlooked is that when the interval between cars exceeds five minutes some even division of the hour should be used, thus making it easier for the rider to know when to expect

TABLE II—CARS REQUIRED TO GIVE PRESENT AND PROPOSED SERVICE

	Large Cars		Small Cars		All Cars	
	Present	Proposed	Present	Proposed	Present	Proposed
A.m. rush period.....	163	220	212	111	375	331
Non-rush period.....	98	130	119	69	217	199
P.m. rush period.....	186	270	248	121	434	391
Early night period.....	95	123	134	68	229	191
After 8:30 p.m.....	68	98	97	56	165	154

a car. With a five- or ten-minute headway cars will be scheduled to arrive at a certain point at equal intervals of the hour, while with a nine- or eleven-minute service there is no way for patrons to tell when to expect a car. Where two or more lines with infrequent headways operate on joint tracks it is desirable, when practicable, to effect a combination of the different headways to prevent the bunching of cars.

According to the proposed scheduling of cars, the average loading of the large cars in the maximum a.m. hour would be decreased from sixty-five, at present, to fifty-nine; in the maximum p.m. hour, from seventy-one, at present, to sixty-three. For the small cars the average loading would be decreased in the maximum a.m. hour from forty-three, at present, to twenty-nine, and for the maximum p.m. hour, from forty-five to thirty-two. The basis for estimating service required during the non-rush hours was to provide a seat for every passenger at the maximum point on the line, based on half-hour averages. Largely increased seating facilities were then proposed for the rush hours. On the basis of these recommendations, the report shows that the number of passengers per seat for the maximum a.m. hour would be decreased from 1.3 to 1.2, for the maximum p.m. rush hour from 1.4 to 1.2, on lines where the large cars are used, and on lines on which the small cars are used from 1.5 to 1.0 in the maximum a.m. hour and from 1.6 to 1.1 in the maximum p.m. hour. The average seating for all cars would be improved from 1.4, at present, to 1.1 passengers per seat in the maximum a.m. hour, and from 1.5 to 1.2 in the maximum p.m. hour. The proposed arrangement gives 21 per cent greater seating capacity, or, to put it another way, lowers the maximum number of standees 60 per cent in the evening and 75 per cent in the morning.

The report comments that it is easy to see why there is prejudice in the mind of the car rider against the small car. With its narrow doors and restricted platforms, it nevertheless shows under present conditions an average loading over seating capacity of 60 per cent during the maximum hour. On the other hand, the large car, with its wider aisles, double doors and more commodious platforms, shows only 40 per cent overloading. Is there any wonder, then, that patrons throughout the city express the preference for the large cars, without giving thought to the frequency of headways? With the small car modernized and operated as proposed, better service will result than is economically possible with the larger type. The betterment in the loading and the more effective use of the equipment are demonstrated by the figures given showing a comparison in present and proposed loading.

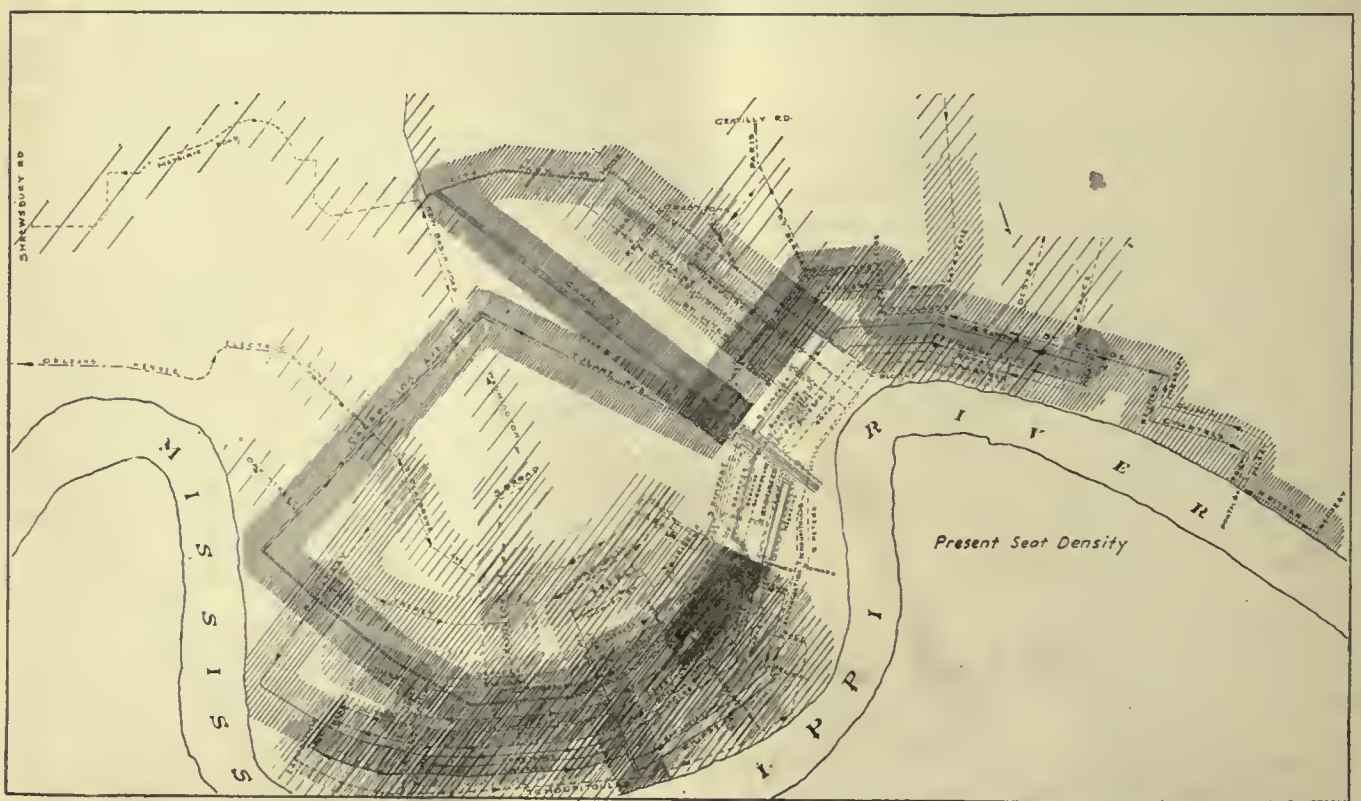
A summary of the present and proposed service as indicated by car-miles, seat-miles, car-hours and car-miles per car-hour is given in Table I. The car requirements to provide this service are summarized in Table II.

In giving the proposed service with 563 less car-hours, as shown in Table I, than required by the present plan, a good idea of the importance of the relation of proper routing to the transportation problem is obtained. With the estimated saving of $2 per hour, expenses can be reduced $1,126 per day, while the service is actually extended and improved.

General Operating Improvements

Under this heading the report states that there are many factors the adoption of which will bring marked advantages to the service. It is pointed out that all of these except the first one discussed are wholly within managerial control.

Passenger Stopping Places.—Distance from the business section is not by any means the only factor that determines the time necessary to reach it. The number of stops made is the factor that does more to limit the capacity and reduce the quality of service than any other one thing. Almost any district can be brought relatively closer by a reduction in the number of stops.



Seat Density on New Orleans Street Railway Under Present and Proposed Service and Routing Plans. As Drawn, Each

In New Orleans the stopping places average fourteen to the mile. This is entirely too many for good results. An average spacing of 660 ft., or eight stops to the mile, is standard practice in the larger cities where good surface car facilities exist.

It is pointed out that even in making eight stops to the mile the running speed of a car is reduced 50 per cent. In other words, one-half of the time is consumed in making the stops. It means a complete stop every forty-five seconds when making a speed of 10 miles an hour, and it is necessary to make practically all of the stops during the rush hours. With the big cars stops should never be closer than eight to the mile. With the smaller and lighter cars it is not quite so important.

Designation of Stops.—The location of every stopping place should be plainly indicated. Loading platforms are self-indicating. At other points, however, the stops should be designated by painting a white or light yellow band, a yard wide, around the trolley pole about 7 ft. above the ground. These can be seen farther at all times than lettered boards.

Destination Signs.—The general practice in New Orleans is to display a route sign regardless of direction or destination. This may be right for short local runs, short cross-town lines, shuttles, etc. Some of the through city lines, like Jackson-Claiborne, carry two route designations, one on each end of the car. When the car is headed toward North Claiborne Avenue the front of the car reads N. Claiborne, while on the rear it reads Jackson Avenue. It is not at all clear to those unfamiliar with the city or the car routing. A person desiring to go toward Jackson Avenue sees a car passing designated Jackson Avenue, and should he board it he would be informed it was bound toward Claiborne; properly, this route sign should read "Jackson-N. Claiborne," and the supplementary destination sign displayed in conjunction with it should clearly show the direction of the trip.

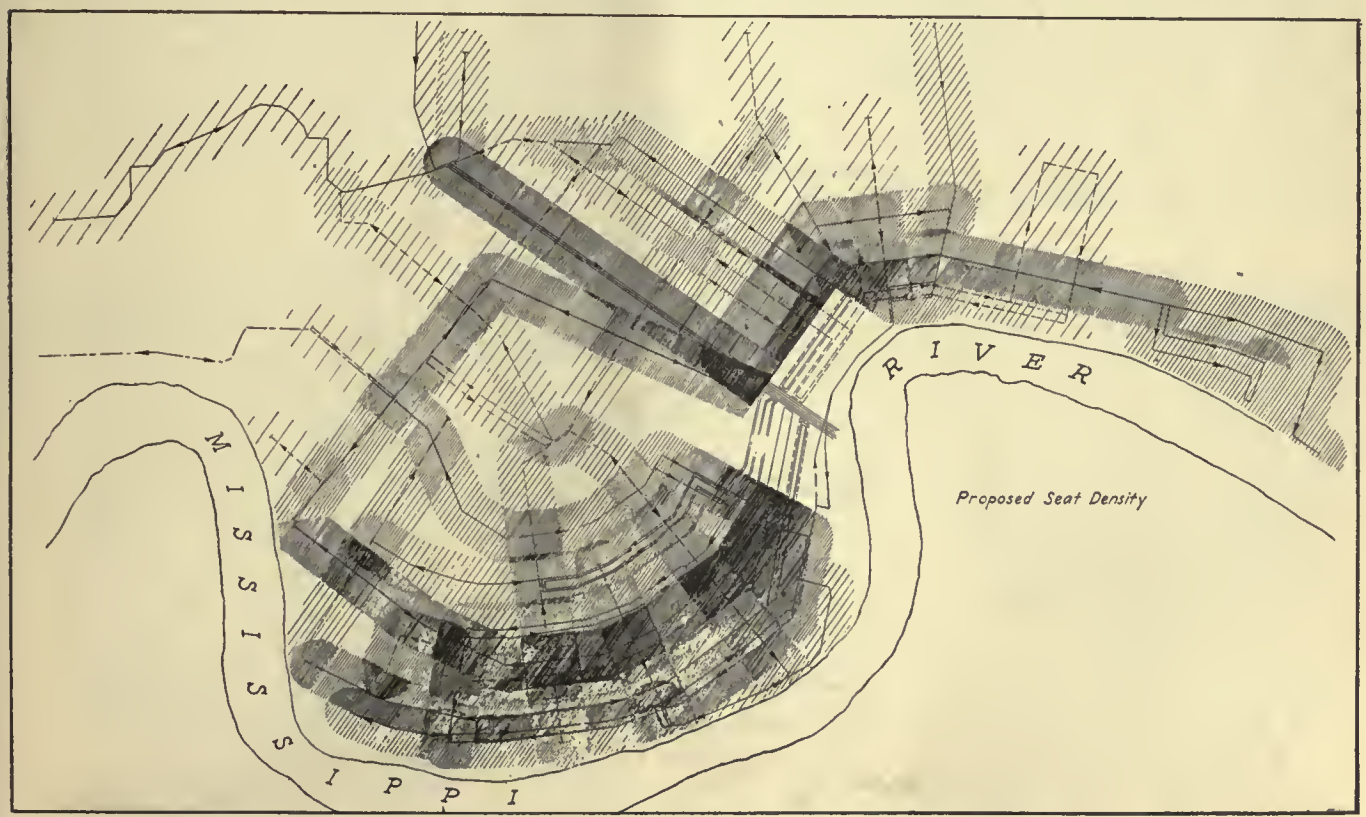
Similarly, inbound St. Charles Avenue cars now carry a sign reading "Tulane Belt." These cars reach Tulane after a while, but first go to Canal Street, then down to the Wells Street Loop, where they turn again, proceed along Canal to Rampart, and finally to Tulane. Under the proposed plan the St. Charles cars would display at all times the St. Charles route sign, together with the destination sign reading "Canal" when inbound and "Carrollton" when outbound. The engineer recommends that all destination signs be of the illuminated type.

Double Berthing.—Double berthing, or loading of cars in pairs, should be employed at all important stops included within the congested district, and wherever loading platforms are provided. The first car to approach the stop should always take the forward position. When a second car arrives while the first is still standing, it should invariably take the second place, and when it goes forward after taking on and discharging passengers, it should proceed without stopping at the forward position.

Street Collectors.—There is no one thing that pays better dividends than the employment of a live bunch of energetic young men to assume the duties of conductors at the front end of cars at congested points during the period of heavy traffic. Service is speeded up, the loading equalized, delays reduced and the strain on the line relieved when it is ordinarily greatest. The result can be measured in the good-will engendered by this added convenience and courtesy extended the public.

In New Orleans the plan would be especially applicable. To a large extent it would segregate the present mixed loading. This would be gratifying, especially to women and children.

Trackwork.—Generally speaking, the new trackwork is of an excellent type, but the cost is high. This is largely due to the fact that the equipment and facilities available for such work are inadequate. There is



Line per Inch Represents Fifty Seats per Maximum Rush Hour. Areas Were Shaded 1,000 Ft. Each Side of Tracks

too much done by "main strength and awkwardness," and too little by modern labor-saving machinery. Material and supplies are scattered in widely separated storage yards. Proper care of it is as difficult as getting it to the job is costly. Unless the department is given better equipment, rapid and economical work of large proportions is out of the question.

Electric Track Switches.—There are many locations where these devices can be used to the great improvement of the service. Their use at all regular points of track divergence where car movements are frequent is most desirable.

Power Saving.—While the power charges covering railway operation, as evidenced by the company's statement, are low, it is apparent to a close observer that the energy consumption is far from economical. Brakes are applied before the current is shut off and cars started before the brakes are released. Little or no effort to coast is evident. Level tracks, such as those in New Orleans, particularly lend themselves to coasting.

All cars should be equipped with some type of modern power-saving device. Its application and proper use will not only save power, but the cost of maintenance of both electrical and mechanical equipment will be reduced. Minimizing power consumption with a given schedule requires uniform acceleration and a minimum of braking at a uniform rate. Smoother operation results, the operator has better control of his car and accidents are reduced. A safe estimate would be that from 10 to 15 per cent of the power now used could be saved.

The company has been making considerable expenditures in adding needed power facilities. It should not overlook the field of power conservation. One-quarter of a cent a mile is a conservative estimate of the saving possible. This will amount to $108.50 per day.

One-Man Operation.—The application of the one-man principle of operation should be made on all the small cars as soon as they can be remodeled and the safety and automatic features installed. There are scheduled in the proposed plan 1,498 small car hours per day. A saving of 50 cents per hour would reduce operating expenses $749 daily.

There is no valid reason why the extension of the one-man principle cannot be made to include certain of the lines using the larger cars, for after all it is simply the utilization of labor-saving devices to reduce the hardship of manual labor and improve the skill and capacity of the trainmen. With cars equipped with a full line of automatic labor-saving and safety devices and with the assistance of street collectors at heavy loading points an operator should not have any more to do than at present. In fact, it would be easier, cleaner and nicer work.

The report then lays particular emphasis on the importance of enlisting the support and co-operation of employees and suggests the adoption of a co-operative plan along the lines successfully employed in a number of cities. Some suggestions are also made as to how patrons can help in speeding up and improving the service.

Carrying Safety to the Public—V*

An Important Factor in an Organized Safety Campaign Is a School for Drivers of Commercial Vehicles—It Brings Realization that They Must Co-operate

By C. W. Price
Vice-President in Charge of Public Safety, Elliott Service Company, New York City

DURING the past four years schools for drivers of commercial vehicles have been conducted in a number of large cities, including Chicago, Detroit, Milwaukee and St. Louis, and always with a large attendance and far-reaching results.

Except through a general educational campaign, it is difficult to reach owners and drivers of private cars with any direct service, but it is possible to gather large numbers of drivers of commercial vehicles into a school for group instruction. These are the men who, in proportion to their numbers, are the largest users of the streets. If they can be interested, they are, therefore, in a position to do much to reduce the hazards.

To secure a large attendance at the school the following plan has proved most successful: A complete list of owners of commercial vehicles is obtained and a strong letter is sent to each, outlining the plan and purpose of

*Fifth of a series of ten articles.

Posters of Attractive Design Emphasize Some of the Common Hazards

Posters of this Type Were Used in Connection with the Instruction Work of the Drivers' School

the school, and emphasizing the direct service which the school will render to employers of drivers, computed in dollars and cents. The employers are asked personally to urge their drivers to attend, and they are requested to send in lists of the drivers who have promised to do so. A few days before the opening of the school the members of the drivers' school committee reach by telephone all employees who have not responded.

The course of study in the school includes twelve lessons. Each lesson is divided into two parts, one of which covers points of mechanical safety, while the other deals with traffic laws and the rules of safe driving. Each driver is furnished with a set of twelve printed lesson outlines.

In order to maintain interest in the school and to get the best results from the lessons it is important to have a director who is able to lead and enthuse the drivers. He should know traffic safety and should be able to direct the general discussion which should be made a prominent feature of each session.

The sessions of the school are usually held on a stated night each week and each week's topic is presented by a different speaker. The speakers on mechanical safety are selected from among mechanical experts in garages, superintendents of garages and teachers in automobile schools. Traffic policemen, judges of traffic courts, safety engineers and employers of drivers can usually be induced to present the lessons on traffic laws and the rules of safe driving.

The continued attendance of the drivers throughout the course and the permanent results accomplished in convincing the drivers will depend on securing speakers who not only know their subjects but, what is more important, know how to present each one in a simple and convincing manner. In many of the schools the drivers sing one or two of the old war songs at the opening of the school. This always is done with good effect. Motion pictures and lantern slides are used to illustrate the lessons and to furnish entertainment.

At the last session of the school an attractively engraved diploma is presented to each driver who has attended at least nine of the twelve lessons. It is customary to make the occasion as impressive as possible by having one or two prominent speakers at this session.

In the various drivers' schools which have been conducted it has been found that the drivers go out of these schools not only informed regarding the mechanical safety of their machines and the rules of safe driving but, of far greater import, they go out with a changed attitude, with a new sense of their obligation to help make the streets safe, with a new thought about the traffic policeman and their relationship to him. They have come to see that the traffic judge and the traffic policeman are their friends and are doing their duty in trying to safeguard every driver.

In several cities a school for women drivers has been conducted with gratifying success. The course is usually limited to six lessons, and the sessions are held in the afternoon. In one city, at the close of the school, a tournament was held in the local armory. One of the features of the program was a contest of the drivers in handling their own cars. The sales agents of various popular makes of automobile had on exhibition the chassis of their cars, thus enabling each woman to get first-hand information regarding the mechanical points of her car.

SAFE DRIVERS' CLUBS ORGANIZED

In this chapter mention should also be made of the safe drivers' clubs which have been organized in several cities. While these clubs are usually organized with the primary object of raising money, they may be made to serve in stimulating interest in safety. The members are secured through mail solicitation, letters being sent to a complete list, or to a selected list of owners of cars. The membership fee is usually one dollar. Every member receives a membership card and an emblem for his car. The one appeal which seems to win membership is that each driver of an automobile should be willing to do his "bit" by paying one dollar to help make the streets safe for him and his family.

In Milwaukee the club is governed by an executive committee consisting of superintendents in charge of motor vehicles. This committee did effective work in building up the membership of the club, had supervision of the school for drivers, issued monthly bulletins to the club members and took an active part in promoting traffic safety.

Illinois Utilities and Colleges Co-operate

University of Illinois and Northwestern University Prepare Plans for Instruction Specially Adapted to the Needs of Utilities

SEVERAL utility associations in Illinois have formed a joint committee to co-operate with the colleges of commerce and business administration of the schools in the state and in such ways as will insure to the industry a supply of young men versed in the administrative subjects which are peculiar to the public utility business, and likewise insure to the student an opening in the field for which he has been prepared.

A suitable curriculum has been planned by two of the large universities, through co-operation between the deans of their colleges of commerce and business administration and the utility committee. A study of the requirements was made with a view to incorporating in the regular commerce course those subjects which would familiarize the students with the problems confronting the public utility companies. It is not the desire to make an engineer of the student, yet he will be familiar with engineering to such an extent that he will be able to understand blueprints and the fundamental principles of mathematics. He will have what may be termed "descriptive engineering." His training will include also instruction in the relation of public-service corporations to the public, the various methods of regulation and control, public-utility valuation, rate-making, service, capitalization and financing. He will have a thorough knowledge of economies and business methods.

Following is the text of a letter which has been sent out by the joint committee to the utility companies in Illinois, which explains the plan:

Public-utility companies have long felt the need of men who have had special training in the economics, business administration and law governing the incorporation and operation of public utilities. Some companies have endeavored to impart this information to certain members of their supervisory force by means of lectures, or by encouraging individuals to take special courses in schools of commerce. It is just as essential to have young men especially trained along these lines entering the service of utilities as it is to have men trained in the various engineering fields, such as mechanical, civil or electrical. Definite co-operation between Illinois colleges and universities and public-utility companies of Illinois to bring about the desired results have been attained, largely due to the efforts of a joint committee representing the Illinois Electric Railways Association, the Illinois State Electric Association, the Illinois Gas Association, the Illinois Telephone Association, the Illinois Bell Telephone Company and the Illinois Committee on Public Utility Information.

Every phase of the utility industry and its interests has been given full and practical consideration. The plan contemplates curriculums in the colleges and universities—probably full college courses in the long run—which will tend to do two things of immense value to the industry, namely (1) educate regular classes of young men, especially for the public-utility industry, in all of its branches, much as they are now educated for agriculture, finance, journalism or the professions; and so increase the supply of college-made men so badly needed in the utility business; (2) establish instruction in the fundamentals of the utility business as an essential part of college courses in economics and the like, so that better understanding of the utility industry and its problems may permeate both instructing forces and student bodies.

At the University of Illinois and Northwestern University a start has been made in and along these lines in the college of commerce and business administration. Probably most of the higher educational institutions in the state, if not all, can be interested if we of the utility business do our part. And we have a very definite part to perform, as the students will not take this course on public utilities and the colleges and universities will not continue to teach it unless we absorb the young men into our organizations after they have completed the courses. We must assist in the operation of the plan in the following ways: (1) By helping to stimulate interest in the public-utility curriculum among those entering the colleges; (2) by giving summer vacation employment to as many as possible of the students who are taking subjects in the public-utility curriculum; (3) by employing the students of public-utility subjects when they are graduated and then seeing to it that they are assimilated and developed in our various organizations as examples of the opportunities for college men in the public-utility industry; (4) by utilizing college faculty members whenever possible for study, surveys, research or other work, for which they are especially fitted by their special knowledge and faculties.

Execution of the educational program sketched in the foregoing has been submitted to the following executive committee of five: B. I. Budd, Chicago Elevated Railroads, chairman; George R. Jones, Public Service Company, speakers' bureau, vice-chairman; R. V. Prather, secretary Illinois public utility associations; A. G. Mitchell, secretary Illinois Telephone Association; G. W. McRae, Illinois Bell Telephone Company, and H. A. Johnson, secretary.

This executive committee cannot do much without the co-operation of the public-utility companies. The co-operation. to be effective, should come through some one man in each company and that man should be the chief executive of the company or one reporting directly to the chief executive. You are hereby requested to designate the man in your company with whom we may pursue this matter systematically and in detail. We would also like to know how many students you will promise to employ for summer work each year and how many graduates from these courses you will take into your organization each year.

All who have sat in the joint committee sessions are convinced that we are inaugurating in this something of inestimable helpfulness to the utility industry. Your cordial support is, therefore, counted on.

PUBLIC UTILITIES CURRICULUM
COLLEGE OF COMMERCE,
UNIVERSITY OF ILLINOIS

First Year

Principles of Accounting; Survey of Modern Industries; Economic History of the United States; Rhetoric and Themes; Military Training and Gymnasium; Electives (Science, Mathematics or Languages).

Second Year

Intermediate Accounting; Principles of Economics; Economics of Money and Banking; American National Government; State and Local Government; Principles of Business Administration; Business Letter Writing; Military Training; Electives (Science, Mathematics, Language or the Social Sciences).

Third Year

Principles of Marketing; Business Law; Corporation Finance; Principles of Railroad Transportation; Freight Shipment; Municipal Governments; Constitutional Aspects of Social and Industrial Problems; Principles of Public Utilities; Public Utility Accounting; Free Electives.

Fourth Year

Principles of Public Finance; Labor Problems and Labor Organizations; Municipal Problems; Public Utility Finance; Law of Public Utilities; Regulation of Public Utilities; Problems of Special Utilities; Personnel Management.

PUBLIC UTILITIES CURRICULUM
SCHOOL OF COMMERCE
NORTHWESTERN UNIVERSITY

First Year

Economics
English II
Accounting I

Second Year

Corporation Finance
Investment Securities
Accounting II
Business Law I and II

Third Year

Required:
- Public Utilities
- Business Organization
- Marketing and Distribution

Elective (one elective required):
- Selling by Mail
- Office Management
- Government
- Sociology

Fourth Year

Required:
- Statistics and Statistical Methods

Elective (two electives required):
- Employment Management
- Money and Banking
- Resources and Trade
- General Psychology

Association News & Discussions

And There Arose a New King Which Knew Not Joseph*

Some Intensely Interesting and Practical Advice on Public Relations Work by the Man Famous for His Common Sense Editorials

By Bruce Barton

WHAT I have to say will consist principally of two stories, which I think have a direct application to the utility business.

The first concerns a member of my profession, an advertising man, who was in the employ of a circus. It was his function to precede the circus into various communities and there to call at the newspaper offices and make sure that the notices would be flattering and to put on the fence posts and the barns pictures of the bearded lady and the man-eating snakes, and finally to get in touch with the proprietor of some store and contract with him for the space on either side of the elephant to be used for advertising purposes in the parade.

So, coming to a cross-roads town one time he found that there was only one store and the proprietor did not receive him enthusiastically. Said the proprietor, "Why should I advertise? I have been here for twenty years. There isn't a man, woman or child around these parts that does not know where I am and what I sell and how I do business." The advertising man answered very promptly, because in our business if we hesitate we are lost, and he said to the proprietor, pointing across the street, "What is that building over there?" The proprietor said to him, "That is the Methodist Episcopal Church." The advertising man said, "How long has that been there?" The proprietor said, "Oh, I don't know; seventy-five years probably." "And yet," said the advertising man, "And yet, they ring the church bell every Sunday morning."

My second story has also a religious flavor. It relates to a gentleman named Joseph, who is now deceased. Those of you who, like myself, were brought up on the Bible may have found some account of his very remarkable business career in that book. Those of you who have not read that book or who do not have it in your libraries may have heard of him through the works of Rudyard Kipling, because Mr. Kipling said of Joseph this, as you will remember: "Who shall doubt the secret hid under Cheops' pyramid was that the contractor did Cheops out of several millions, and that Joseph's sudden rise to controller of supplies was graft of monstrous size worked on Pharaoh's swarthy civilians."

But the account of Joseph in the Old Testament is much more complete and to his credit. You remember that he left his country under difficulties and, coming into a strange country, through his diligence and intelligence, he rose until he became the principal person in the state, second only to the King. Then there comes in that account, in that story, what I regard as one of the most amazing, one of the most staggering lines that has ever been written in a business history, a line that I think ought to be engraved deep on the office wall of every man who has anything to do with public relations, because with no interruption, no explanation, the account which has just finished telling of Joseph's remarkable career (and he reached a point where his public relations were widespread and where his private relations had all the good jobs in the Kingdom) goes on to say:

"And Pharaoh died, and there arose in Egypt a new King which knew not Joseph."

Now, gentlemen, I believe that that is the greatest sermon ever written on the subject of public relations.

When we gathered in this room this afternoon there were in this country in bed sick several thousand old men. It perhaps is indelicate for me to refer to that fact, but it is a fact, and we are grown up and we have got to face these things. On these old men you gentlemen collectively have spent a considerable amount of time and a considerable amount of money. It is to be supposed that you have made some impression upon them regarding your service and your purposes and your necessities. And in this interval while we have been sitting here those old men have died and all your time and all your money and whatever you have built up in the way of good-will in their minds—all those things have passed out with them.

In the same interval, in the same half hour, there have been born in this country several thousand lusty boys and girls to whom you gentlemen mean no more than the Einstein theory. They do not know the difference between a Mazda lamp and a stick of Wrigley's chewing gum. Nobody has ever told them that "Ivory soap floats" or that children cry for Castoria, or what sort of soap you ought to use if you want to have a skin that people would like to touch. Nobody has ever told them any of the other facts that are so vital in maintaining existence in these complex modern times.

The whole job of giving to them all the things that they are going to need in order to be able to form an intelligent public opinion and to exercise an intelligent influence in the community has to be started from the beginning and done over again.

So the first very simple thing that I would say to you (and it is so simple that it seems to me it ought to be said at every convention of this kind) is that this business of public relations is a very constant business, that the fact that you told your story yesterday should not lead you into the delusion of supposing that you have ever told it. There is probably no fact in the United States that is easier to impress upon people's minds than the fact that Ivory soap floats, and yet the manufacturers of Ivory soap think it not inconsistent or wasteful to spend more than a million dollars a year in repeating that fact over and over again.

It is a day-by-day and hour-by-hour business, gentlemen. Every day and every hour "the king" dies and there arises a new "king" in this country to whom you and all your works mean absolutely nothing.

Now, the second thing and very simple thing that it seems to me I might say to you is that in your dealings with the public, in what you write and say to them, you have got to be genuine; at least, you have got to appear to be genuine.

When I came to New York a great many years ago I had a lot of trouble with banks. I had great difficulty in finding any bank that would be willing to accept the very paltry weekly deposit that I wanted to make, and I finally found one which was not as closely guarded as the others, and I succeeded for over a period of three years of being insulted by the teller every Saturday. And at the end of three years when I came to draw out my money I had an audience with the vice-president who wanted personally to insult me.

I said to myself, if I live and grow old in this town, some day I think I would like to take a crack at this situation. And so as the years passed, as they have the habit of doing, and I lived and grew old, one day a bank came in to us and said they would like to have us do some advertising for them. I said to these bankers, "Now

*Address made before convention of National Electric Light Association, New York, June 5.

you go back to your office and shave off all the side-whiskers that there are in your bank and you take all the high hats and carry them out into the back-yard of the bank and you put them in a pile and light a match to the pile and burn them up, because I am going to advertise to people that you are human, and it may be a shock to have them come in and find you as you are."

And the ad said, "There is a young man in this town who is looking for a friendly bank, a bank where the officers will remember his name and where some interest will be shown when he comes in," etc.

And it was very successful. It was too successful. It was so successful that we could not control it, and all over the country there broke out a perfect epidemic, a kind of measles, of "friendly banks." Bankers who had not smiled since infancy and who never had had or needed an electric fan in their offices, suddenly sat up and said, "Why, we are friendly."

Well, our bank dropped out. The competition was too keen. But it culminated, I think, in a letter which I saw and which was mailed by the president of a really very important bank in a large city of this country. I won't attempt to quote it verbatim, but it was to this effect:

"Dear Customer: As I sit here all alone in my office on Christmas evening thinking of you and how much we love you, I really wish that you and every other customer could come in here personally so I could give you a good, sound kiss."

Well, that is a trifle exaggerated, but the fact is this—if you don't feel these things you can't make other people feel them. Emerson said, as you will remember, "What you are thunders so loud I cannot hear what you say." Unless there is back of this desire for better public relations a real conviction, a real genuine feeling that you are in business as a matter of service, not merely as a matter of advertising service—unless there is that, then it is very dangerous, indeed, to attempt to build public relations on any other ground.

The third very simple thing, and the last thing that I suggest, is this: In dealing with the public the great thing is to deal with them simply, briefly, and in language that they can understand.

Two men delivered speeches about sixty years ago at Gettysburg. One man was the greatest orator of his day, and he spoke for two hours and a half, and nobody in this room probably can remember a single word that he said. The other man spoke for considerably less than five minutes, and every school child has at some time in his career learned Lincoln's Gettysburg Address, and remembers it more or less all his life.

Many prayers have been uttered in the Word—many long, fine-sounding prayers, but the only prayer that any large majority of people have ever learned is the Lord's Prayer, and it is less than two hundred words long. The same thing is true of the Twenty-third Psalm, and there is hardly a Latin word in it. They are short, simply, easily understood words.

Asking an advertising man to talk about advertising at a convention like this is a good deal like asking a doctor to talk about health. I have listened to many such addresses and they are all about the same. The eminent physician says, "Drink plenty of water. Stay out doors as much as you can. Eat good food. Don't worry. Get eight hours sleep. And if you have anything the matter with you, call a doctor."

So I say to you that there is a certain technique about these things, and if you have anything seriously the matter with you there probably is some doctor in your town who has made a business of that thing, and it may be worth your while to call him in.

But in the meantime, and in this very informal and necessarily general talk, I say to you, "Be genuine, be simple, be brief; talk to people in terms and in language that they understand, and finally, and most of all, be persistent."

You can't expect to advertise in flush times and live on the memory of it when you are hard up. You can't expect to advertise when you are in trouble, or about to be in trouble, and expect to get anything in that direction. It is day-by-day and hour-by-hour business.

If the amount of money that has been thrown away by people who advertise spasmodically was all gathered together it would found and endow the most wonderful home for aged advertising men and their widows in the world. Don't throw any of that money away. If it is worth doing at all, it is worth doing all the time.

For every day, gentlemen, the "king" dies, and there arises a new "king" who knows not Joseph.

Public Relations Main Topic of N. E. L. A.

Annual Meeting Held in New York with Attendance of Some 7,000—Customer Ownership and Technical Subjects Also Given Much Attention

A FIVE-DAY convention of the National Electric Light Association was held at the Commodore and Biltmore Hotels, New York, June 4 to 8. Probably the proceedings of greatest interest to electric railway men were those devoted to the building of better public relations. The principal ideas expressed along this line are treated in later paragraphs in this report.

Gen. Guy E. Tripp, chairman of the board, Westinghouse Electric & Manufacturing Company, spoke on the future of superpower systems, which he thought was bright, but the fact that they are monopolies will make them shining marks for the advocates of public ownership. However, he did not think they could well be acquired by the public, because their interstate business took them out of municipal or state scope and he saw objections from the several states to Federal control.

According to the committee on customer ownership, the sales of securities of electric light and power companies directly to customers during 1922 consisted approximately of $145,000,000 of preferred shares, $16,000,000 of common shares and $14,000,000 of bonds and debentures. This is a noteworty advance over 1921 when the aggregate total as reported reached $80,000,000. The total annual sales of securities during 1920 was estimated to be $35,000,000. Statistical information appended to the report indicates that in the past eight years no less than 425,000 customer owners have been attracted to the possibilities of investing in the securities of local electric light and power companies and the prediction is made that within three years there will be no less than one million people owning such securities. The cost of distributing these securities is becoming lower each year.

The report of the committee on insurance was presented by Ed. Wolff, chairman of last year's committee. It spoke of considerable reduction secured in premiums on both liability and fire insurance through a better knowledge of what the insurance companies require. Unfortunately, where companies are insured through local agents these agents are not always anxious to reduce the rates, because their commissions would thereby be reduced, and some companies are much indisposed to disturb their agencies. Mr. Wolff pointed out that the machinery in getting new rate schedules is extremely cumbersome, but this work would be greatly helped if companies kept carefully compiled experience records. This is becoming more common. The percentage reduction in the fire insurance rate was approximately 25 per cent, and for auto truck liability, 31 per cent. From reports received from ninety-one companies a saving in premiums of $103,769 was recorded. The lowest reported was $25 and the largest approximately $25,000, the average being $1,140.

Dwight N. Lewis, president National Association of Railway and Utilities Commissioners, in speaking of public ownership, said, in part:

"The committee of our national association on public ownership and operation reporting at our convention last year at Detroit, most emphatically repudiated government ownership, but it was just as emphatically favorable to public ownership with private operation, with protection both for the producer and the consumer through state regulation.

"The government should concern itself with the purely governmental affairs, protecting both persons and property in their constitutional rights and leave to private capital and initi-

ative the advancement of business affairs. The rights of the public may always be secured by proper oversight and regulation, and this should not go so far as to destroy incentive for investment of capital and talent. There are some who believe that for every economic ill there is a legislative remedy, a sort of quack cure-all. I think what we need most in more than one line of industry in this country today is a more carefully arranged diet with the proper nursing of an enlightened public conscience. I don't believe a weakened patient is best cured by the drastic purgatives and deadening narcotics of ill-advised statute law."

L. E. Pierson, chairman board of directors Irving Bank-Columbia Trust Company, New York, emphasized the essential character of the electric utility service by saying that should it cease functioning for a single day, modern life, as we know it, would go out. Mr. Pierson saw tendencies toward municipal ownership and said:

"If only the utilities themselves were concerned the prospect of government ownership would be serious but not alarming. The capital invested in the utilities could be withdrawn and placed in purely private industries. The plants could be sold or put to other purposes. The engineers, the executives and the technical personnel would still find their knowledge and experience in demand. The real victim of any such wholesale change would be the nation as a whole. Industry in general would suffer, politics would replace efficiency, and mounting taxes would quickly convince the public that it is infinitely easier to criticize public utilities than to operate them.

Richard T. Ely, professor of economics at the University of Wisconsin, spoke about the connection between utility operation and education. He said, in part:

"In my judgment, what is needed is a central research institute with its own board of trustees, amply and permanently supported with its own funds handed over to it without hampering conditions of any sort or description, but commissioned to organize the public utilities educationally, to search fearlessly for truth and to diffuse knowledge. The scope of the work should reach from high schools, Y.M.C.A.'s, etc., through the colleges to graduate courses and research in the universities."

Public Policy Session

A PUBLIC policy committee session was held Thursday evening at Carnegie Hall, the speakers being Julius H. Barnes, president of the Chamber of Commerce of the United States, and Martin J. Insull, who presented the report of the public policy committee. Mr. Barnes spoke of the resolution passed last month by the Chamber of Commerce of the United States, commending the state unit as the proper agency of public utility regulations and said: "This is the judgment of the business opinion of the country as to what is fair and intelligent in public relations."

The addresses and music at the meeting on Thursday night were broadcasted through special arrangements with the broadcasting stations in New York, Pittsburgh, Chicago and Schenectady, so that more than five million people were able to listen to them. This is undoubtedly the most extensive broadcasting ever attempted, and more than one hundred men and women were employed in maintaining telephone connections between the four stations.

Public Relations Discussions

IN INTRODUCING the chairmen of committees in charge of different phases of the public relations work, H. T. Sands, chairman of the public relations section, spoke about the organization of a speakers' bureau as an auxiliary to the work of state committees on public utility information, and declared the idea that an effective address must be made by a polished orator is incorrect. The public is more interested, he said, in acquiring facts in regard to an industry than in listening to flights of oratory. Two films have been distributed by the section, one entitled "Back of the Button," the other "Yours to Command," but the distribution falls short of what it should be due to the difficulty of the industry in understanding the public mind.

The committee on educational institutions recommended that the association could well undertake to endow two or three professorships which could be intended primarily to facilitate research and secondarily to provide for the teaching of a series of public utility courses. Such a department would require an endowment of $20,000 to $30,000 a year. It was the belief of the committee that when the time is ripe for such an endowment the central-station industry could well afford the expenditure.

The committee on employee relations with the public finds that fourteen member companies have issued employees' manuals and suggests that the association prepare and publish a loose-leaf manual of this kind, giving facts about the origin and growth of the industry, space for local information or instruction on the duty of the employee to help mold favorable public sentiment to the company, and how these objects can be attained.

The committee on manufacturers' advertising mentioned several companies which have conducted national advertising campaigns to build up confidence in the private ownership and operation of electric light and power companies and in the sale of electrical appliances. This assistance was commended. The report also said that a number of security houses had cooperated by running advertisements recommending public utilities' securities for investment. In connection with individual offerings of issues, much has been said in advertisements in favor of securities of this kind.

The committee on public speaking commended the work along the lines of providing public addresses conducted by the state public utility information committees and the Public Utilities Advertising Association, and spoke particularly of the effective work conducted in the Rocky Mountain district, in Boston and elsewhere. Mention was also made of a series of lectures given by Carl D. Jackson, former president of the National Association of Railway and Utilities Commissioners. At educational institutions he spoke on general economic problems and brought the utility industry into his talk in a most interesting way. He also addressed bankers, editors, state and city officials and presidents and members of faculties of several educational institutions. This was thought by the committee to be the largest thing done this year in the way of publicity through educational work.

The committee on relations of financial institutions described its efforts to draft a law which can be introduced into the legislature of New York to legalize the investment of savings banks in the securities of gas, electric power and light and telephone utilities. An effort was made to include in this list electric street railway securities, but as the representatives of the savings banks were not convinced of the advisability of including these securities, the committee did not press the point further. The law as drafted is thought to meet the views of the savings bank committee, but as the Savings Bank Association has resolved this year to support no project for the enlargement of the field of investment of its funds the bill will not be introduced this year.

The committee on women's public information spoke particularly of the need of getting the women employees of the company together for educational work along the line of better public relations between the utility company and the customers. The results so far are declared to be worth while.

The fundamental reason why it is necessary to make the effort to inform the public of the function and purposes of the public utility was discussed at length by Don Seitz, business manager of the New York *World* who said that the electric utility pioneers failed in the early days to sell the idea of electric light and power to the public, so they formed an alliance with the politician. Over-capitalization became a feature of early utility operation and the unfavorable sentiment thereby created still lingers in many minds. The facts as they are must be carried to the public consistently and continuously until the beneficent influence of the capital invested in public utilities is understood and appreciated. Nail down the facts, said Mr. Seitz, until it is universally realized that the purpose of the public utility is to provide convenience for everybody and service for every body.

A paper by Robert Lindsay, president Cleveland Electric Illuminating Company stated that the public information bureau is the only mechanism

available for representing the four elements in the public utility group—the electric light and power company, the telephone system, the gas company, and the street railway. In the final analysis, the public holds the fate of the utility industry in its hands but only through mutual co-operation is it possible to develop the highest type of service at the lowest rate. But this co-operation can only be effected when the methods and purposes of the utilities are interpreted to the public and understood. Information bureaus, however, cannot accomplish this by merely stating that the service is good and that the rates are low; it must be demonstrated also by the acts of the utility, and the bureau that gets only funds and no active support from its members will not go very far. The bureau should also be made the agency through which important news is issued to the public, for if it is allowed to become merely a clipping bureau its usefulness will be much impaired. Moreover, even though there be sincere co-operation among all the public utilities, each individual company must in addition keep up its own public relations work.

At the final meeting of the Public Relations Section, short talks were given by several members of state regulatory commissions as well as by prominent central station men. The meeting was called to order by Chairman Sands and the first speaker was M. H. Aylesworth, executive manager of the N.E.L.A. Mr. Aylesworth said that experience has shown that it is not sufficient for a utility company simply to give the best service of which it is capable. The company must also advertise the fact that it gives service. On the other hand, he said, it will not do merely to advertise without actually giving the service. Satisfactory public relations can be built only on the basis of giving the service and telling the story to the people.

The second speaker, Hon. W. D. B. Ainey, a member of the Public Service Commission of Pennsylvania, said that he visualized the function of a regulatory commission as being that of the equals sign in an equation with the duty and the privilege of the utility on one side and the privilege and the duty of the public on the other side. It is for the commission to keep the equation properly balanced. He particularly stressed the point that the public is more likely to be swayed by emotion than by logic, and he spoke of the inestimably greater value of personal contact as compared with the printed page.

The Virginia State Corporation Commission was represented by the Hon. Alexander Forward, who said that it was his experience that the utility which receives the greatest amount of consideration from the public is the one which always has time to listen to complaints. Conversely the company which pays little heed to the troubles of its customers receives but little consideration from the public. Mr. Forward mentioned also the necessity for publicity so that people shall understand what the utilities are trying to do. In this respect the street railway has the advantage over other utilities, but the latter may advertise in newspapers and send out publicity matter with their bills. By proper handling of news stories, valuable publicity can be had without buying advertising space.

The fourth speaker was the Hon. E. V. Kuykendall, commissioner of the Department of Public Works of the State of Washington. He drew attention to the fact that the decisions of regulatory commissions have more frequently been unfair to the utilities than unfair to the public. Nevertheless the public has become suspicious of the commissions. This situation he characterized as one phase of the war reaction, like the restlessness which follows a fever, and he recommended that the fundamentals of valuation, rate making, etc., should be included in school textbooks on civics.

Hon. Clyde M. Reed, member of the Kansas Public Utilities Commission, spoke, and Commissioner H. G. Wells of Massachusetts told some of the difficulties that have been experienced there. He said that three-quarters of the utility companies gave the commission no trouble, but that the service given by the remaining one-quarter was the cause of frequent and characteristic complaints from customers. The majority of the utilities in his opinion are trying to carry out the teachings of the public policy committee; and the others would do well to follow that example.

Customer Ownership Session

THE session of the customer ownership committee was held Thursday afternoon, June 7, with M. R. Bump in the chair. B. C. Forbes, editor *Forbes Magazine*, New York, said that what is needed in the utility business today is not men of light but men of leading. In a plea for wider distribution of the securities of utilities, he said that the great reason for the downfall of governments and dynasties was that the great mass of the common people were not able to get ahead of the game. By becoming investors they place themselves in an entirely different position and the country is in no danger. In the last eight years the light and power companies have attracted 425,000 customers to become stockholders, and he is of the opinion that within three years more there will be a million customer-owners.

Mr. Forbes mentioned a prize contest conducted by his magazine on the benefit of customer ownership of public utilities. Many excellent articles were received, and he recommended that the prize-winning papers be reprinted for distribution by utility companies. The arguments will then be presented by the public itself, and will carry more weight than when material in the nature of propaganda is prepared by the utilities' publicity men.

The opportunity presented the utilities by the customer-ownership plan brings with it a new responsibility to hold up the quality of the securities. He suggests that a vigilance committee be formed to attend to this vital question.

Employee ownership is believed by Mr. Forbes to be of equal importance with customer ownership. When public questions are being considered the working classes can roll up more votes on election day than any other class in the country. Whether we are to move toward state or municipal ownership will depend in no small measure on how this employee and customer-ownership movement succeeds or fails.

In conclusion, he said that if you transform America into a nation of investors you will have a happier, more contented and more cheerful people.

E. K. Hall, vice-president American Telephone & Telegraph Company, New York, emphasized the points made by Mr. Forbes and paid particular attention to the statement that the securities offered the customers must be gilt-edged, or else the public would lose confidence in the utilities as investments.

Louis H. Egan, president Union Electric Light & Power Company, St. Louis, pointed out that theoretically the customers should hold common stock so that they would feel the fluctuations of the business. Anything tending to cut down the dividends or affect the solvency of the company would then be examined with particular care by the customer-investors. As the risk of common stock may be considered too great, he makes a compromise by selling the preferred stock to his customers. In his case the stock is one-third of the capital, and this is divided equally into two classes, so that the preferred represents one-sixth of the entire investment in the property. He has been able to sell the entire issue of new preferred stock to his customers with relatively little effort, and has also considered the sale of higher-grade investments to them.

John A. Britton, vice-president Pacific Gas & Electric Company, San Francisco, told of some of the experiences of his company in the sale of securities to customers, in which he said it was a pioneer. He said that there is a pride of ownership in the average person that can be used to advantage in connection with inducing the customers to participate. It is, however, no use to try to give poor service because the customers are also owners of the property. As soon as they discover that such a policy is in force they forget their holdings and register their complaints.

Technical Section

THE prime movers committee, C. F. Hirshfeld chairman, presented a 374-page report in two sections. Emphasis was placed on recent innovations, such as higher pressures, reheating of steam, stage bleeding, useful life of turbines and internal-combustion engines. Plants

are now being considered with boiler pressures from 400 lb. up to 550 lb. and steam temperatures of 650 to 750 deg. F.

Development in the art of steam-power production has progressed far enough to make it entirely feasible to attain a goal of one kilowatt-hour per pound of coal in the near future, according to Fred N. Bushnell, Stone & Webster, who made an address on "Higher Steam Pressures and Improvement in Station Economy." One means of attaining this mark is through the use of much higher steam pressures. Already steam pressures up to 1,200 lb. have been definitely planned for commercial installation. For an experimental plant in England a critical pressure of 3,200 lb. will be adopted. Attainment of one kilowatt-hour per pound of coal cannot be reached by higher pressures alone. There must be co-ordination of this with heating of the feed water by multistage bleeding of turbines, careful selection of auxiliaries, proper design of stokers, furnaces and heating surfaces of boilers, superheaters and economizers, and burning of pulverized coal.

Prof. A. G. Christie, Johns Hopkins University, made a very frank appraisal of powdered fuel. In general, he said that while powdered fuel has many points in its favor, there is a great danger in the extensive adoption of an underdeveloped practice by enthusiasts. The decision on whether to use powdered fuel depends entirely upon each individual installation. Before there is a general adoption of powdered fuel, there is a great necessity to have power station records to analyze. Furthermore, there is an opportunity for considerable improvement in equipment. None the less, Prof. Christie commended manufacturers for the great strides they have made so far.

On account of the almost unprecedented adoption of new practices in the central-station field, some of which are almost radical in the absence of extensive experimental data, and the fact that the use factor of equipment now being adopted is indefinite, there is more necessity than ever of giving serious consideration to obsolescence in determining the economies of new innovations, asserted Peter Junkersfeld. Furthermore, the prospective capacity factor or usefulness of the unit must be carefully estimated.

In the report of the underground systems committee, G. G. Post chairman, two developments of great interest and importance to the central station industry are apparent:

First—Improvements in the quality of paper-insulated, lead-covered cables have made it possible to reduce the thickness of insulation without reducing the factor of safety of operation. Manufacturers have estimated that on this account a saving of from 10 to 15 per cent has been made in the price of cable in the last two or three years.

Second—The use of the kenotron for testing high voltage cables with direct current promises to result in the ability to detect incipient failures of cables so that weak spots may be removed and the troubles due to cable failures in service largely eliminated. During the year 1922 one company was able by means of the kenotron almost to eliminate failures in service on a number of 6,600-volt rosin oil cables.

The committee called attention to the report of the American committee on electrolysis published in 1921. Too much emphasis cannot be laid upon the desirability of organizing electrolysis committees in all cities where the rail return system of electric railways is used as it is only possible to co-ordinate the mitigative work of the various utilities owning underground structures by causing their representatives to get together and from time to time decide upon measures which will be the most economical for the utilities as a whole. In other words, the problem should be dealt with as though one company owned and operated all of the underground systems and structures.

The underground-cable structure is no less a part of a superpower scheme than the 110,000 and 220,000-volt overhead lines, declared W. S. Murray in an address before the Technical Section. To realize the future rôle the highest voltage electric cables are to play one has but to look at the rapidly forming necessity of conducting large quantities of electric power beneath the earth's surface. Our overhead day within our cities and on the approaches to them is drawing to a rapid close. Henceforth what we shall need is not only 33,000-volt but 66,000-volt cables. Too much emphasis cannot be placed on the importance of properly relaying systems to make the alternating-current network as reliable, flexible and economical as direct-current networks.

The overhead systems committee, L. M. Klauber chairman, has this year continued its work along the general lines of standardization and the investigation of new and improved practices. The report, of 176 pages, is a résumé of the information which has been gathered during the past year and covers such subjects as specifications for construction materials and methods, poles and supporting structures, insulators, insulator research, line sectionalizing and protective devices, transformer installations, construction and maintenance equipment and methods, wood pole transmission lines, joint use of poles, and transpositions.

According to information obtained by the electric apparatus committee, R. H. Tapscott, chairman, the service rendered by automatic alternating-current substations has been reliable, and keen interest in this development is being shown. Very convincing information regarding the reliability of automatic direct-current substations has been obtained during the past year in St. Louis and Cincinnati, the former being of 1,800 kw. rating and the latter of 1,875 kw.

At least two systems of complete remote supervision and control of distance switching over telephone lines have been developed and are being installed. Several companies have installed equipment to provide communication over their high-tension transmission lines. The operation of carrier-current apparatus is very satisfactory, and communication can be maintained through disturbances which would cripple the line telephone.

A definition of circuit-breaker duty cycle has been agreed upon by the A. I. E. E. protective devices committee and the electrical apparatus committee of the N. E. L. A.

Inductive Co-ordination

The report of the inductive co-ordination committee, R. N. Conwell chairman, reviews the progress made during the year. As a whole the year's work has advanced along lines of development outlined in the last report.

Co-operative procedure between the Bell telephone system and the N. E. L. A. was one of the chief activities during the year and resulted in the adoption of the joint "Principles and Practices," in the Dec. 9, 1922, report of the joint general committee. This is probably the outstanding achievement of the year. Continued organization and expansion of the activities of the geographic division and local committees on inductive co-ordination was another prominent result of the year's work.

Officers Elected

AT THE meeting on Friday the following were elected president and vice-presidents National Electric Light Association for the ensuing year:

President, Walter H. Johnson, Philadelphia Electric Company, Philadelphia, Pa.

First vice-president, John A. Britton, Pacific Gas & Electric Company, San Francisco, Calif.

Second vice-president, J. E. Davidson, Nebraska Power Company, Omaha, Neb.

Third vice-president, R. F. Pack, Northern States Power Company, Minneapolis, Minn.

Fourth vice-president, H. T. Sands, Charles H. Tenney & Company, Boston, Mass.

A.S.M.E. Nominates Officers

AT THE spring meeting of the American Society of Mechanical Engineers in Montreal, May 28-31, the nominating committee presented the following nominees for the offices of the society for next year. Election by ballot will be held in the fall.

President: Fred R. Low, Editor *Power*, New York City.

Vice-president: George I. Rockwood, Worcester, Mass.; M. L. Cooke, Philadelphia, Pa.; W. J. Sando, Milwaukee, Wis.

Managers: E. O. Eastwood, Seattle, Wash.; F. A. Scott, Cleveland, Ohio; E. R. Fish, St. Louis, Mo.

Treasurer: W. H. Wiley, New York.

American Association News

Welded Rail Joints

THE meeting of the executive committee of the welded rail joint committee was held in Cleveland, Ohio, June 1, 1923, at the offices of the Cleveland Railway, with the following committee members and guests present: E. M. T. Ryder, vice-chairman; Dr. H. L. Wittemore, representing Dr. G. K. Burgess, chairman; W. F. Graves, representing C. A. Adams; J. Wolfe, representing E. J. McIlraith; W. W. Wysor, J. H. Haylow, representing G. L. Wilson; R. C. Cram; C. F. Gailor, representing H. M. Steward; G. C. Hecker and W. Spraragen, secretary. Several members of the committee on way matters of the A.E.R.E.A. also were present as guests.

Secretary Spraragen presented a financial statement showing the amount of contributions, the amount of expenditures to date and the balance on hand.

Mr. Ryder, who presided in the absence of Dr. Burgess, stated that there had been a change in the financial arrangements between the American Welding Society and the National Research Council in regard to the services of its secretary. A resolution was passed fixing the amount to be paid to the American Welding Society by the welded rail joints committee for the services of its secretary.

Secretary Spraragen presented a statement showing the status of the shipments of rail joints for test purposes. He stated that approximately one-third of all joints had been shipped to the various laboratories and called attention to the necessity for prompt action in regard to the shipment of the remaining joints, so that it will be possible to make tensile tests before the Emery 1,150,000-lb. testing machine at the Bureau of Standards is dismantled.

Mr. Wolfe presented for Mr. McIlraith a report and drawings covering the design of a repeated impact testing machine delivering blows that represent approximately the impact delivered by an average car wheel passing over a cupped rail joint. After a discussion it was finally agreed that there were so many factors involved as to make it practically impossible to approach actual service conditions with this machine. Several modifications were suggested. Another feature discussed was the type of foundation and method of supporting the test joints. It was finally agreed to prove the design submitted by Mr. McIlraith, and the committee authorized the purchase and erection of a repeated impact testing machine at a cost not to exceed $2,000. The machine will be erected at the Bureau of Standards, Washington, D. C.

A telegram from M. B. Rosevear, chairman power distribution committee, asked that the testing machine be arranged to test trolley wire and collectors simultaneously.

Mr. Wysor then submitted a report and drawings covering the design of a rotary service testing machine. It was the sense of the committee that the design as submitted was satisfactory except for a few details. The committee voted an expenditure of a sum not to exceed $12,000 to build and erect such a rotary service testing machine at the Bureau of Standards, Washington.

Upon invitation of J. H. Alexander, president of the Rail Welding & Bonding Company, the committee visited its plant, where a very interesting description was given of the research work in the development of seam-welded rail joints. Data collected by the Rail Welding and Bonding Company were made available to the committee.

Way Committee

The committee on way matters of the American Electric Railway Engineering Association met in the offices of the Cleveland Railway on May 31. Reports of the various sub-committees were presented and action taken on each.

In connection with sub-committee No. 1, on standardization of frogs and car clearance easements, data were submitted with a view to reducing the number of standard frogs. The committee decided that formal action at this time was not justified, and recommended that a further study of the subject be made by next year's committee. In regard to car clearance easements, the sub-committee reported that it had been unable to confer with the committee on unification of car design. As this subject was considered to be distinctly a matter of car design rather than a way matter, it was decided to recommend that the subject be discontinued as an assignment to the way committee. It was further recommended, however, that a request be made that several way engineers be appointed members of the next year's committee on unification of car design.

A report of sub-committee No. 2 on substitute ties was presented. It was pointed out that several designs of substitute cars are in use on a considerable mileage of track. The committee felt that this subject was of great importance and that it should be continued. Steps were taken to secure co-operation between this committee and the tie committee of the A. E. R. A., and it will be requested that next year's tie committee have representatives of the way committee in its membership.

A report of sub-committee No. 3 was read, consisting principally of a statement of the sub-committee's activities in co-operating with the committee on buildings and structures. There was considerable discussion as to whether or not the subject of the design of small bridges, culverts and trestles should be assigned in the future to the buildings and structures committee or to the way committee. It was the sense of the meeting that this subject was primarily a way committee subject, and it was recommended that it be assigned to next year's committee.

Sub-committee No. 4 on the design of track construction for paved streets stated that the specifications had been submitted also to a committee of the American Society of Municipal Improvements, and it was the understanding that the specifications had been approved by the latter body. Formal action of the A.S.M.I. will no doubt be taken at the annual convention of this society in October. The specifications as submitted by the sub-committee were approved by the way committee with minor changes. If adopted by the A.E.R.E.A. and the A.S.M.I., these specifications should permit the establishment of more harmonious relations between city engineers and electric railway engineers as they provide for the first time a design for track construction in paved streets which appears to have the unanimous approval of all concerned.

Sub-committee No. 5 reported that the work of the welded rail joint committee had been followed and that a report of the work thus far will be summarized and included in the final report of the committee on way matters.

The sub-committee on review of existing standards reported that all of the standards on way matters in the engineering manual had been reviewed and that a number of revisions bringing the specifications into conformity with the latest and most generally accepted practices has been made. A complete report covering in detail the changes recommended will be included in the report of the way committee.

A report covering the revision of specifications for manganese steel switch pieces was presented and resulted in a great deal of discussion, the report subsequently being verified and approved.

Those present were W. F. Graves, chairman; H. H. George, vice-chairman; C. F. Gailor, secretary; E. M. T. Ryder, C. A. Alden, Victor Angerer, E. B. Entwistle, J. B. Tinnon, W. W. Wysor, J. H. Haylow, H. Fort Flowers, G. C. Estill, Charles H. Clark, Mr. Wolf, as representing A. McIlrath, and G. C. Hecker of association headquarters.

Charles A. Coffin Prize

THE committee of the American Electric Railway Association on the Charles A. Coffin Foundation prize is urging every electric railway company that contemplates participating in the award to advise the committee of its intention as promptly as possible. A representation of the railway company's activities and accomplishments covered by the field of the award should be in the hands of the committee by Aug. 15. The conditions of the award were set forth in a letter of March 19, published in ELECTRIC RAILWAY JOURNAL for March 24, page 529.

Maintenance of Equipment

Grinding Cylinders and Boring Bearings

ACCOMPANYING illustrations show equipment used in the Fairview shops of the Lehigh Valley Transit Company, Allentown, Pa., for grinding compressor cylinders and reboring the crankshaft bearings. Compressor cylinders which have become scored are babbitted and then ground by the use of this fixture. For the grinding operation the equipment is installed in the position ordinarily occupied by the compressor motor. The supporting framework has holes which fit those used for bolting the motor to the compressor frame. The mechanism is driven by a small motor with a belt and gearing attachment. When in position, the herringbone gear on the geared end meshes with that which drives the crankshaft.

A special piston is used for the grinding. This consists of a regular piston which has been cut in two and provided on the inside with means for connecting to the regular connecting rod. A spring arrangement forces the two pieces apart, so that they bear firmly against the lining of the cylinder. On the outside of the grinding piston are numerous small holes, which collect and distribute the emery grease. Additional emery grease is applied with the hand as needed. A valve grinding compound made by the Hall-Thompson Company, Hartford, Conn., is used in Allentown.

The grinding piston is turned as it is being driven, which is accomplished by means of a ring screwed into the end of the piston.

In babbitting the cylinders where there are grooves, these are scraped with a steel scraper to clean them, and these are made deep enough to hold the babbitt lining. A brass scraper is then used to coat the iron so that the babbitt will stick when applied.

Attachment Also Provided for Boring Crankshaft Bearing

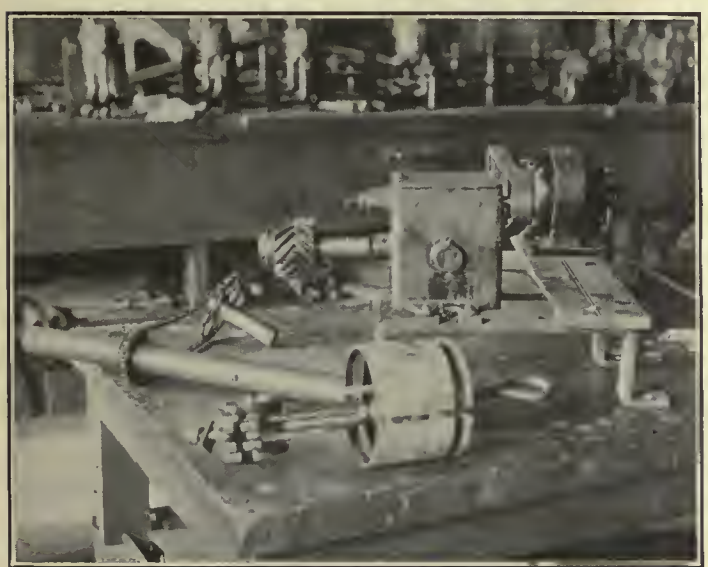
The same driving mechanism as that for grinding cylinders is used for boring out the crankshaft bearings. The herringbone pinion is removed from the geared end of the mechanism and a sprocket is substituted. The boring bar has a similar sprocket, but of smaller diameter. This is placed in position after the bearings have been babbitted, and the driving mechanism operates the boring bar through a chain, which fits around the sprocket.

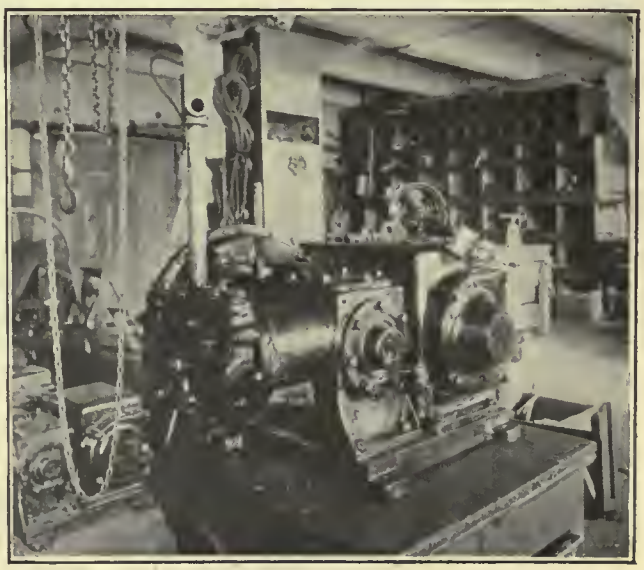
By use of this method perfect alignment is assured since the boring of all bearings is done by the same bar which is supported to insure accurate alignment.

Bending Carlines on Tire Bender

IN ITS car construction and repair work the West Penn Railways, Connellsville, Pa., has occasion to use many bent sections of steel. Where continuous curving is necessary the usual method on many properties is to bend the steel about a metal former, forcing it into position by hammers or swages. This company has obtained better results by the use of a tire bender, such as is familiar to the wheelwright. This device consists of three bending rolls, which are adjustable to produce various degrees of curvature. The standard tire bender has cylindrical rolls for flat strap tires. To accommodate angles and T sections, such, for instance, as are used in making carlines, the rolls furnished with the bender are replaced by rolls having grooves in the middle to accommodate the webs of the steel sections. This does not, incidentally, prevent the bending of flat sections on the same rolls, so that it is not necessary to change them every time such sections are bent.

Proper adjustment of the rolls for any curvature is made easily, and all carlines are thus bent to the same radius without deformation, such as is customary when they are hammered into shape in a former. The





At Left, Mechanism Used for Grinding Compressor Cylinders and Boring Crankshaft Bearings. At Right, Westinghouse D 2 EG Compressor in Place for Overhauling. Grinding Piston Shown on Top of Compressor

fitting of the carlines is easier and the assembly work that much reduced.

The facility with which the bender may be used for various operations makes it a valuable adjunct to the shop.

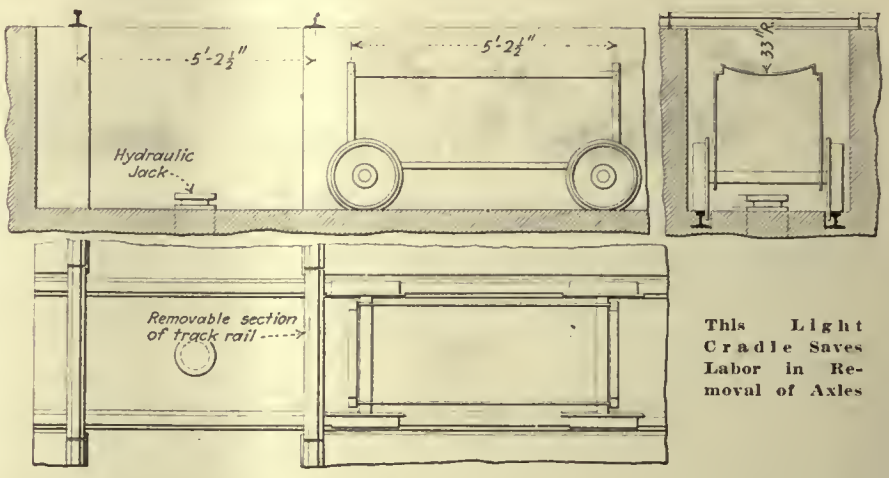
Devices for Building Up Axles and Flanges

ACCOMPANYING illustrations show attachments which have been added to an old scrap lathe for driving axles and wheels while they are being built up by arc welding. Axles are placed in the lathe centers and the lathe operating head is driven in the usual manner. As the back gearing of the lathe does not sufficiently reduce the speed a small countershaft is belted to the back shaft of the lathe, and a small pulley on this countershaft is belt-connected with a collar clamped on the axle by means of set screws. With this arrangement a very slow speed is obtained, and this can be adjusted so as to meet the desired speed of welding.

As the axle is belt-driven, it can be turned readily by slipping the driving belt. To facilitate this a clamp is fastened around the axle and the welder uses it as a handle for stopping the axle at any desired location or for bringing it back to any position should it rotate too far.

By this method all worn seats of axles are built up by applying the metal spirally around the axle and thus minimizing welding strains, producing a result similar to that secured with an automatic welding machine.

The same mechanism is used for rotating wheels, but in this case the wheel is belted to the back axle of the lathe, the belt passing around the wheel. The axle carrying the wheels is supported at the ends by two horses in a position convenient for the welder.

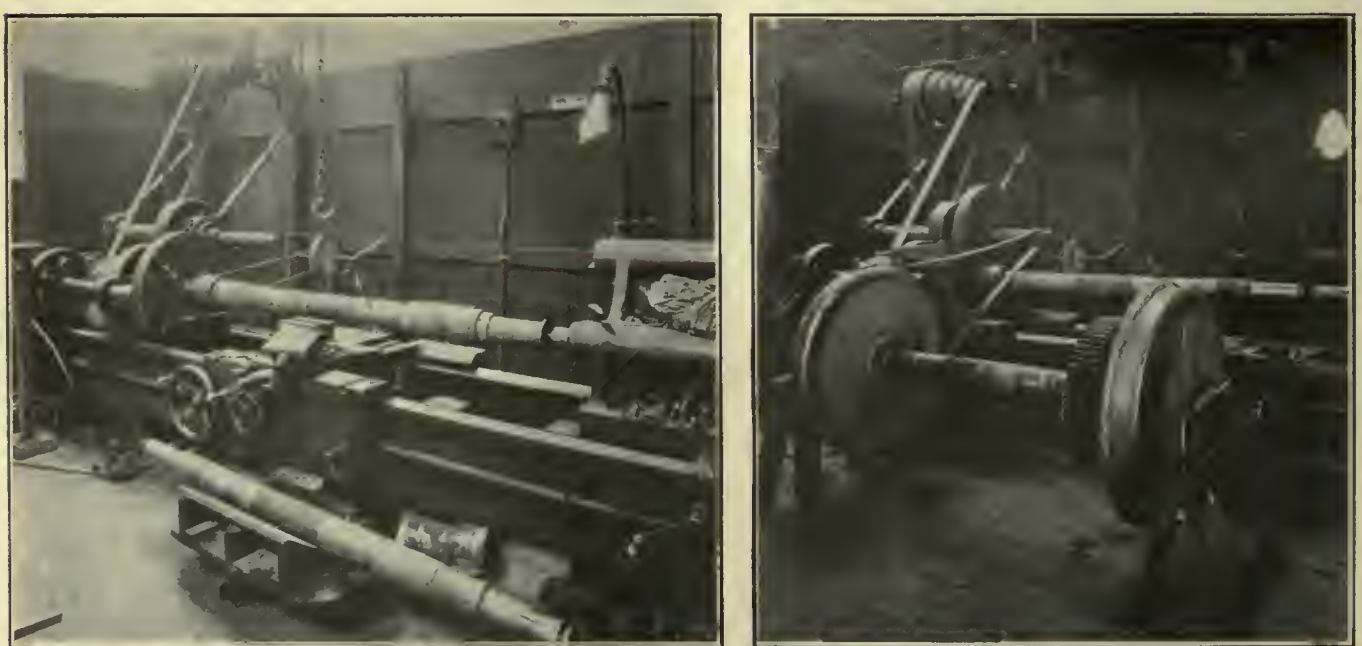


This Light Cradle Saves Labor in Removal of Axles

Convenient Method for Removing Axles

THE Beaver Valley Traction Company of New Brighton, Pa., has at its Junction Park shops a novel method for removing wheels and axles from single-truck cars. A small pit is constructed at right angles to the main track pit. A light carriage of iron strap is made with four wheels to run on a transverse track at the bottom of the side pit. This carriage has a wheelbase the same as the track gage. The top crossbars of the carriage are curved with a radius of 33 in. to take standard wheels. The short section of the track rail above this transverse pit is made removable.

In using this wheel carriage the car is run out of the pit so that one of its axles is directly above the center of the side pit. The body and truck are then jacked up, and the removable section of rail is taken out. The small carriage is then run in to line up with the wheel, after which the hydraulic jack is dropped, and the axle falls with it so that the wheels rest on the carriage. The carriage is then run out to one side, and the wheel and axle may be removed by a crane. A new axle may then be substituted for the one taken out and the car put back in service without being held up longer for the repairs to the axle.



At Left, Belting Attachment to Old Lathe for Rotating Axle During Welding. At Right, Arrangement for Rotating Wheels for Building Up Flanges by Welding

Truck Overhauling Shop Divided Into Sections by Whitewashed Lines

Eliminating Disorder in the Truck Overhauling Shop

THE accompanying illustration shows a section of the Thirty-ninth Street shop of the New York Consolidated Railroad, Brooklyn, N. Y. In order to eliminate the disordered appearance from having various truck parts scattered over the floor, the truck overhauling section is divided into squares by whitewashed lines on the floor. Each truck to be overhauled is set in the center of such a section and the various parts are not allowed to accumulate in the aisles. Sawdust is used on the floor and this is renewed at frequent intervals.

In addition to eliminating the disordered appearance by this method, the work is greatly facilitated as the men do not need to jump over various parts while working and also there is less danger of accidents happening.

Helical Gears Show Little Wear

THE West Penn Railways, Connellsville, Pa., has been using helical gears on its cars for a number of years. The original installation is still in use, and now has made approximately 500,000 car-miles. After this amount of service, the wear is very small, the gear being worn about $\frac{1}{64}$ in. and the pinion $\frac{1}{32}$ in.

This type of gearing has now been adopted as standard by the company. According to Daniel Durie, general superintendent, it has been found that much better service is obtained from the cars thus equipped. Vibration is so much less that the wear on many parts of the equipment is reduced materially. Axles and motor bearings show this especially.

Another important feature is that commutation is much improved. Motors of the non-interpole type are in use almost exclusively on the interurban cars. With ordinary spur gearing there was considerable difficulty from flash-overs when the voltage went up above 650, but with the helical gears it has been found possible to apply 700 to 720 volts without trouble. In fact, commutation on the motors under these conditions is better than it was at considerably lower voltages with spur gears.

New Equipment Available

Gasoline Hammer Drill

A GASOLINE impact drill of the air hammer type has been placed on the market by the Pennsylvania Gasoline Drill Company, Philadelphia, Pa. This drilling unit is self-contained and portable, so that one man can operate and transport it from place to place. It combines the action of an air hammer and a gasoline engine in such a manner that the drilling unit has but two moving parts, the hammer piston and the flywheel assembly. There is no crank or connecting rod and no spring or other yielding member used in the internal construction. Exhaust valves or camshafts are not found necessary, as the air and gas passages are fixed ports, cut through the solid steel of the cylinder.

The down or power strokes of the hammer piston are made with approximately 900 lb. of gasoline explosive force thrusting it forward to hit the drill bit. The flywheel is employed only to return the hammer piston on the upward or compression stroke. Approximately 1,800 impacts are struck each minute. For carburetion, a gasoline mixing valve is used which permits the drill to be worked at any angle. While the drill continues to run at full speed, the operator shifts it from one position to another and to any desired angle without affecting its operation. To start the drill, the operator gives the rim of the flywheel a pull by hand and it starts.

Gasoline Drill and Street Opening Tools Used

Lubrication of the various parts of the drill is provided by scoops, fixed to the hub of the flywheel, which, in turn, runs in a reservoir of oil and delivers a supply to the moving parts. A four- or six-cell dry battery is used for ignition.

Special alloy steel of 210,000-lb. tensile strength is used in the impact members of the structure. To avoid checks, flaws and other imperfections, these parts are machined from solid steel billets. When these parts are heat treated, recording instruments are employed to avoid unknown variations in the heats, thus giving uniformity in the steels. Machining dimensions with very close tolerances are fixed to assure the interchange of repair parts.

The News of the Industry

Conciliation Board Reports

Recommends the Eight-Hour Day for Ottawa Employees—Company Refuses to Accept

The board of conciliation appointed under the industrial disputes act to consider a dispute as to hours of work and wage rates between the Ottawa Electric Railway and those of its employees who are members of Amalgamated Division 279 presented its majority report on June 2. The representative of the company on the board dissented from the award.

The board recommends the establishment of the eight-hour day throughout all the departments of the business and an increase in wage rates sufficient to make the daily wage the same as was earned before in nine hours. It also recommends the abolition of the "pull in" and "pull out" carhouse time allowance so that the net result to the individual employee is a reduction in wages of about $25 per year, but the cost to the company of establishing the eight-hour day would be $115,440 per annum.

COMPANY STATES ITS CASE

A statement has been issued by the company in which it explains the reasons for its non-acceptance of the findings.

It is the company's contention to the board of conciliation that no reasonable arguments were presented on behalf of the employees proving the necessity for the eight-hour day and that it would neither increase the railway revenue nor the efficiency of the service. That if adopted the fare would inevitably be raised because the present revenue of the company could not stand the $115,440 a year which the institution of the eight-hour day would cost the company. To prove this the company presented figures showing that with a conceded value of between $4,500,000 and $5,000,000, an actual cash investment to March 31, 1923, of $4,220,762, and with net profits for 1922 of $278,914, for 1921 of $235,615 and for 1920 of $282,250, the average for the past three years was $265,593.

On the matter of wages the company claimed that it had accepted increases in wages recommended by various boards because the cost of living was abnormal. The board of conciliation last year brought out the fact that the cost of living had dropped 24 per cent. It recommended a reduction in wages of 12½ per cent, still leaving a large margin in favor of the employees. Further, that under the present wage scale a conductor or motorman can earn, without working overtime, $1,500 a year.

The company contended that the board indicated an increase in yearly wages was not considered necessary, but recommended the 6 cents an hour increase for the single purpose of establishing the eight-hour day. In fact the company argues the adoption of the majority report would mean a slight decrease in the wages to the individual trainman because it recommends the abolition of the "pull out" and "pull in" time allowance about $25 a man a year.

In conclusion the company says it cannot continue to accept recommendations from boards of conciliation which constantly add large sums to its operating expenses. Since 1918 six boards have been created by the Department of Labor to deal with the disputes between the company and Division No. 279. Feeling that the eight-hour day is not necessary or justified, the company suggests that employees who are not satisfied seek employment in some other occupation.

Plans Revived for Connection with Cincinnati Loop

Officials of the Cincinnati Rapid Transit Commission are keenly interested in reports from Indianapolis that the directors of the Indianapolis & Cincinnati Traction Company have revived plans for a connection with the Cincinnati rapid transit loop now under construction.

C. L. Henry, president of the Indianapolis & Cincinnati Traction Company, was one of the original boosters of a rapid transit loop which would afford entrance for interurbans into Cincinnati. Plans submitted by Mr. Henry several years ago, which had tentative approval of the Rapid Transit Commission, called for an extension of the line from Rushville, Ind., to Harrison, Ohio, thence through Westwood and the Mill Creek Valley to a point in Cumminsville where connection with the loop was to be effected.

At a recent meeting of directors of the Indianapolis & Cincinnati Traction Company it was stated a more convenient route had been selected by way of College Hill. The entrance to the city would be made over the track of the Cincinnati & Dayton Interurban Railway and to the loop at Spring Grove Avenue.

Frank S. Krug, chief engineer of the Cincinnati Rapid Transit Commission, said that the proposed change in the plan from Harrison by way of College Hill would eliminate the necessity of building a large viaduct over Mill Creek and represented a saving of at least $750,000.

Electrification Approved

Governors of New York and Massachusetts Sign Bills Calling for Large Capital Expenditures

Governor Smith of New York has signed the measure requiring the electrification of all railroads in the city of New York. Many representatives of the New York Central and other roads, such as the Baltimore & Ohio, operating on Staten Island, vigorously opposed the bill at the public hearing held during the week ended June 2. They declared that to comply with this order was impracticable. The law, it is estimated, if made effective will require the expenditure of between $50,000,000 and $100,000,000 before Jan. 1, 1926. The electrification measure was ostensibly directed against the New York Central's west side freight line in New York City, but as drawn is all inclusive in its provisions. Except in the case of the lines of the Baltimore & Ohio Railroad on Staten Island, nearly all the lines of the other companies entering New York are already electrified.

The electrification bill amends the public service commission law of New York as follows:

Sec. 53-a. Electrification of railroads in certain cities. No railroad corporation, operating a railroad or a part thereof within the limits of a city of the first class having a population by the last state or federal census of 1,000,000 or more, shall on or after Jan. 1, 1926, use any motive power in the operation of such railroad or part thereof within the limits of such city, except electricity to be generated, transmitted and used in said operation in a manner to be approved by the Public Service Commission. The commission shall have power to prescribe the location, elevation, size, kind and construction of poles, wires, safety devices, conduits, and all erections, buildings, fixtures, appurtenances and equipment used or found by the commission desirable, to be used in the electrification, maintenance or operation of such railroad or part thereof within the limits of such city.

Sec. 2. This act shall take effect immediately.

BOSTON ELEVATED WILL OPERATE LINE

Governor Cox of Massachusetts has signed the so-called Dorchester Rapid Transit Bill, providing for the operation of electric trains over the Shawmut Branch of the New Haven road from a point near Andrew Square, South Boston, to Fields Corner. It is intended that the Boston Elevated Railway shall operate the line.

The improvements intended to be carried out under the provisions of this measure call for the expenditure of more than $5,000,000. Of this amount it is expected that the State will be called upon to contribute about $4,000,000, while it is expected that the expenditure on the part of the Boston Elevated Railway for rolling stock and other equipment will account for the other $1,000,000 of the total expenditure.

Purchase Proposal Explained by Milwaukee Company

The Milwaukee Electric Railway & Light Company has recently explained in display space in the daily newspapers the recent reports of a proposed operating and option-to-purchase contract between the company and the city of Milwaukee.

The contract under discussion is being negotiated by committees representing the city and company, subject to ratification or rejection by the people. It will, if ratified, give the city more power than it now has to supervise the company's services. It will give the city an option to purchase the company's property at any time, on six months notice, at a price agreed on in the contract, plus cost of additions to date of purchase. It will provide a financial interest for the city in economies resulting from closer co-operation between the city and company in operating matters. The company explains that purchase by the city, at such price, would assure preferred shareholders repayment in full of every dollar they put into this business. This is the case at present, and must continue to be the case, according to the company, under state regulation of the company's financing of new growth from year to year.

In regard to bus service the company says that it aims to supply its transportation customers with whatever new forms of service they may desire. The company is operating one of the largest fleets of fast passenger and express motor buses, in city and interurban service, attached to any American street railway system. In this connection it says:

> Your company will supply increased bus service as fast as increase of public demand will warrant it. We think you need have no fear that your city government will discriminate against your company, in this field, in favor of folks from the outside. And you need have no fear of your company's ability to hold its field against all comers, in fair and open competition. We have never bragged of it, but your company for years past has been known among experts throughout the country as a leader in the invention and adoption of the best new methods and devices for improving street railway service, as well as in the other branches of its business.

The company also explained the idea behind the recently-installed city bus service, and said that "as in all large and rapidly growing cities increase in population provides plenty of work for both car and bus lines."

Wages Increased in Evansville

Frank L. Haas, vice-president and manager of the Southern Indiana Gas & Electric Company, operating the city car lines in Evansville and the Evansville & Princeton Traction Company, has announced a new wage agreement for the conductors and motormen, effective June 1. The new wage agreement calls for an increase of 4 cents an hour for employees on two-men city cars and also the same increase for interurban employees. The pact carries an increase of 5 cents an hour for employees on one-man cars.

The old wage pact, which expired at midnight, May 31, was for 36 to 41 cents an hour for two-men cars in the city, and 40 to 45 cents for one-man cars, and 38 to 43 cents for employees on the company's interurban cars.

The employees on the Evansville & Princeton Traction Company get a 4-cent increase, flat.

New men will continue to receive a 1-cent increase upon every six months of service.

Ordinance on One-Man Cars Introduced

Operation of one-man cars by the Columbia Railway, Gas & Electric Company, Columbia, S. C., will be permitted under an ordinance introduced by title into the City Council. The ordinance was introduced by the Mayor, who said he had a letter from the South Carolina Railroad Commission showing that that body had given the railway company authority to put on the one-man car in Columbia. There have been rumors for some time that the one-man cars would be used in Columbia. Charleston uses that system. The Columbia railway, which charges a fare of 7 cents with 3 cents for transfers, has, according to reports, been losing money and the adoption of the one-man car will reduce expenditures. At the present time, two-men cars are in operation. Jitneys, charging 10 cents per passenger, operate extensively in Columbia and have cut into the revenue of the car company to a considerable extent. Orders for new equipment have been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Minimum Wage Scale Increased in Birmingham

A material increase in the minimum wage scale of workers is provided under a three-year contract which has been signed by the Birmingham Railway, Light & Power Company of Birmingham, Ala., and Local No. 725 of the Amalgamated Association, according to an announcement on May 25 by R. P. Bernhart, president of the local. The new contract became effective on June 1 and succeeds a one-year contract now in effect.

No change, it is stated, is made by the new contract in the existing maximum wage scales. The new contract, it is stated, provides better working conditions. Mr. Bernhart stated that it was ratified by the union by a 9 to 1 vote.

Trainmen on the extra board are guaranteed a minimum of six hours a day under the new contract. Under the old contract they were guaranteed a minimum of 105 hours in fifteen days. Based on 125 men on the extra board, Mr. Bernhart stated that this provision of the new contract will represent an increase of about $25,000 a year. Under the new contract, it is stated that regular trainmen get better runs and that a number of split runs are eliminated and new runs created. The minimum wage for shopmen, including apprentices and helpers, is increased by the new contract from 2 to 12 cents per hour, it is stated.

Mr. Bernhart estimates that seventy men will be affected by these increases in wages.

Queensboro Subway Tunnel Open

© Wide World Photos.

The last rock of the Queensboro subway extension to Times Square was broken a short time ago. Work was started on the tunnel last August and it is hoped that it will be completed by January, 1924, which will be nine months ahead of schedule. More than six tons of dynamite was used to drill through the rock from Grand Central to Bryant Park.

California Lighting Company Wins Coffin Medal

The Southern California Edison Company, Los Angeles, of which John B. Miller is president, was presented on June 7 with the gold medal of the Charles A. Coffin Foundation, offered for the first time last year to the electric public utility company of the United States which made the most notable contribution during the year to the development of electric light and power service. This is the first award of the medal to be made by the foundation, which was created by the General Electric Company. The recipient was selected from eighteen electric light and power companies which submitted their year's records for consideration, and the decision is understood to have been extremely close. The presentation of the medal was made during the meeting of the public policy committee of the National Electric Light Association, which was holding its annual convention in New York. Frank W. Smith of New York, president of the association and chairman of the association's Charles A. Coffin prize committee, officially presented the medal.

The award of the medal was accompanied by the presentation of a check for $1,000, to be applied to the employees' benefit fund of the Southern California Edison Company, under the terms of the foundation.

The foundation comprises a fund of $400 000. the income from which is to be devoted to rewarding outstanding service in the electrical field. In addition to the gold medal to be awarded annually to an electric light and power company, provision is also made for a gold medal to be awarded to an electric railway company and for certain fellowships to graduates of American colleges and technical schools.

Commission and Mayor in Parleys on Transit for New York

A spirit of co-operation on the part of the city administration was manifested at the hearing recently before Mayor Hylan on modifications of the Transit Commission's plan for new rapid transit facilities for boroughs of Manhattan, Brooklyn and Queens. The Mayor stated emphatically that he proposed to give the public transit routes which it most desired.

Chairman McAneny of the Transit Commission told the Mayor the commission had accepted modifications of its crosstown route and the Washington Heights route which bring them into conformity with the Mayor's plans. He declared little change would be necessary in the proposed extension of rapid transit lines to Flushing and to Fort Hamilton or in the plans for completing Nassau Street line. Mr. McAneny urged approval of these routes by the Board of Estimate so that construction work could be started at once.

The Mayor expressed doubt as to the advisability of tying up new lines with existing lines operated under lease by private companies, and stated his desire to place the city in such a position financially that it could recapture any rapid transit properties deemed advantageous.

Wants Electrification of Roads Entering St. Louis

Director of Public Safety James N. McKelvey of St. Louis is sponsoring a move to compel the railroads entering St. Louis to electrify their lines within the city limits. It is part of the drive now under way for smoke elimination.

Mr. McKelvey has obtained and is studying a copy of the bill recently signed by Governor Smith of New York and referred to elsewhere in this issue providing for the electrification of steam railroads within New York City by Jan. 1, 1926.

City Counselor Haid will be requested for an opinion of the legality and advisability of a city ordinance for St. Louis to eliminate other than electric locomotives in St. Louis. Prof. E. T. Ohle, chairman of the St. Louis Smoke Advisory Committee, has stated that the McKelvey plan is worth consideration. The railroads have not been consulted.

Test Run Over Route Where Accident Occurred

Further investigation has been made by the New York Transit Commission of the accident about 5:03 p.m. on May 1, to a double-truck closed car No. 20 of the Manhattan Bridge Three-Cent Line. This car while eastbound was derailed at the Bridge Plaza, on the Brooklyn side of the Manhattan Bridge, and collided with two iron trolley poles between the tracks. The car was badly damaged and thirty-three persons were seriously injured. The preliminary investigation made by this commission indicated that either the brakes failed or the motorman failed to apply the brakes before reaching the reserve curve. As a result of further investigations made by the engineers of the commission, it developed that the equipment provided six methods of stopping the car:

1. By service application of the brakes from the motorman's valve.
2. By an emergency application of the brakes from the motorman's valve.
3. By an emergency application of the brakes from an overhead emergency valve.
4. By application of the hand brake.
5. By application of power to the motors through reversing them.
6. By the regenerative effect of the motors being short-circuited should power fail.

A car with equipment similar to the one in the accident was operated over the various grades of the line and stops made by all of the preceding methods. These tests showed that with maximum speeds of as high as 25 to 30 m.p.h., very short stops could be made upon the severe grade of the Manhattan bridge and that even had the air brake and the brake rigging of the car become entirely inoperative and the power lost for any reason the last-mentioned method of braking could still have been used in an effort to stop the car.

Maximum of Fifty-five Cents for New York State Men

The recent acceptance by employees of the New York State Railways in Rochester, Syracuse and Utica, N. Y., of the offer of the company, which embraced a wage increase of 5 cents an hour, was brought about after a series of conferences that were held in the three cities.

The men originally sought a scale up to 65 cents an hour. The wage prior to the increase was 46, 48 and 50 cents for employees of three, six and twelve months or more, respectively. Five cents an hour is added to each of these wage figures by the new contract, accepted by the men in simultaneous meetings in the three cities the morning of June 2. The chief opposition to the acceptance of the company's offer was encountered in Rochester. It is said that there was little opposition in Utica or Syracuse.

It is significant that the New York State Railways is the only large operator in the state which officially recognizes the trolleymen's union. The new contract, which expires on May 1, 1924, made no mention of a closed shop. Quite a number of employees, however, do not belong to the union at the present time.

According to officials of the New York State Railways, the wage increase involves an estimated additional expense to the company of $500,000 for the year.

Twelve per Cent Advance on Beaver Valley Lines

An agreement was recently entered into between the trainmen and management of the Beaver Valley Traction Company, New Brighton, Pa., whereby the men will receive an increase in wages approximating 12 per cent. At the same time wages of the carhouse and shopmen were voluntarily given a boost equal in percentage to the trainmen's advance. Recently employees on trackwork were given an advanced rate.

The co-operation of the employees in building up the business and in effecting economies were sufficient reasons for the increase, in the opinion of the company's representatives, although the present revenues of the company did not justify the increase. It has been many years since there was a wage dispute on the lines of the Beaver Valley Traction Company.

Journal Helps to Enforce Law

Considerable publicity has been given in the local newspapers in Buffalo to the article in the May 26 issue of the ELECTRIC RAILWAY JOURNAL entitled, "Bootlegging Jitney Rides in Buffalo." Parts of the article have been reproduced and newspapers have printed editorials calling upon the city authorities to enforce the anti-jitney law because of the unfavorable impression which is going out of Buffalo by reason of the illegal operation of buses in the city.

Strike in Albany

Service Restored Between Schenectady and Interurban Lines—Jitney Service Gains

A new trolley men's union started to function among the employees of the United Traction Company in Albany and Troy on June 2, when the company officials discharged about a score of the leading members thereof. The day following, Sunday, and the day of the opening of the Elks' state convention, the men went on strike. Three or four cars were stoned early Sunday morning in Albany, the police promptly arresting the disorderly persons. The company was able, however, to maintain a 60 per cent service in the city of Albany on Sunday, although service with Rensselaer, Troy, Watervliet and Cohoes was not had until evening. The strike lasted exactly three days, all of the men except those the company had permanently discharged returning to work. The new union admits its defeat.

Service was restored between Schenectady and the cities served by its interurban lines this week, and while no attempt was made to run the full schedule, such trains as were operated received a goodly amount of patronage.

Schenectady Lines Also Affected

In the city of Schenectady an increased number of cars are being operated, although at seven o'clock at night the cars are put in the carhouse. They are carrying many passengers.

Rioting and disorder broke out in Schenectady on June 6, when three or four cars became stalled in the heart of the city, as the result of which one of the workers is in the hospital and three arrests were made. Further rioting occurred in the middle of the night when an attempt was made to return some cars that had been left on the streets to the carhouse, during which several shots were fired.

The Mayor highly commended the police for their prompt and efficient work and called upon the citizens and strike breakers to preserve law and order in the future.

Report Expected on Findings

The state investigation being conducted by the Industrial Commission, which was to have concluded its work on June 7, with the taking of the testimony of J. F. Hamilton, again postponed its final session until June 13, at which time it is hoped to conclude its work and render a report through the public press of the result of its findings. Union officials and Harry B. Weatherwax have already been examined, the latter having been catechized quite thoroughly as to capitalization, earnings, dividends and the general condition of the company as well as his personal reasons for entering into a new working agreement with the union.

Jitney service during the hot weather has gained considerable impetus between the cities affected by the strike, and with the temporary tie-up of the Albany lines on Sunday, motor service between Albany and Troy, which has been running in the face of injunction orders ever since the big Albany strike, gained a new lease of life. A regular terminal has been established opposite the post office in Albany, with a starter in charge, and cars proceed as rapidly as loaded. The starter is paid 25 cents for each loaded car dispatched.

On June 3 jitneys were being dispatched to Schenectady, Troy and Midway Park at the rate of one every two minutes from the Albany terminal. A similar terminal arrangement is had at Schenectady for its interurban service. No attempt has been made by the jitneys to compete with the regularly established and duly licensed bus routes.

The Schenectady Railway has not yet applied for an injunction to stop jitney service in that city.

Conference Called on Chicago Situation

In an effort to avert the threatened street car and elevated railroad strike in Chicago Mayor Dever called both sides in the wage controversy into conference in his office in the city hall on June 8. Although the Mayor has met the various groups separately several times during the past week, this was the first joint meeting of the officials of both local transportation companies and the union representatives. The deadlock over the 10-cent an hour increase demanded by the men continues.

A resolution was adopted on June 4 delaying the taking of a strike vote. William Quinlan, head of the union, presented the resolution at the meeting of the street car men's union at Carmen's Hall. It set forth that Mayor Dever asked the men to refrain from doing anything to "intensify the situation" until he had further chance to work for a settlement without an actual blockade of transportation.

The resolution set forth that the men would lose nothing by granting this "fair request," but would strengthen their position. It called for a continuation of the wage negotiations, which were broken off early during the week ended June 2. If the officers, aided by the Mayor, are unable to get a settlement proposal worth while submitting to the men, they are empowered, if they deem it necessary, to take a vote of the membership on the question of a walkout.

The younger members of the union started a stampede as soon as the resolution was read. In the midst of the bedlam Mr. Quinlan pounded his gavel and declared the resolution adopted. The meeting was declared adjourned.

While the way was opened for continued negotiations between officials of the local transportation companies and the union men, a threatened walkout of the trackmen, who number 2,000, was also headed off. They also met Monday night all primed for a strike vote, but Samuel P. Luzzo, president of the union, announced that late in the afternoon he had held a conference with G. A. Richardson, vice-president in charge of operation of the Chicago Surface Lines, and that the companies had conceded that when the wage scale is fixed for the trackmen it will be made retroactive, being given the same date as that of the trainmen. A threatened "sympathetic strike" of the substation electricians, whose wage agreement does not expire until later in the year, was also forestalled by this action. Employees of the Elevated Lines are expected to take similar action at their meeting on June 9.

Wages Increased in Philadelphia

In conformity with the wage increases of the Cleveland Railway the general committee under the Co-operative Plan has agreed that the scale of wages of the trainmen of the Philadelphia Rapid Transit Company be increased 1½ cents an hour. The new scale in cents per hour effective May 1, 1923, is as follows:

	Men New	After Three Months	After One Year
Surface motormen and conductors ..... (Operators—one-man cars, 5 cents additional.)	59	62	64
Elevated motormen ...	62	65	67
Elevated conductors ..	59	62	64
Elevated guards	59	61	62

The Co-operative Plan for Collective Bargaining provides as a basis for determining wages the average of the wage scales of the electric railway companies in Chicago, Detroit and Cleveland.

News Notes

One Dead in Accident.—One person is dead and four injured as the result of a runaway car of the Sixth and Amsterdam Avenue route speeding down the hill on Amsterdam Avenue and 118th Street, New York, jumping the track and crashing into a five-story apartment building. The accident occurred on June 7. The damage to the front wall of the building is estimated at $15,000.

Wages Advanced Five Cents.—The Pennsylvania-Ohio Electric Company and the Youngstown Municipal Railway, operating city lines in Youngstown and Warren, Ohio; New Castle and Sharon, Pa., and interurban lines connecting those cities, have entered into new wage agreements with their car service employees, granting an advance of 5 cents an hour. The new wage scale is 48 cents an hour for the first three months of service, 51 cents an hour for the next nine months and 57 cents an hour after one year, with 5 cents an hour additional on each classification for one-man operation.

Financial and Corporate

Warrant Basis in Seattle

Railway Employees Will Take Action—Five-Cent Fare Accumulates $550,000 Deficit

The Seattle Municipal Railway system is now on the warrant basis and will continue to operate on warrants for the next year as regards supplies and equipment purchased. Warrants stamped "not paid for want of funds" were issued for the April bills for supplies and equipment.

In the meantime the men's union is debating plans of procedure offered it, in case warrants issued for its members' pay and stamped not payable because of lack of funds are presented them in lieu of their checks. The head of the trainmen's union states that the union will take no action as a body until the warrants have been offered them, believing that the City Council will find some way to meet the payroll with negotiable warrants. If no such action is taken, the union members may ask for an injunction restraining the city treasurer from laying aside any money for interest on the purchase contract on the theory that labor has the first claim on the car lines' receipts.

Under the 5-cent fare, the lines will have accumulated a deficit of more than $550,000 during the months of March, April, May and June. This must be reckoned with other charges in the issuance of warrants. The fare bill raising cash fares to 10 cents, with sale of tokens at three for 25 cents, will be passed over the veto of Mayor Brown, but will not become effective before July 4.

A. W. Leonard, president of the Stone & Webster interests in Seattle, recently returned from a business trip to Boston. He has advised City Council members that the Old Colony Trust Company, trustee for the holders of the bonds issued by the city of Seattle to purchase the railway system, will be glad to discuss proposals for an extension of time in which to pay off the obligations. The first requisite for entering into negotiations would be the establishment of an "adequate fare." Mr. Leonard was not prepared to say whether the 8½-cent fare proposed would be deemed "adequate."

Files Suit to Force Payment on Chicago Railway Certificates

Holders of series 1 certificates of the Chicago Railways filed suit in the United States District Court in Chicago on May 28 in an effort to force payment of dividends at the annual rate of $8 a share with accruals on that basis from Aug. 1, 1917. The suit is directed against the company, its officials, the City of Chicago and Martin J. O'Brien, city comptroller. The municipality and the city comptroller are made parties to the suit because the latter failed to certify to bonds to which the company is entitled for extensions of its system as required by ordinances.

It is charged that under the plan for the reorganization of the Chicago Railways the series 1 certificates were to receive $8 a year cumulatively out of the net earnings before the railways should build up any surplus or make other disposition of net earnings. The payments, amounting to $240,000 a year were made up until Aug. 1, 1917. Since then the company has been used to build up a surplus, which now aggregates about $2,000,000, it is alleged in the bill. Back dividends to Aug. 1 amount to $48 a share or about $1,400,000.

The bill also asks that the company be restrained from selling, transferring or encumbering any first mortgage bonds which already have been issued to it or to which the company is entitled by means of capital expenditures.

The suit was filed in behalf of Mahlon D. Thatcher and Miss Helen P. Luce of Pueblo, Colo., and Rhode Island Hospital Trust Company of Providence, R. I.

$54,000,000 Valuation for St. Louis

Figure of Commission Contrasts with Company's Claim of $70,000,000 and City's Contention for $29,805,957 — Commission's Figure $43,347,790 Less than Par Value of Outstanding Securities

THE Missouri Public Service Commission handed down a decision on June 4 fixing the value of the property of the United Railways of St. Louis for rate-making purposes at $51,761,348, plus the Missouri Electric, a suburban subsidiary company, at $781,949, as of Jan. 1, 1919.

This means a valuation of approximately $54,000,000 because more than $2,000,000 has been added to the property since the date mentioned. The receiver of the United Railways claimed a valuation of $70,000,000, and the city's attorney contended for $29,805,957 as a rate basis value.

Will Seek Rehearing

Whether the valuation would be accepted by the receiver and the various groups of security holders had not been decided when this report was written. However, a rehearing of the case will be asked for by the railway company.

In its decision the commission stated it had taken into consideration the rule of the Supreme Court of the United States as enunciated in the Southwestern Bell Telephone case a few days ago, holding that reproduction value must be considered in evaluating public utility properties.

The commission gave the details of the valuation as follows:

Actual investment cost of physical property other than land	$35,013,419
Add 50 per cent to cover increase in prices	17,506,710
Total	$52,520,129
Deduct 30 per cent for accrued depreciation	$15,756,038
Total	$36,764,071
Add for construction overhead costs	5,252,013
Add for land at present market value	3,252,470
Add franchise (money actually expended	208,522
Add for working capital and stores and supplies	2,151,014
Add for promotion, cost of financing and consolidation	2,700,000
Add for going concern value	2,500,000
Total fair present value as of Jan. 1, 1919	$52,838,110

Of the foregoing amount $1,056,762 is not useful in transportation service. Hence the rate base as of the date aforesaid is $51,761,348, the commission comments.

It will be noted that the commission deducted $15,756,038 for accrued depreciation from the estimated reproduction cost of the property other than land.

The valuation figure is $43,347,790 less than the par value of the stocks, bonds and receiver's certificates of the company, which on Dec. 31, 1920, had a market value of $30,725,975. No prediction on the effect of the decision on the market value of stocks could be obtained from financiers in St. Louis. The normal effect would be to make the market value approach the appraised value.

The commission also announced that no increase would be made in the present 7-cent fare in St. Louis at this time. On the other hand, it declared that fares could not be reduced, as the present earnings of the railways are at the rate of 6.4 per cent on the valuation announced.

Additional Property Fixed at $1,056,762

A formal statement issued by the Missouri Public Service Commission, commenting on its decision, follows:

"The proceedings before the Public Service Commission for a valuation of the property of the United Railways, was brought to an end by the decision of the commission, as announced today, fixing the value of the property of the United Railways, of St. Louis for rate making as of the first day of January, 1919, at the sum of $51,761,348.

"The value of the company's additional property of the same date, which is not used for serving the public, was fixed at $1,056,762, making a total valuation of all the property of the United Railways, as of Jan. 1, 1919, of $52,838,110. The net additions to the property since the first day of January, 1919, to the end of the year

1922, makes the total value of all the property at the end of 1922 the sum of $53,222,012.

"The revenues for the year 1922 were $20,166,386 and the operating expenses, including $1,500,000 for depreciation, were $16,741,231. This left $3,425,155 for a return upon the total valuation of $53,222,012 at the end of 1922, which is 6.4 per cent thereon.

"Under such a showing the commission finds that the rates should not be increased; neither can they be decreased until revenues are increased or expenses reduced.

"The value of the property of the United Railways as fixed by the commission is $43,347,790 less than the par value of the stocks, bonds and receiver's certificates of the company now outstanding.

"The value as fixed included the property of its subsidiaries, the Florissant Construction, Real Estate & Investment Company, which owns 500 acres of land in St. Louis County, and the St. Louis County Railroad, which owns 2 miles of track in St. Louis County now leased to the Missouri Electric Railroad, which in turn owns and operates an electric railroad from Wellston to St. Charles.

"A separate valuation was made by the commission of the property of the Missouri Electric Railroad and the commission fixed the value of the property of that company as of Jan. 1, 1919, at $781,949. The inventories and appraisals as made by the engineers were of that date.

"The accountants of the commission made an audit of the books of the companies for the purpose of ascertaining the cost of the property now in use. Their report shows the cost of the property of the United Railways in use as of Dec. 31, 1919, to have been $47,863,728. The report of the accountants is subject to further adjustments because complete accounting records were not available.

Three Years Spent in Appraising Property

"The commission engineers under the direction of Chief Engineer J. L. Harrop spent three years in making a detailed inventory and appraisal of the property of the company. There was no dispute as to the inventory of the property.

"The case turned largely upon land values, the unit prices to be used in making the appraisal of the other physical property, the intangible values claimed by the company and deductions for accrued depreciation. The commission allowed the company for land at its present market value as estimated by its engineers and added thereto $175,000. The commission sustained the city in making large reductions for depreciation.

"The construction overhead costs as fixed by its engineers were reduced from $7,387,693 to $5,252,013, which was a victory for the city.

"In response to the ruling of the Supreme Court of the United States as announced in the recent case involving rates to be charged by the Southwestern Bell Telephone Company, the commission added 50 per cent to the appraisal by its engineers of the physical property of the company other than land, to wit: $15,506,710. That amount was added to represent increased costs which prevail now over the costs incurred by the company at the time the property was constructed. That was one of the points urged by the receiver and the company and their attorneys.

"The commission sustained the contention of the city and refused to allow any part of the $7,000,000 contended for by the company for property which had been superseded and rendered useless by changing the roads from horse and cable road to electricity. The company claimed large allowance for cost of promotion, consolidation financing and going value, which were greatly reduced by the commission.

"A final analysis of the report of the commission shows the investment cost of the property of the United Railways as estimated by its engineers, plus the present fair market value as of the date of the appraisal, to be $48,587,438.

Valuation Case Started in 1918

"The accountants' report shows the cost of the property in use at the time of the transfer of the capital stock of the constituent companies to the United Railways, was $25,001,134, and that there were issued on account thereof by the United Railways stocks and bonds to the amount of $51,654,329. The property thus acquired by the United Railways was leased for operating purposes to the St. Louis Transit Company. The Transit Company continued to operate the property until Nov. 1, 1904, at which time it became insolvent and returned the properties to the United Railways.

"The property of the United Railways as valued by the commission included all the lines in the city and in St. Louis county, excepting that of the Missouri Electric Railroad, which was separately valued.

"Counsel for the company and the receiver contended for a valuation of the properties of the United Railways of $60,000,000. C. E. Smith, engineer for the city, estimated the value of the property for rate making at $40,000,000."

The valuation case was instituted in 1918. It grew out of an application made by the United Railways to raise its rates above that fixed in its franchise from the city to meet increased wages of its employees and other increased operating costs.

The commission authorized an increase of the fares from 5 to 6 cents for adult passengers in 1918. The Supreme Court upheld the power of the commission to increase fares above the rates fixed by the franchise. The commission thereafter arbitrated and settled a controversy between Rolla Wells, receiver, and his employees as to wages. The commission subsequently increased the fares from 6 to 7 cents for adult passengers, which is the fare now being charged. The report of the commission in the case contains more than 100 typewritten pages and marks the end of a long controversy, the case having been finally submitted to the commission for decision by the filing of the company's reply brief on March 20, 1923.

Communities Must Support Utilities or Lose Service

In its decision upholding the opinion of the State Public Utilities Commission, permitting the Indiana, Columbus & Eastern Traction Company to abandon its lines between Columbus and Grove City, the Ohio State Supreme Court revealed what the attitude of a community toward its utilities should be. The issue was referred to in the ELECTRIC RAILWAY JOURNAL for May 12, 1923.

The court ruled that, after careful reading of the entire records, one is convinced that the utility could have continued to serve the community if it had had its support and co-operation. Further, it is apparent that the community cannot support truck and bus service, operate privately-owned autos and at the same time afford sufficient patronage to the rail line to justify its continued operation.

The court said, in its findings, that it was a matter of astonishment that the village, city and state executive officials, together with hundreds of people in the vicinity where the line operated, could appeal to the court to compel the continuance of a service, when the conditions which made that service unremunerative were of their own choosing.

In the opinion of the court the commission realized the economic problem, because the original order of abandonment of May 9, 1922, was suspended until Sept. 1, 1922, evidently for the purpose of probation, to determine whether the protestants were earnestly and sincerely desirous of continued railway service.

The court said that it was deplorable that the community must lose the service of the utility and that the community would indeed sustain a severe loss. It might even be that some plan of co-operation between the utility and the community could be made to save the situation, but the court ruled that the legal processes presented by this review must be resolved in favor of the commission. For that reason the utilities commission's order was affirmed by the court.

The traction line expects to abandon service about July 1 on the branch, that period of time being granted by the court to the residents along the line to offer the company some satisfactory proposition or to take over its operation, but to date, such plan has not been forthcoming, and all indications point to complete abandonment of traction service on the branch when the limit expires.

B. R. T. Reorganization Approved

Provisions of Agreement Drawn Up by Representatives of Security Holders Sanctioned by State Body

The New York Transit Commission approved on June 4 the reorganization of the Brooklyn Rapid Transit Company. This action removed the last legal obstacle to the reorganization and marks the end of the receivership, which has lasted for four and a half years. According to members of the reorganization committee, the Brooklyn Rapid Transit Company may be succeeded by the recently incorporated Brooklyn-Manhattan Transit Corporation as the holding company of the B. R. T. system early during the week commencing June 11.

The commission also approved the merger of the New York Municipal Railway Corporation into the New York Consolidated Railroad. The latter company operates the B. R. T. rapid transit lines. The New York Municipal Railway Corporation, the stock of which is owned by the New York Consolidated, was organized in 1912 to conduct contractual relations with New York City in its lease of subways. The merger of the two companies is part of the reorganization plan.

The name of the new company to be formed by the merger has not been made public. A meeting of the B. R. T. reorganization committee on June 4 authorized the purchasing committee to buy the New York Consolidated Railroad when it is offered for sale. Approval of this purchase by the United States District Court is expected at once, in which case articles of incorporation of the new company were expected to be filed in Albany on June 8.

The commission based its action in approving the reorganization plan and the merger on a thirty-page opinion by Commissioner Le Roy T. Harkness.

Mr. Harkness listed the benefits of the organization plan as follows:

1. Termination of Receiverships. Under the reorganization $5,000,000 cash and a $50,000,000 prior lien mortgage to take care of future needs are provided for rapid transit capital expenditures.

2. Long-Time Financing—The whole B. R. T. subway financing was based upon the issuance of nearly $60,000,000 six year 6 per cent notes, which during the war were replaced by three-year 7 per cent notes. This condition is remedied and the situation safeguarded by refunding these notes into long-term bonds carrying 6 per cent interest.

3. Payment of Debts.

(a) Receiver's Certificates and Accrued Interest—Receiver's certificates aggregating $12,000,000 and now carrying 8 per cent interest are paid off. Unpaid and accrued interest amounting to $27,000,000 is paid in part and the balance adjusted, thus clearing the way to paying current bond interest.

(b) Tort and Contract Creditors—Claims of tort creditors estimated at $2,200,000 are to be paid in cash in full. Claims of general contract creditors amounting to $1,600,000 are to be adjusted.

4. Provision of New Money—Stockholders are to supply $26,000,000 of new money for the purpose of the reorganization, of which $5,000,000 is to go for rapid transit needs, and the balance after paying claims and expenses, to provide additional working capital. This, with the new $50,000,000 prior lien mortgage, should put the new company in a strong financial condition, especially on the rapid transit side.

5. Public Participation—A voting trust agreement, put in evidence, provides for three representatives of the public on the board of directors.

6. Further Readjustment—This readjustment and the settlement of the legal questions that have abounded during the receivership paves the way for pressing to a conclusion the commission's plan for the readjustment of all the transit lines in the city.

7. Bettered Service and Restoration of Transfers—Over and above all, from the standpoint of the riding public, is the opportunity the reorganization gives for bettered service and the restoration of transfers as and when net earnings increase.

Mr. Harkness discussed the objections put forward by the city, which included opposition to a holding company, failure to consolidate the surface line properties, the receipts over expenditures and the valuations placed upon the company's properties by the commission. He said that the absence of the Brooklyn City Railroad, the lease of which by the B. R. T. was abrogated during the receivership, was unfortunate. He pointed out that this company might, however, come into the reorganization in the future.

Regarding the alleged overcapitalization and lack of sufficient margin of receipts over expenditures, Mr. Harkness said that a reasonable margin was indicated.

In discussing methods of valuation, Mr. Harkness held that in this case, original value less cost of putting in first-class condition was a reasonable method of calculation. On this basis the valuation of the B. R. T. properties was fixed at $164,992,589.

On June 5 the properties of the New York Consolidated and the New York Municipal Railway Corporations were sold to the representatives of the reorganization committee for $26,500,000, with the approval of Judge Mayer, on June 7.

The terms of the proposed reorganization were reviewed at length in the ELECTRIC RAILWAY JOURNAL for Feb. 17, 1923, page 304.

Sale of Waukesha Plant Being Negotiated

The Wisconsin Gas & Electric Company, Racine, a subsidiary of the Milwaukee Electric Railway & Light Company, has applied to the Wisconsin Railroad Commission for authority to issue $400,000 of serial notes for the purpose of paying in part the purchase price of the electric and gas plants of the Waukesha Gas & Electric Company, located about 25 miles from Milwaukee and 35 miles from Racine.

At present the output of the steam generating plant of the Waukesha Gas & Electric Company is supplemented by a high-tension transmission line from which the Milwaukee Electric Railway & Light Company has been supplying this company with additional energy from its Lakeside power plant.

The Waukesha Gas & Electric Company is owned by the American Gas Company, Philadelphia. The annual report of the company as rendered to the Wisconsin Railroad Commission, for the period ending Dec. 31, 1920, discloses a valuation of $983,032.

New Orleans Stock Off List

The stock of the New Orleans Public Service, Inc., both common and preferred, will be taken off the list of the New Orleans Stock Exchange. Official notification has been received by Howard W. Newman, president of the Exchange, from R. S. Hecht, chairman of the board of the Public Service, Inc., declaring that the stock is ineligible for listing under the rules of the Exchange.

Mr. Hecht stated further in his communication that the Chase National Bank, the Electric Bond & Share Company and allied interests not only control 90 per cent of the common stock as the result of the reorganization agreement, but recently became the owner of 50 per cent of the preferred stock. It was also stated by Mr. Hecht that those interested in the rehabilitation of the New Orleans system were of the opinion that it would be best to let the stock prove its value during the period of one year (the trial year) under which the public utilities are now being operated by agreement.

It was shown by Mr. Hecht that the preferred stock of the corporation advanced from 75 to 87½, under sales made in units of ten shares, between April 15 and May 15.

Jersey Central Traction Applies for Abandonment

The Jersey Central Traction Company, Keyport, N. J., has made application to the State Utilities Commission for permission to abandon its entire system of trolley lines. In its application the company gives as its reason for desiring suspension the wide use of automobiles by residents of Perth Amboy, South Amboy, Keansburg, Atlantic Highlands, Keyport and other towns. According to General Manager Hitchcock, the company has been running behind in operating expenses at the rate of $6,000 per month. The Jersey Central Traction Company employs more than 100 men and owns 40 miles of track and thirty-six cars.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons, New York, on June 6 there was sold $1,000 of the Oregon Electric Railway's first mortgage 5 per cent bonds, due 1933, interest May and November, 47 per cent.

Consolidation of Maryland Companies Proposed.—The Potomac Public Service Company and the Cumberland Edison Company will be merged into one company, known as the Maryland Public Service Company, according to present plans, which will be the subject of a hearing in Baltimore before the Maryland Public Service Commission. Both companies are controlled by the American Water Works & Electric Company.

Bids Made for Old Equipment.—The Southern Wisconsin Railway, which plans to build a railroad from Madison to the Sturgeon Bay region by way of Fond du Lac, has submitted a bid for

the ties and rail of the Wisconsin Interurban line, which formerly operated in Madison and in Portage, but which went out of business early in 1922 due to bankruptcy. The cars of the company in Portage were sold to a Portage concern. These cars were dismantled and the trucks used under converted sand cars.

Common Stock of New Jersey Corporation on 8 per Cent Basis.—The directors of the Public Service Corporation of New Jersey have declared a quarterly dividend of $1 on the new common stock, payable to stockholders of record June 15. The quarterly dividend of $1 on the new common places this issue on a $4 annual basis, equal to $8 annually on the old stock, which was exchanged on a basis of one share of old common for two of new no-par value stock.

Quebec Railway Financing Arranged.—The newly authorized issue of preferred shares of the Public Service Corporation of Quebec, subsidiary of Shawinigan Water & Power Company, will be used in part to retire the $500,000 bond issue of the company outstanding and the remaining preferred will be used as funds are required. Future financing of the Quebec Railway will be done through the medium of the Public Service Corporation, the funds to retire the impending maturity of underlying bonds having been supplied through that company.

Passes Into New Hands.—Control of the former Lima-Defiance division of the Indiana, Columbus & Eastern Traction Company, passed into the hands of the newly organized Lima & Defiance Railroad on June 1. The transfer was made in accordance with the terms of sale approved by the Federal court at Toledo. Eventually, the new company plans the use of gasoline motor cars on the line, but at present electric cars will be used with power supplied by the Northwestern Ohio Light & Power Company at Lima.

United Railways Plan Declared Operative.—The plan of the United Railways Investment Company, Jersey City, N. J., for the transfer of its Philadelphia Company holdings to a new company, known as the Pittsburgh Utilities Company, has been declared operative under the alternative proposition of the plan to transfer the stock subject to a lien of a part of the outstanding collateral trust bonds of the United Railways Investment Company. Ladenburg, Thalmann & Company, in charge of the negotiation, reported on April 26, that not enough bondholders have agreed to the conditions to make the transfer free of the lien of the entire issue.

Application Made to Sell Line.—Application has been filed with the State Utilities Commission of Ohio for authority on the part of the Pennsylvania-Ohio Electric Company to sell to the East End Traction Company, Youngstown, a line of railway in East Youngstown. The appraised value of the line is $525,994, in payment of which the East End Traction Company agrees to sell $360,000 in 7 per cent first mortgage bonds and to issue $165,994 in common stock at $100 a share, in order to raise the necessary funds. The line in question extends from Stop 10 in East Youngstown to a point on the Ohio-Pennsylvania state line where the Pennsylvania-Ohio Electric Company main line intersects the East Youngstown branch.

Offer Gold Bonds.—A syndicate including Halsey, Stuart & Company and W. A. Harriman & Company are offering $3,900,000 of the Potomac Edison Company's first mortgage gold bonds, Series "A," 6½ per cent. The price is 97 and accrued interest to yield 6¾ per cent. The bonds are dated May 1, 1923, and are due May 1, 1948. The Potomac Edison Company was incorporated Oct. 16, 1922, under the laws of Maryland, as the Williamsport Power Company, and will acquire all the properties and franchises formerly owned by the Edison Electric Illuminating Company of Cumberland, Md., and the Cumberland Electric Railway, which own and operate without competition the power and light business in Cumberland and vicinity and the street railways in Cumberland.

Preferred Issue Offered to Yield 7.53 per Cent.—An offering of 3,500 shares of the Eastern Wisconsin Electric Company's cumulative 7 per cent preferred stock is being made by Paine, Webber & Company, New York, N. Y., at 93 per share, to yield 7.53 per cent. The company was incorporated under the laws of the state of Wisconsin in 1917 for the purpose of owning and operating public utility properties, and serves directly or indirectly twenty-five communities with various classes of public utility service including electricity for light and power, gas, street and interurban railways. The district centers around the cities of Sheboygan, Fond du Lac and Oshkosh, having a total estimated population of 110,000.

Funds Deposited to Pay Interest.—It was announced in Portland, Ore., on May 25 that the Great Northern Railroad and the Northern Pacific would again advance money to pay the semi-annual interest which came due on May 1 on the $2,000,000 of outstanding first mortgage 5 per cent bonds of the Oregon Electric Railway. It had previously been learned in New York that up to May 23 the company had not deposited with the trustee for the holders of the bonds funds to pay the interest, but the opinion was expressed by the informant of the ELECTRIC RAILWAY JOURNAL that the funds undoubtedly would be deposited shortly. This matter was referred to in the issue of this paper for May 12.

Last Minute Intervention in Receivership Case.—Joseph B. Cotton, representing a group of bondholders, has filed with the court on behalf of their trustee, the Bowling Green Securities Corporation, a petition to intervene in the New York Railway receivership case. Judge Mayer, presiding in the matter, declared that he thought all parties were acting in harmony so that the receivership might be adjusted in the near future. He pointed out that if the request for delay were pressed it meant that the matter of clearing up the receivership question would have to be postponed, and declared that he thought the court had not been fairly dealt with. When Mr. Cotton filed his petition Judge Mayer was sitting in an adjourned session of the court to pass upon the form of a decree for the foreclosure of the mortgage on the Broadway & Seventh Avenue Railroad. Parties to the action were attempting to expedite an appeal from judge Mayer's ruling that mortgages secured by bonds may be foreclosed in receiverships.

$1,225,000 Value of Superior Lines.—The Wisconsin railroad commission has fixed the value of the operating property of the Duluth Street Railway in Superior at $1,225,000. This is an increase of $268,000 since the last valuation in August, 1921, following the appeal of the company for a new valuation upon which a new rate could be determined. In all probability the company will ask for an increase in fares from 6 cents to 8 cents. The valuation which has been announced by the commission shows an increase of $508,313 over that of June 30, 1911, over which the controversy raged during the last fight for an increase in rates. That proceeding resulted in the increasing of rates from the sum of 5 cents to 6 cents. The Duluth Street Railway, in its appeal for a new valuation, stated that $1,750,000 was considered a "fair and reasonable" figure. The total income of the Superior lines during the first eleven months of 1922 was $351,863. Operating expenses and taxes amounted to $331,026. A loss of $7,537 was shown for the first eleven months of 1921.

Merger of Subsidiaries Planned.—The United Railways & Electric Company, Baltimore, Md., has perfected a plan for the merger of its divisional companies into a single corporation, the purpose being to simplify its corporate structure and to make favorable provision for the parent company and its subsidiaries. The system of the United Railways & Electric Company, it is explained, divides itself naturally into two parts. On one hand the old city lines and old suburban lines, and on the other the new suburban lines. Practically all of the old lines became one in the consolidation of 1899. The new suburban lines have been built by separate companies in order to obtain the best price for securities by giving the investor a first lien upon the new properties. It is proposed to consolidate and unite the Sparrows Point line and the Halethorpe line with the Maryland Electric Railways, which also owns certain trackage, into one company under the broad charter powers of the Maryland Electric Railways. All of the stock of the consolidated company will be owned by the United Railways & Electric Company.

Traffic and Transportation

United States Supreme Court Passes Ruling on Municipality Jurisdiction

In two practically parallel cases decided on June 4, with Associate Justice Sutherland reading the opinions, the United States Supreme Court declared that a municipality cannot regulate electric railway fares outside the corporate limits.

In the case of the Georgia Railway & Power Company, the Georgia Railway & Electric Company, R. C. Hickman and others against the town of Decatur, Ga., the companies, one the owner and the other the lessee of a railway line, operated in Decatur under an ordinance fixing the fare between Decatur and Atlanta at 5 cents. In 1920 the fare was increased to 7 cents, and litigation arose. Hickman and other citizens living on another car line which had a 7-cent fare into Atlanta intervened, alleging that a 5-cent fare was discriminatory, inasmuch as the state commission agreed to the increase by the line in litigation. A preliminary injunction was affirmed by the State Supreme Court, but reversed by the United States Supreme Court, which held that the ordinance was not binding outside the corporate limits of Decatur.

The same corporations and J. D. Malsby and other citizens appealed a similar injunction which had been granted the city of College Park, Ga., having a 5-cent fare ordinance to Atlanta, which the companies attempted to increase to 7 cents. After the ordinance was accepted as a franchise, the corporate limits of College Park were extended. The Supreme Court held that the ordinance was effective only as to the old corporate limits.

Interurban Parlor Car Service Started in Wisconsin

Parlor car service between Milwaukee and Sheboygan, Wis., was started on April 30 by the Milwaukee Northern Railway, which was recently acquired by the North American Company. The parlor car, known as the Lake Shore Limited, gives daily service, leaving Sheboygan at 8 a.m. and connecting on its arrival in Milwaukee with the Eastern Limited of the Chicago, North Shore & Milwaukee (electric) Railroad for Chicago. Only one stop is made en route. The reduction in running time over regular trains is 29 minutes. The car leaves Milwaukee at 5:15 p.m. There is thus created direct electric interurban connections between Sheboygan and Chicago. A charge of 25 cents over and above the regular fare is made for parlor car seats. The car used in the new service was built in the Cold Spring shops of the Milwaukee Electric Railway & Light Company, another subsidiary of the North American Company. It is luxuriously appointed and compares favorably in its appointments with steam road parlor chair cars.

No Temporary Eight-Cent Fare in Buffalo

The International Railway, Buffalo, will be unable to put into effect a temporary 8-cent fare on the local lines in Buffalo as a result of the Ryan bill signed by Governor Smith. The new law was sponsored by Senator Ryan of Troy and deprives the Public Service Commission and public utilities companies from putting into effect temporary schedules of rate increases. Under the old law any public utility could file a schedule increasing its rate with the Public Service Commission, and, after the expiration of thirty days, put it into operation temporarily upon one day's notice, providing no adverse ruling on the application had been made by the commission.

The Ryan law now prevents the International Railway from putting the proposed 8-cent fare into effect in Buffalo until after hearings are held by the commission and a final order is made by the commission. The commission's order in such event would be permanent, not temporary, as had been proposed.

Auxiliary Bus Service Extended

The Connecticut Company started a through bus service between Mill Plain, Branford, and State and Chapel Streets, New Haven, on June 10. It is intended to serve through riders and those residents of the section between East Haven Green and Branford not served by the trolley. Forty-five-minute service is operated during the day and one and one-half-hour service during the evening. Two twenty-five-passenger vehicles are used.

The running time from Branford Green to State and Chapel Streets is thirty-five minutes. The fare is 10 cents for each fare limit, or 30 cents for the entire trip. Transfers are issued from the bus and accepted on the trolley to the first fare limit in Branford and New Haven. Transfers are also to be issued from the trolley to the bus in both cases and accepted on the bus as 7 cents toward payment of the first fare; that is, a transfer received on a trolley car with the payment of 3 cents entitles the passenger to ride to the first fare limit on the bus.

The bus is operated express between the easterly side of East Haven Green and State and Chapel Streets, stopping on inbound trips only to discharge passengers and on outbound trips only to take on passengers destined to points beyond East Haven Green.

Movement Against Jitneys Planned in Detroit

In connection with the move to bar jitneys from the streets of Detroit, Ross Schram, assistant general manager of the Department of Street Railways, contends that the jitneys are clogging traffic and that their drivers are taking $1,000 a day from the municipal railway. The drivers are using their 1922 licenses as the police refuse to issue new permits on account of the pending litigation as to the legality of their using the streets, from which the Council thought it had legislated them.

In a letter to Mayor Doremus, Mr. Schram states that the injunction case has never come to trial, mainly through reluctance on the part of the department to force the issue until such time as the department felt it had improved service on its own lines. He thinks the time has now arrived to attempt regulation of jitney operations, in justice to the department of street railways.

The carrying of 20,000 passengers daily by the jitneys means that Detroit is probably losing $350,000 a year, which would otherwise be available to help the citizens purchase their own railway lines.

Mr. Schram says that the department of street railways now has the equipment necessary to handle the 20,000 people who patronize the jitneys. Since the first of the year, 180 new cars have arrived in the city and twenty more are on the way. This will give 200 cars to use in place of the jitneys, and a study is now being made to determine on what lines the cars are most needed.

According to Mr. Schram most of the jitneys are privately owned and when an owner desires to use his car he withdraws it from the jitney service. No complaint is made by officials of the city against competition by the Detroit Motorbus Company as that company furnishes a reliable transportation service.

The corporation counsel is ready to proceed immediately in court to have the injunction dissolved which has prevented the jitneys from being ruled off the streets.

On the other hand an ordinance has been prepared by the attorney for the jitney operators designed to license and regulate the operation of jitneys.

$750,000 of Buses Ordered for Los Angeles

The Los Angeles Motor Bus Company, organized by the Pacific Electric Railway and the Los Angeles Railway to operate motor-bus feeder lines in the city of Los Angeles, has ordered $750,000 of the most improved type of motor buses. This action is in line with the promises of the two railways to the city of Los Angeles after the defeat of the McAdoo bus scheme at the May 1 election. The order for the new buses was placed on May 26 with the Moreland Motor Truck Company, Los Angeles. The buses will cover routes totaling approximately 70 miles.

The $750,000 order calls for two styles of the latest type of motor buses manufactured by the Moreland concern, both single and double decks. The single-deck buses will seat twenty-six and the double-deck ones fifty-six passengers.

Hearing on One-Man Car Operation by Cincinnati Interurban

A hearing on the operation of one-man cars by the Cincinnati, Georgetown & Portsmouth Interurban Railway was held before the Public Utilities Commission at Columbus on June 4.

The street railway employees' union of Cincinnati contends that the one-man operation of the interurbans is dangerous and wants the commission to stop it.

The hearing brought out the fact that employees of the interurban road have asked for a considerable increase in wages and that the company has served notice on them that it desires to terminate its contract with the employees.

A number of witnesses testifying for the company, residents of points served by the road, said the service was satisfactory and that they did not consider it dangerous.

At the beginning of this year the Cincinnati, Georgetown & Portsmouth Interurban Railway began the operation of one-man cars on its line. The new type cars, however, were operated by two men until April 29, when the one-man system was formally put into operation. A decision will be given later.

Rerouting of San Diego Lines Improves Service

The so-called Sixteenth Street cut-off of the San Diego Electric Railway, San Diego, Calif., has been completed and on May 1 the Logan Avenue line and the National City and Chula Vista interurban line were routed via Broadway and the new track on Sixteenth Street, instead of the former route via Fifth and Market Streets. The new arrangement furnishes improved and increased service to the suburban cities of National City and Chula Vista. Electric cars will operate every twenty minutes to Eighth and National Avenue, National City, and alternate cars will continue to Third Street, Chula Vista, but motor coach service connects every forty minutes with the cars that stop at Eighth and National, thus giving Chula Vista twenty-minute service also. The motor coaches operate by way of Highland Avenue, to Third Street, Chula Vista, thus serving different territory from the electric cars, but with the same terminals. The interurban cars will operate on express schedule between Thirty-first Street and National Avenue and Twelfth Street and Broadway, making only compulsory stops.

Passengers from the northeast part of the city, under the new arrangement, can transfer to the Logan Avenue and interurban lines at Twelfth and Broadway and at Sixteenth and Broadway, thus saving the ride to the downtown district and consequent loss of time in reaching the industrial section.

New Ordinance Proposed by Jitney Men in Birmingham

Jitney men are circulating petitions for an election on a jitney regulation ordinance drawn by the Jitney Owners' and Operators' Association of Birmingham, Ala. They will seek to have this ordinance adopted at the polls as a substitute for the jitney regulation features of the ordinance recently adopted by the City Commission, when a settlement of issues with the Birmingham Railway, Light & Power Company was effected. One mass meeting has already been held by the jitney men and others are to be arranged.

The proposed ordinance is to be presented to the commission under the initiative feature of the Birmingham charter. This provides that on a petition of 1,500 citizens legislation can be initiated. The law requires that the proposed ordinance be set out in full on the petition. When the names have been checked and found sufficient the commission must either adopt the ordinance presented without amendment or alteration or must submit the ordinance to the people at an election.

Thirty-eight of the petitions are in circulation. The ordinance carries about the same regulations now in force —not those provided in the ordinance to go into effect July 1. It provides for an association of jitney men which shall maintain a revolving indemnity fund of $2,500 in lieu of the $10,000 indemnity bonds provided by the city in its new ordinance. It removes all of the other restrictions included in the new city ordinance which would tend to eliminate the jitneys. Membership in the association maintaining the indemnity fund is made voluntary in the proposed ordinance.

Program of Improvements Offered for Exclusive Rights

The Berkshire Street Railway, in a letter from General Manager C. Q. Richmond to the Mayor and the aldermanic committee on street railways, has proposed that the company be granted a monopoly of transportation by barring all jitney traffic. This is made a condition to the adoption by the company of extensive changes for the improvement of railway service, including partial conformance to the aldermanic committee's plan for "lap-overs" of zones during factory rush hours. This would reduce the cost of rides in many instances in the morning and late afternoon hours, but the rate for noon-hour rides would remain as at present.

The most important of these competing lines is the bus line from Pittsfield to Dalton and a proposed bus line from Pittsfield to Great Barrington, for which a petition has been filed by Frank J. Hazard, Pittsfield, and Burton L. Millard, Winsted, Conn.

Four Tokens for Twenty-five Cents.—The International Railway, Buffalo, has been directed by the Public Service Commission to issue four tokens for 25 cents between Hoffman station and Martinsville on the Buffalo-Lockport interurban division under the same rules as those governing a 10-cent cash fare.

Trackless Trolley Bill Signed.—The Governor of Wisconsin has signed the bill which gives permission to City Councils to grant franchises for the use of trackless trolleys. The measure is understood to have been introduced primarily in the interest of the Milwaukee Electric Railway & Light Company.

Allows One-Man Cars to Operate.—The Lykens Valley Railway, Williamstown, Pa., has been authorized by the Public Service Commission to operate one-man cars in the upper end of Dauphin County. The permission is granted on the condition that all cars are stopped on the near sides of grade crossings.

Bus Operation to Start on July 1.—The Des Moines City Railway will put buses into service on several lines during the present year and at least two lines will be in operation by July 1. The buses will be used as supplemental service and will be extensions of present lines. The first service to be started will be on the University and Walker Streets lines. The City Council has given its approval to the use of buses.

Urges Restoration of Skip Stop.—The return of the skip-stop system on the lines of the Cincinnati Traction Company as a contribution to the improvement of traffic conditions in Cincinnati has been recommended by attorney Michael G. Heintz in an article in the *Evanstonian*, the official organ of the Evanston Welfare Association. The Cincinnati *Times Star* of recent date refers to Mr. Heintz's views and quotes what he has to say about the frequency of car stops as it affects Evanston. The skip-stop plan, he believes, would bring about a shortening of running time and be a preventive for traffic congestion. Further, that it would prove a benefit not only to the car rider but also to the automobile rider.

Mail Men Must Pay.—The Morris County Traction Company, Morristown, N. J., has issued orders to its conductors to collect fares from letter carriers, who hitherto have ridden without charge. The order applies to all points along its lines from Lake Hopatcong to Maplewood, with some question still existing as to its enforcement in Summit, where a clause in the franchise stipulates that mail men shall ride free. Charles Fields, manager of the traction company, says that the change was made with the approval of Postal Inspector Campbell of that district. Mr. Fields said it was intended to sell postmasters books of 7-cent tickets, which will be given to carriers for use in deliveries, but that some of the carriers had abused the privilege and had ridden free outside the limits of municipalities where they worked.

Book Reviews

E.M.F. Electrical Year Book

Electrical Trade Publishing Company, Chicago. 1,030 pages.

The second edition of the "EMF Electrical Year Book" is a combined dictionary, encyclopedia and trade directory of the electrical industry. Of its original 14,000 or so topics, nearly half have been rewritten or thoroughly revised and several thousand new topics added. Definitions cover the entire range of electrical terms. The encyclopedia topics include facts and figures on each branch of the industry, complete lists and data of electrical associations, periodicals, libraries, colleges, etc. About 3,150 classifications of electrical and related products are included, with listings of manufacturers. The topics dealing with electric railways and their equipment were prepared by C. C. Beck, W. T. Thorn, C. S. Holcomb and August J. Fry.

Essentials of Transformer Practice

By Emerson G. Reed. 265 pages. The D. Van Nostrand Company, New York.

The sub-title of this book states that it is a treatment of the theory, design and operation of the transformer, from a practical engineering viewpoint, prepared primarily for the engineering student and the designing and operating engineer.

Only those theories, however, are developed which have a direct bearing on design and operation. The author states that the series of lectures given by him before the Electric Club of the Westinghouse Electric & Manufacturing Company was the nucleus of the work, which was supplemented by matter in several papers presented before the National Electric Light Association. This material has been revised and rearranged and new matter added to form the present book. The entire work is written from the viewpoint of the commercial designing engineer and appears to be thoroughly practical and to the point.

Highways and Highway Transportation

By George R. Chatburn, professor of applied mechanics and machine design and lecturer on highway engineering at the University of Nebraska. 472 pages. Thomas Y. Crowell Company, New York, N. Y.

The primary object of this book, as stated by the author, has been to sketch briefly and simply the development of the transportation systems of the United States, to indicate their importance and mutual relations, to present some practical methods used in the operation of highway transports and to make seasonable suggestions for the betterment of the roads and of the usable machines for the benefit and pleasure of mankind.

The principal part of the text is divided into two parts—the development of highways and their uses. The first part treats of the relation of transportation to civilization generally, explaining briefly how the two have grown together like children at school, how each helps the other and how the development of one is the measure of the other. Automotive transportation for business and pleasure, including rural motor express and bus lines and their effect on production and marketing, is described and discussed.

Of particular interest to the electric railway man is a chapter on railroads, giving the development of the railroad with a brief description of the electric railway. The chapter on highway accidents and highway aids to traffic calls attention to many types of accidents, including railway crossing accidents, with suggestions for their mitigation.

The book appears to be sensibly written and is well illustrated. As a general treatise on the subject, it is worthy of the reader's attention.

New Edition of Cook's Wiring

Interior Wiring and Systems for Electric Light and Power Service. By Arthur L. Cook, professor in Pratt Institute, Brooklyn, formerly electric power engineer Westinghouse, Church, Kerr & Company. Second edition. John Wiley & Sons, Inc., New York, N. Y.

Wiring is a subject which concerns the electric railway engineer who has in hand the lighting and power supply for shops, stations, carhouses, etc. To all such a manual of this sort will prove useful. It goes somewhat beyond the field specified in the title in the selection of motors, some elementary illuminating engineering and choice of systems. It contains many reference tables, conveniently arranged.

The Engineering Index for 1922

Published by the American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York, N. Y.

This is the twenty-first volume of the Engineering Index and the fourth to be issued by the A.S.M.E. It is based on some 1,300 periodicals, reports and other publications regularly received during the year by the Engineering Societies' library. This is the largest volume issued in the series, exceeding that for 1921 by approximately 15 per cent, and has a total of 675 pages. The references have also been made exceedingly concise, so that the total number of articles listed is far greater than ever before. Approximately half of the references are from foreign periodicals, some 20 per cent being from periodicals printed in Great Britain or its possessions, and approximately 30 per cent from representative publications of Belgium, France, Germany, Italy, Spain, South America and other foreign countries.

The Young Man and Civil Engineering

By George F. Swain, consulting engineer, professor of civil engineering in Harvard University. The Macmillan Company, New York, N. Y.

Under the editorial direction of Prof. E. Hershey Sneath of Yale University, the Macmillan Company is issuing a vocational series consisting of a dozen books written by leading men in as many different vocations. Several of these will deal with engineering, the first to be issued being that by Prof. Swain. The books will be useful to young men who are selecting a vocation or who, having selected one, wish to gain a broad view of its history and possibilities.

In his book Prof. Swain gives an inspiring picture of engineering in general and civil engineering in particular, showing how all engineering is related and at the same time how it is subdivided. Taking up each branch of civil engineering in turn he tells of what it consists and points out its relation to the others. He then takes up the qualifications necessary or desirable in the civil engineer, stating among other things that he should "have a perception of the true relations of things or a sense of proportion which will indicate what measures or projects that are physically possible will really conduce to the use and convenience of man."

The book as a whole makes stimulating reading. It will be helpful to any one who may be called upon to advise an aspirant for the career of a civil engineer, giving as it does suggestions regarding education, professional posregarding education, professional possibilities in this field, and the general told in a delightful and helpful way.

Year Books

Spring is the season for the appearance of the year books of national and local societies. Among those which have recently appeared and which may be useful to electric railway men are the following:

American Engineering Standards Committee, 29 West Thirty-ninth Street, New York City. This contains practically everything that one would need to know about the committee. The electric railways figure largely.

American Institute of Electrical Engineers, same address as above. A 500-page volume containing alphabetical and geographical distribution lists of the 14,401 total membership, consisting of fellows (574), members (6 honorary, 2,212 regular) and associates (11,609). Students to the number of 2,673 are stated to be enrolled representing nearly 100 educational institutions.

Society for the Promotion of Engineering Education. F. L. Bishop, secretary, University of Pittsburgh.

This list of names of 1,608 engineering educators and others and eighty-seven educational institutions will be useful to electric railways desiring to co-operate with the teaching fraternity in promoting employee training.

Personal Items

New President in Toledo

B. C. Adams Has Succeeded Frank R. Coates, Who Has Assumed Larger Duties in New York

Benjamin C. Adams, vice-president and general manager of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., operated by Henry L. Doherty & Company, will succeed Frank R. Coates as president and general manager of the Community Traction Company and in addition has been made vice-president and general manager of the Toledo Edison Company at Toledo, Ohio. Mr. Coates, who was president and general manager of the Edison Company, retains the presidency of that company and will continue on the directorate of the Community Traction Company.

Details of the change will probably be announced later. It does, however, mark the withdrawal of Mr. Coates from most of his active duties with the Toledo properties and the asumption of larger duties with Doherty and the Cities Service Company in New York.

J. Frank Johnson was recently made vice-president and general superintendent of the Community Traction Company. Ferd Derge will remain as vice-president and assistant general manager of the Toledo Edison Company, according to present plans.

Mr. Coates came to Toledo on Dec. 5, 1911. He has been instrumental in putting the Toledo system in such relations with the public that the service-at-cost ordinance was ratified by a large majority more than two years ago. He was head of the company during the fight against 3-cent fares, when the ouster ordinance was adopted, and has a particularly notable record in the handling of labor difficulties.

Mr. Adams is a comparatively young executive and has come up through the Doherty organization, having been in St. Joseph about five years. He has worked on a number of other properties.

More Changes in International Personnel

William J. Whiteside has resigned as traffic agent of the International Railway, Buffalo. Mr. Whiteside had been associated with the International as traffic agent for more than ten years. He has had supervision over ticket sales on all interurban lines.

R. F. Kelsey has been appointed traffic agent to succeed Mr. Whiteside. For several years Mr. Kelsey has been joint agent of the Erie Railroad and the International at the Lockport, N. Y., interurban station.

T. T. Nelson has resigned as comptroller of the International Railway. Mr. Nelson joined the staff of the International about two and a half years ago as comptroller.

R. R. Ray has resigned as employment agent of the International Railway. He joined the staff of the company in the summer of 1920.

George W. Fugitt, who for many years has been associated with the Philadelphia Rapid Transit Company, has been appointed secretary of the International Railway Co-Operative Association and will have supervision over employment, according to an announcement made by President Herbert G. Tulley. Mr. Fugitt will assume some of the duties of R. R. Ray, resigned.

Union Traction Company of Indiana Makes Changes in Division Heads

J. E. Hester, formerly master mechanic of the Union Traction Company of Indiana, recently resigned his position to become associated with the Interstate Public Service Company, Scottsburg, Ind. Mr. Hester will have charge of the motive power maintenance for that company. Mr. Hester became connected with the Union Traction Company twenty-three years ago when he was employed as bridge carpenter. He later became general foreman of the woodworking and carpenter departments at the North Anderson shops. Mr. Hester, however, wanted a bigger promotion and he later won for himself the position of master mechanic, which he held for several years prior to his resignation.

W. O. Smith has been made division engineer of the Anderson division of the Union Traction Company. Prior to his joining the Union Traction forces, which was on Jan. 1, 1917, he was employed by the New York Central lines at Elkhart. On April 15 of this year he was made engineer of the Tipton division, taking the place of A. R. Manifold, who was transferred to the Muncie division.

A. R. Manifold, on May 1, was made division superintendent at Muncie, filling the position made vacant by the resignation of G. M. Rozelle, and George Powell, formerly division engineer for the Anderson division, took the Muncie division as engineer. Mr. Powell became associated with the company in 1917, when he entered the employ as a draftsman. Less than a year later he was made office engineer and on Aug. 7, 1919, was made engineer of the Anderson division.

C. H. Evenson has been appointed superintendent of transportation of the Chicago Surface Lines.

A. S. May has been made treasurer of the Berkshire Street Railway, Pittsfield, Mass., with office in New Haven, Conn.

S. N. Irelan Succeeds Mr. Adams at St. Joseph

S. N. Irelan, Montgomery, Ala., has been appointed manager of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., succeeding B. C. Adams. He will also be vice-president of the company. Mr. Adams, as noted elsewhere in this department, goes to Toledo, Ohio.

Mr. Irelan was graduated from Purdue University at Lafayette, Ind. Following his graduation in 1899 he enrolled in the engineering school of Mr. Doherty at Denver and remained there a year. He then took a position as secretary and treasurer of the Fremont Gas & Electric Company at Fremont, Neb. He remained there two years and then took a position in the engineering and statistical department of the Henry L. Doherty Company in New York City.

From February, 1914, to September, 1915, Mr. Irelan was general manager of the Bartlesville, Okla., plant, going from there to Sedalia, Mo., to become vice-president and general manager of the City Light & Traction Company. He was promoted to the office of vice-president and general manager of the street railway, electric and gas company at Montgomery, Ala., in 1916 and remained there until accepting the St. Joseph position.

W. H. Damon Appointed Engineer in Milwaukee

W. H. Damon of Madison has been appointed resident engineer in Milwaukee for the Wisconsin Railroad Commission. In this capacity he succeeds E. J. Steinberg, who resigned on June 1 to become connected with the Milwaukee Electric Railway & Light Company. Reference to his resignation was made in the ELECTRIC RAILWAY JOURNAL, issue of May 5, 1922.

Mr. Damon, his successor, has been with the Railroad Commission for approximately ten years and has served as resident inspector in both the Eau Claire and Appleton districts prior to his promotion to his present position at Madison.

He is well informed on the commission's methods and policies in the regulation of the service of public utilities. His work in Milwaukee will consist largely of investigations of the service of the street railway, electric, gas and telephone utilities. In addition to this, he will be required to furnish service specifications as a basis for street railway schedules in the city of Milwaukee. Mr. Damon is a graduate of the University of Wisconsin.

L. F. Wiegand, formerly executive in charge of the investment department of the Iowa Railway & Light Company, Cedar Rapids, has been appointed assistant vice-president in charge of investments of the Central Indiana Power Company, Indianapolis, and the Indiana Electric Corporation, which is controlled by the Central Indiana Power Company.

Leroy J. Clark has succeeded Harry S. Adams as secretary of the Seattle & Rainier Valley Railway, Seattle, Wash.

Walter N. Munroe, formerly manager of the Paris (Tex.) Transit Company, is now vice-president as well as manager.

G. J. Hickman has been made assistant treasurer of the Utah Light & Traction Company. He is located in New York.

George Little has succeeded I. E. Maxwell as master mechanic of the Salt Lake, Garfield & Western Railway, Salt Lake City, Utah.

T. W. Favelie has succeeded T. N. Favelie as engineer of maintenance of way of the Hydro-Electric Railways, Windsor, Canada.

Ralph H. Jewell has been appointed general counsel and assistant to the president of the Salt Lake & Utah Railroad, Salt Lake City, Utah.

W. S. Hill has replaced C. H. Nelson as superintendent, purchasing agent and claim agent of the Grays Harbor Railway & Light Company, Aberdeen, Wash.

H. E. Bailey is acting superintendent of the New York, New Haven & Hartford Railroad, New York, N. Y., at Harlem River in place of F. M. Clark.

R. C. Lightcap has been added as an assistant treasurer of the West Penn Railways and of the controlling company, the West Penn Company, at Pittsburgh, Pa.

F. T. McCann, formerly master mechanic of the New York State Railways at Utica, has been transferred to Syracuse and there succeeds J. F. McInerney. His place at Utica is being filled by F. J. Doyle.

G. R. Loyall has replaced J. H. Young as president of the Norfolk (Va.) Southern Railroad. J. Frank George succeeds M. Manley as treasurer of that property, and W. U. Dabney has succeeded Trainmaster Leach.

Alanson P. Lathrop has been elected president of the Southern Light & Traction Company, New York, N. Y. He is also president of the American Light & Traction Company, which controls the Southern Light & Traction Company.

S. W. Greenland, general manager of the Indiana Service Corporation, has with a number of other leading citizens embarked in a real estate promotion proposition in the southwestern part of Fort Wayne, Ind. It is proposed to establish some large estates for homes.

F. M. Hamilton has been appointed supervisor of insurance of the Chicago Surface Lines. Mr. Hamilton served as claim agent and then as purchasing agent of the railway company in Seattle from 1911 to 1919. After that he went to the Philadelphia Rapid Transit Company and held the positions of freight traffic manager, purchasing agent, superintendent of the department of accident investigation, assistant to general superintendent, assistant to vice-president, and assistant to president. He resigned the last-named position in December of last year.

Young Lady Auditor

Miss Snyder Has Been Made Department Head of Indiana Company Doing Both Railway and Power Business

It is not extraordinary to find a young lady doing essential work around an electric railway office, but it is unusual for a young woman engaged in such work to receive the recognition that accompanies a titled position. Yet that is just what has happened in the case of Florence Snyder, now auditor of the Marion & Bluffton Traction Company, Bluffton, Ind., to which post she was advanced on April 1, this year.

Miss Snyder specialized in commercial subjects in the closing years of her course in the public schools of Bluffton, and in 1913 wandered forth into the world like many another girl before her with her note book and pencil in hand determined to be on her way, but not knowing at the time just where that way might lead. Being well prepared in advance, however, there was no need on Miss Snyder's part for concern as to where that way might lead, and so when it did lead to the office of the local traction company Miss Snyder entered upon her work as clerk with all the assurance that comes from knowing that you know.

Miss Florence Snyder

It is only a step from knowing that you know to having others discover that you know. This was just what James S. Clark, then auditor of the railway, did. Under his direction Miss Snyder developed rapidly her innate qualities for management and the mastery of detail, and so when Mr. Clark was made secretary and general manager of the company Miss Snyder on June 1, 1918, was promoted to bookkeeper and cashier. Any kind of accounting work is exacting in its requirements, but railroad accounting is in some respects even more exacting than ordinary commercial accounting. In the first place, there are the standards to be met which are set down by the industry itself and then on top of this are the exactions of the government, state and local officials.

Besides operating 35 miles of electric railway doing both a freight and passenger business, the road with which Miss Snyder is identified does a lighting and power business so that the work of the accounting department is still further complicated by the need for attention to all the details that go with the billing of such customers and then seeing that they pay their bills. As a consequence of her able handling and direction of all this work Miss Snyder was made auditor. In other words, Miss Synder has advanced through all the various grades from clerk to auditor in less than ten years.

Milo Gipson has succeeded B. A. Bilderback as master mechanic of the Lewiston-Clarkston Transit Company, Clarkston, Wash.

George B. Williams has been relieved of the duties of secretary of the Virginia Railway & Power Company, Richmond, Va. Mr. Williams continues in the capacity of treasurer and E. H. Herrmann is secretary.

Edward J. Peartree, general superintendent of the Trenton & Mercer County Traction Corporation, Trenton, N. J., has been appointed a member of the advisory committee for the drive to secure funds for the Salvation Army.

Obituary

Major Warner of Tennessee

The man who was responsible for the first street railway in the city of Chattanooga, Tenn., died recently at his home in that city, after a brief illness. His name was Major Joseph Henry Warner. He had been retired from active business and participation in public affairs for some time. In 1881 he organized the Chattanooga Street Railway, which took over all the local transportation then existing and composed of a short division of horse railway. Eight years later it was sold to other interests and was followed by the electrification of the system. In 1896 the property again changed hands and Major Warner and associates were in charge, so that almost the entire railway system, up to some twenty years ago, was constructed under his supervision. Although Major Warner was especially identified with the city of Chattanooga, he also was very well known in other industrial, banking and utility sections in East Tennessee.

Peter Rosener, seventy-nine years old, who was the first operator on the Evansville city car lines when mule cars were used, died recently. He was employed by the local company for many years.

A. C. Sharp, Wichita, Kan., one of the oldest electric railway men in Kansas, died recently. Mr. Sharp was a motorman on the city street cars and during his long service had operated cars on every line in Wichita. He was a veteran also of the Spanish-American War.

Manufactures and the Markets

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

Safe Walkway Manufacturers to Meet

A meeting of delegates representing the several branches of the safe walkway surface material manufacturing industry will be held at 10 a.m. (daylight saving time) on June 14, 1923, in the board room of the American Society of Mechanical Engineers, New York. After effecting a permanent organization the meeting will consider the preparation of model specifications for the use of materials in such manner that walking safety will be promoted.

The particular points to be considered include: Resistance to slipping, freedom from tripping hazard, durability, flammability, dielectric strength, appearance, and maintenance. Stairs, landings, platforms, ramps, lobbies, door sills, etc., are among the places where special danger exists, and the application of safety devices against slipping in railway stations, and in railway cars, both steam and electric, will receive special attention.

The eight general lines of manufacture to be represented are: Safety treads, abrasive materials, cork, linoleum, etc., lumber, artificial stone, natural stone, metals, and textiles. A national safety code for walkway surfaces is now in process of preparation, and this meeting is called by the manufacturers for discussion of its provisions.

Increased Iron Production in 1922

Figures showing the production and shipments of iron ore, pig iron and ferro-alloys in the United States in 1922 have just been made public by the Interior Department. Considerably more iron ore was mined in 1922 than in 1921. The Chattanooga and Birmingham districts made gains of 126 per cent and 73 per cent, respectively, and the Lake Superior district made a gain of 58 per cent. The Adirondack district was the only one that mined less ore than in 1921. The average value per ton of iron ore at the mines in 1922 was $3.12, which is 25 cents less than in 1921. The stocks of iron ore at the mines in 1922 amounted to 10,524,279 gross tons, a decrease of 24 per cent from those in 1921.

Gains in the shipments of pig iron in 1922 were recorded by every producing state except Virginia, Missouri and Massachusetts. The increases were more pronounced in Kentucky, Tennessee, Michigan, Wisconsin and New York. The general average value for all grades of pig iron at the furnaces in 1922 was $21.98 a ton, a decrease of $2.30 from the value in 1921.

An increase of 70 per cent in the shipments of ferro-alloys is shown for 1922. The shipments of ferro-silicon showed an increase of 181 per cent and those of ferro-manganese an increase of 45 per cent. The shipments of spiegeleisen only slightly exceeded those in 1921. The average value of ferro-manganese at the furnaces in 1922 was $66.04 a ton and of spiegeleisen $30.79 a ton.

Gibbs & Hill Will Oversee Virginian Electrification

The announcement was made this week that Gibbs & Hill, consulting engineers, New York, had been appointed engineers of construction for the entire electrification work of the Virginian Railway. A statement of the electrical equipment to be used in carrying out the construction program in connection with this electrification was published in a recent issue of this paper.

Another Plea for Early Coal Buying

The Joint Fuel Committee, representing the gas, electric light and electric railway associations, has been urged by the Federal Fuel Distributor to cooperate with the government and the railroads to avert a transportation crisis next fall and winter. It is asked that every possible effort be made to store coal during the summer months, so as to stabilize the coal industry and to relieve, so far as possible, the peak demand on the railroads. All member companies are urged to complete their annual contracts for their expected requirements at the earliest possible date, store coal at once to limit of capacity and to unload promptly all coal cars and free the sidings so as to reduce car shortage.

Lumber Prices Are Rapidly Rising

Recent reports of the Department of Commerce indicate that the prices of both hard and soft woods are rapidly rising. Although figures are still below the high average of the year 1920, nevertheless the last few months have shown a steady increase. Speaking generally lumber prices in October, 1922, stood at about the same level as in 1919. The average cost of all woods was very much higher in 1920 than in 1919, but in 1921 came a reaction. Since last fall, however, a steady upward trend has been in evidence, and if the present rate of increase continues lumber prices will soon reach the high peak of three years ago.

Orrin Merry Elected President of Missouri Car Company

Orrin Merry, formerly with the Durant Motors, has been elected president of the Missouri Car Company, St. Louis, Mo., while A. G. Miller becomes treasurer through the change. W. L. McKim, who resigned as treasurer, will continue as a member of the board of directors. The other officers are: Theodore A. Brewster, vice-president; A. H. Palmer, second vice-president; L. J. McKim, secretary, and A. G. Muesenfechter and Dr. W. P. Henrich members of the board. The number of directors of the company has been increased by one.

The company's plant on McCasland Avenue, East St. Louis, is being put into first-class shape and officials anticipate that quantity production will start about June 15. Delay in receiving shipments of important pieces of machinery from Eastern manufacturers has delayed the start of operations more than sixty days. In a measure this delay has been beneficial, for it has been possible to go forward with improvements to the plant. It has also permitted a thorough testing of the machines already received, so that everything will be complete and in tip-top shape when the time arrives to start production.

As has been indicated previously in the ELECTRIC RAILWAY JOURNAL this company plans to make a "non-rollicking" truck for street cars and also to make bus and truck bodies. It is said to possess very valuable patents.

Spanish Electrification to Be Begun This Year

According to *Los Transportes*, published in Madrid, Spain, the electrification of the railroad between Tortosa and La Cava, which has been under consideration for some time, will be begun during the coming summer. The same publication says:

> The construction of the railroad between Santana in Santander, Spain, and the station of Gama in Palencia seems to be an assured fact. Santana is one of the most prosperous towns in Spain. It competes with Vigo in the production of canned products and salted fish, while the oyster-farming industry is very active despite the fact that there has been no railroad communication with the rest of the province, nor with the country in general.

Metal, Coal and Material Prices

Metals—New York	June 6
Copper, electrolytic, cents per lb.	14.962
Copper wire base, cents per lb.	18.00
Lead, cents per lb.	7.25
Zinc, cents per lb.	6.67
Tin, Straits, cents per lb.	42.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$6.375
Somerset mine run, Boston, net tons	2.875
Pittsburgh mine run, Pittsburgh, net tons	2.20
Franklin, Ill., screenings, Chicago, net tons	1.825
Central, Ill., screenings, Chicago, net tons	1.875
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$7.75
Weatherproof wire base, N. Y., cents per lb.	19.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$1.15
White lead, in oil (100-lb. keg), N. Y., cents per lb.	13.125
Turpentine, (bbl. lots), N.Y., per gal.	$1.05

Rolling Stock

Butte Electric Railway is putting safety appliances on twenty-two cars so that they may be operated by one man.

Eureka, Calif.—The City Clerk and City Superintendent of Public Works will soon ask for bids for furnishing approximately 20 tons of car wheels for the Eureka Street Railway.

Birmingham Railway, Light & Power Company, as was announced in the May 26 issue of the ELECTRIC RAILWAY JOURNAL, has placed orders for twenty new cars. The specifications of these cars are as follows:

Date order was placed	May 15
Date of delivery	October
Builder of car body	Cincinnati Car Co.
Type of car	Side entrance motors
Seating capacity	62
Total weight	32,000 lb.
Bolster centers, length	32 ft.
Length over all	49 ft. 5 in.
Truck wheelbase	4 ft. 10 in.
Width over all	8 ft. 5 in.
Height, rail to trolley base	10 ft. 6 in.
Interior trim	Cherry
Headlining	Agasote
Air brakes	Westinghouse
Armature bearings (if ball or roller)	Sleeve
Axles	Steel
Bumpers	Hedley Anti-Climbers
Car signal system	Trolley
Car trimmings	Bronze
Center and side bearings	Brill
Control	K 35 KK
Curtain fixtures	Curtain Supply Co.
Curtain material	Pantasote
Designation signs	Hunter
Door-operating mechanism	Air National
Fenders or wheelguards	H. B.
Gears and pinions	Grade M helical 7½ deg.
Hand brakes	Cincinnati
Heater equipment	Consolidated
Headlights	Golden Glow E.SSCD
Journal bearings (if ball or roller)	M.CB type
Journal boxes	Brill
Lightning arresters	G. E. aluminum
Motors, type and number	G. E. 265A (four)
Paint, varnish or enamel	CO, ST.D
Registers	Int. No. 5
Sanders	O.B.
Sash fixtures	Paytori
Seats	Cincinnati (wood)
Seating material	Wood
Slack adjuster	American
Step treads	Feralun
Trolley base	U. S. 13
Trolley catchers	O. B.
Trolley wheels	More-Jones
Trucks	Brill, 76 E.
Ventilators	Railway utility
Wheels (type and size)	26 in. chilled iron

Track and Roadway

Lincoln Street Railway is planning to extend a number of its tracks in the city this summer.

Clinton (Iowa) Street Railway will spend $50,000 for track construction and for paving during the present year.

Cincinnati, Newport & Covington Railway, Covington, Ky., expects to rebuild 2½ miles of track. The work will be done with the company's own men.

Philadelphia, Pa.—Sealed proposals for constructing about 1,529 ft. of two-track subway in Arch Street between Eighth Street and Thirteenth Street will be received at the director's office, Department of City Transit, until June 26.

Pacific Electric Railway, Los Angeles, Calif., will reconstruct its tracks on Pine Avenue south of Sixth Street and double track Third Street between Pine Avenue and American Avenue in Long Beach, according to a promise made by Chief Engineer E. C. Johnson to A. L. Ferver, director of public service.

Texas Electric Railway, Dallas, Tex., is considering an extension of its lines in Denison, and is negotiating with a committee of business men in Denison. It is proposed to extend local street car service about 2 miles west to include the new terminals of the Missouri-Kansas-Texas Railway.

Houston, Tex.—Bids have been called for on the work of grading the track of the Houston, Beaumont & Orange Interurban from Orange to the Neches River. The track will be of 90-lb. rails. Contract for the section between Houston and the Trinity River will be awarded later.

Power Houses, Shops and Buildings

Denver, Col.—The two 10,000 kw. turbines of the Denver Tramway mentioned in the ELECTRIC RAILWAY JOURNAL of May 19 were purchased from the government and will be installed in its steam plant at Denver. The machines are to be ready for operation by Aug. 15, 1923. The installation of these two new units will bring the company's generating capacity up to 30,000 kw., which is sufficient for its needs and it will no longer be necessary to purchase power from a local power company.

Pacific Electric Railway, Los Angeles, Calif., has announced that work will commence soon to improve materially the power conditions on its Los Angeles-San Bernardino line through the installation of additional equipment in the substations at Ramona and Vineland. The new equipment and the alterations and additions to buildings entail an outlay of approximately $100,000. At the Ramona substation an additional 1,000-kw. motor-generator set will be installed, while at Vineland the present 1,000-kw. set will be replaced with an improved 1,500-kw. automatic rotary converter. Additions to the buildings and alterations will be of concrete with steel, fireproof roofs. The installation of additional power facilities is necessary to take care of the present and increasing load requirements on the San Bernardino line. Vineland will be the first 1,200-volt automatic substation installed on the company's lines, as all previous automatic installations have been made in the 600-volt zone.

Trade Notes

H. R. Sargent, formerly manager of the Wiring Supplies Division of the Bridgeport works of the General Electric Company, has been appointed managing engineer of this division under a development plan which will create several unit divisions at the Bridgeport factory.

Westinghouse Air Brake Company-Westinghouse Traction Brake Company have changed the address of their New England quarters to 35 Congress Street, Boston. The personnel has been increased with E. W. Davis, representative in charge; G. H. Martin, representative; C. H. Larimer, mechanical expert; C. D. Brown, industrial representative, and P. L. Bradford, mechanical expert. Charles R. Ellicott is Eastern manager.

General Electric Company, Schenectady, N. Y., has announced contracts for the equipment of fourteen new trackless trollibuses. Nine equipments are for buses to be operated by the city of New York on City Island. They have two GE-258 25-hp. motors each and K69 control. In Rochester, N. Y., five buses will be equipped with two GE-264 25-hp. motors and non-automatic contractor type control. These will be operated by the New York State Railways and are the first to be used in the state outside New York City. The buses will be made by the Brockway Motor Truck Corporation, Cortland, N. Y.

New Advertising Literature

Crouse-Hinds Company, Syracuse, N. Y., has issued Bulletin No. 2001 on flexible fixture hangers and folder No. 2 on vapor-proof condulets with reflectors.

Detroit Stoker Company has just published a new bulletin, "Cutting the Cost of Producing Steam." The bulletin takes up the dollars and cents value of mechanical stokers, dealing with each of the savings effected, in detail. It deals also with the application of advanced engineering principles and modern stoker design, and concludes with a section on the service of the mechanical stoker. Complimentary copies will be forwarded to interested engineers and executives upon request.

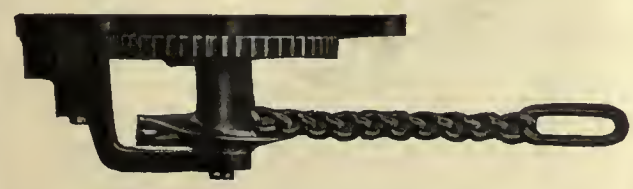
National Pneumatic Company, New York, has issued catalog No. 3, which combines several purposes. In the first place it is an excellent catalog, being well illustrated as regards complete equipments and their parts and with lists in which each piece carries a catalog number. This section of the publication includes not only pneumatic door engines an other pneumatic equipment manufactured by the company, but also its full line of equipment for manually operated door and step control. In addition to the catalog features of the publication, there is a chapter on "Remodeled Cars and Safety Cars" of technical interest to the trade, but particularly to those companies considering the best way of modernizing old rolling stock. Facts are also given on the design and construction of the equipment and method of manufacture, with views of the company's works at Rahway.

Chicago, North Shore and Milwaukee R.R. Train

Heavy traction men specify them exclusively

Engineering work of the highest class is required on the heavier interurban roads, on rapid transit lines, and on the steam railroad systems. On such work, the more experienced engineers and the more skilled technical experts are employed. Every detail of equipment is most carefully investigated, thoroughly tested and only the most reliable, safe and economical apparatus is specified.

That's why such roads as the Chicago, North Shore and Milwaukee R.R., the New York Municipal Railway (B.R.T. Subway system) and many of the leading steam railroads equip with Peacock Brakes.



PEACOCK IMPROVED BRAKES

1. **Maximum braking power.**
2. **Reserve chain-winding capacity.**
3. **Greatest speed of application.**
4. **The eccentric winding drum**
5. **The automatic stop.**

There is a suitable type for every size car. Let us figure with you on your equipment.

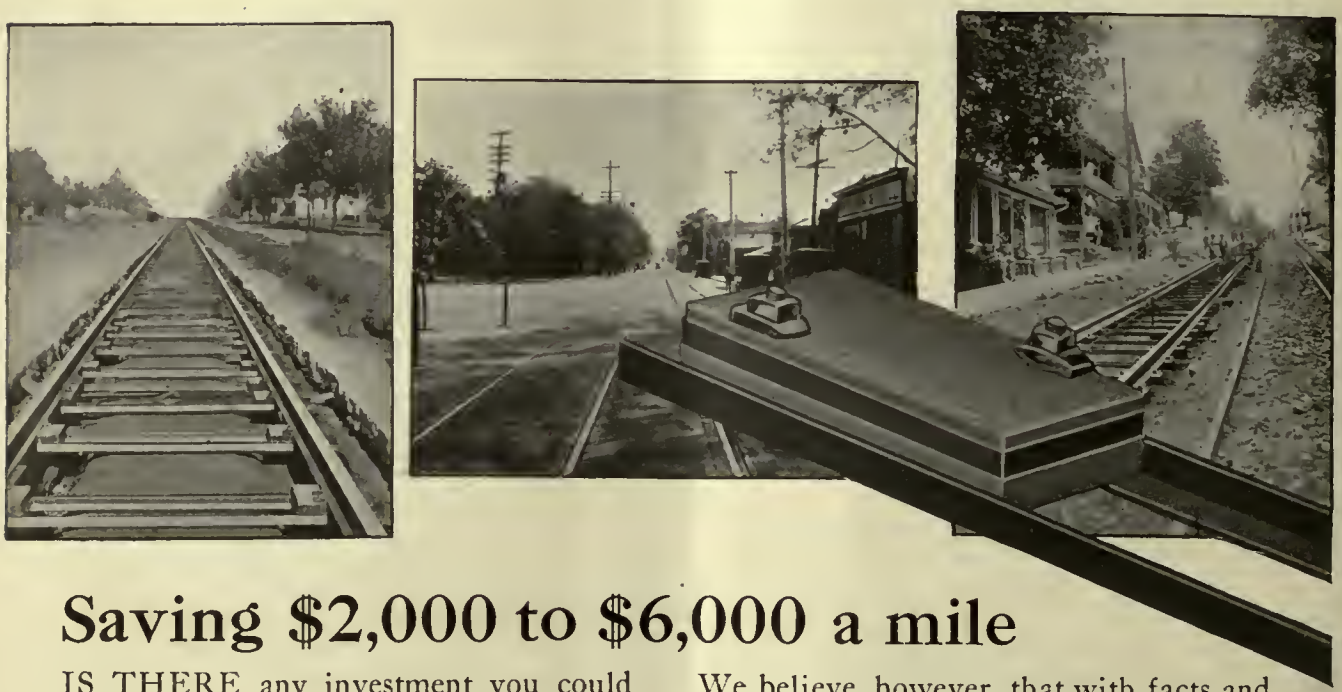
National Brake Company

890 Ellicott Square, Buffalo, N. Y.

Canadian Representative
Lyman Tube & Supply Co., Ltd., Montreal, Can.

Bankers and Engineers

No finer tracks were



Saving $2,000 to $6,000 a mile

IS THERE any investment you could possibly make which would pay anything like as large a return?

Think it over in these terms—

A saving of $6,000 per mile over wood ties in concrete!
A saving of $2,000 per mile over wood ties in gravel ballast!
Giving far longer life to the track—
Reducing track and paving repairs—
Reducing upkeep in rolling stock—
Reducing traffic noises.

These are the separate elements of economy which go ino every purchase of Resilient Ties.

The time for track building and track rebuilding is nearly here; thinking in terms of costly wood-tie construction you have perhaps felt that you couldn't afford to undertake construction for which there is real necessity.

We believe, however, that with facts and figures before you on the much lower cost of Resilient Tie construction, you will not only see your way clear to make the absolutely necessary track renewals but can definitely plan for track extensions as well.

These facts and figures as adapted to your particular problems are at your disposal any day you may care to take the matter up with us.

We can show you conclusively where you can put down *better* track for much *less* money than you had any idea of spending. A request for these figures as applied to your particular problems will not put you under any obligation at all.

We want you to know and

IT WILL PAY YOU TO KNOW

DAYTON

ever built

Permanent—Easy riding—Economical, and put in at a saving of from $2000 to $6000 a mile.

Resiliency is the coming thing in track construction.

It's simply the application of the century old principle of shock absorption for dissipating the terrific hammer blows of heavy equipment pounding over a solid foundation. Dayton Mechanical Ties are built on sound principles and are fundamentally correct. That's been proven by the ever increasing number of installations that are going in year after year in every section of the country.

Get all the facts on Dayton *Resilient* Ties. A two-cent stamp now may save you thousands of dollars next month or next year. Let us tell of the experience of dozens of cities who have so successfully used this type of construction.

CUSHION
THE SHOCK ON
THE ROLLING STOCK

The Dayton Mechanical Tie Co.
707 Commercial Building, Dayton, Ohio
Canadian Representative:
Lyman Tube and Supply Co., Ltd, Montreal, Quebec

Resilient TIE

Built up by

AJAX

Arc Welder

Highest Capacity Resistance Machine

WITH a normal rating of 333 amperes at 600 volts this equipment makes most deeply-penetrating welds. Even at low line voltages, its current output is extremely high—for instance, at 300 volts it will give 200 amperes. A switchboard at one end gives complete current control under all conditions.

Ajax Electric Arc Welder weighs only 155 lbs., and can be easily carried by two men as shown above, loaded on passenger car platforms, and otherwise conveniently handled.

Complete equipment furnished with each machine—trolley contact, leads, switches, electrode holder and operator's hood.

Here is a machine which is not too big or expensive for the smallest road. Its initial cost is small and will soon repay itself in the value of track-work salvaged and prolonged for useful service.

RAILWAY TRACK-WORK COMPANY

3132-48 E. Thompson St., Philadelphia, Pa.

30 Church St., New York, N. Y.

AGENTS:

Chas. N. Wood Co., Boston — Atlas Railway Supply Co., Chicago
Electrical Engineering & Mfg. Co., Pittsburgh — P. W. Wood, New Orleans
Equipment & Engineering Co., London, England

Manufacturers of

UNIVERSAL
Rotary Track Grinder

ATLAS
Rail Grinder

RECIPROCATING
Track Grinder

DIAMOND BRAND
Grinding Wheels

Universal Rotary Track Grinder

GIVE YOUR PATRONS AN ADDED SERVICE THEY WILL APPRECIATE

The Read-Wyl-U-Ryd System (fully patented) of selling morning newspapers in street cars makes it possible for every one of your passengers to read his morning paper while on his way to work—

2 Years Of Successful operation have proven Its Worth

Any of the following successful street railway managers will glady tell you how the Read-Wyl-U-Ryd service in connection with their local morning newspaper has served them.

T. E. Howell, Gen. Mgr.,
City Railway Company, Dayton, Ohio.

W. E. Bolieau, Gen. Mgr.,
Peoples Railway Company, Dayton, Ohio.

Wm. L. Smith, Gen. Mgr.,
Dayton St. Ry. Company, Dayton, Ohio.

Henry Gebhart, Gen. Mgr.,
Oakwood St. Ry. Company, Dayton, Ohio.

T. A. Ferneding, Gen. Mgr.,
D. S. & X. S. Ry. Company, Dayton, Ohio.

P. E. O'Brien, Gen. Mgr.,
Springfield Ry. Co., Springfield, Ohio.

W. R. Power, Gen. Mgr.,
Ohio Valley Elec. Ry. Co., Huntington, W. Va.

C. D. Porter, Gen. Mgr.,
Newport News and Hampton Ry. Co.,
Newport News, Va.

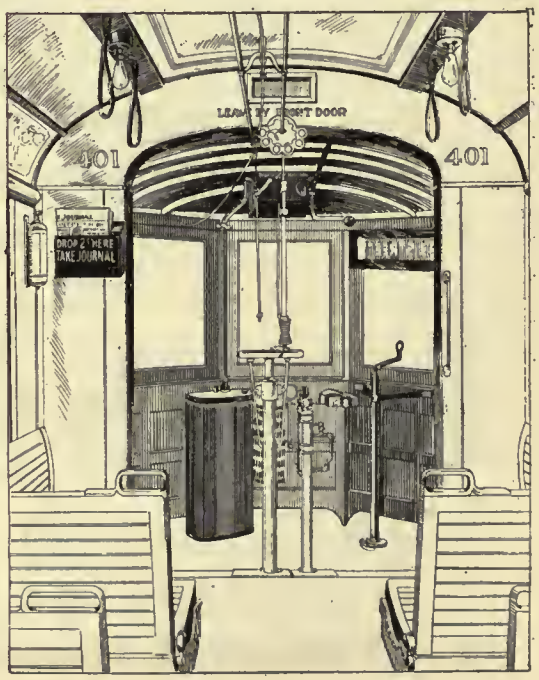
Chas. C. Johnson, Gen. Mgr.,
Danville Trac. & Power Co., Danville, Va.

W. F. Raber, Gen. Mgr.,
Southern Colorado Power Co., Pueblo, Colo.

Robert I. Todd, Gen. Mgr.,
Indianapolis St. Ry. Co., Indianapolis, Ind.

H. A. Mullett, Asst. Gen. Mgr.,
Milwaukee Elec. Ry. and Lt. Co., Milwaukee, Wisc.

Note the small size of the device used (above) and (below) its comparative size placed next the fire extinguisher.



U. S. Patent Issued April 11, 1922

Canadian Patent Issued Dec. 26. 1922

Other Patents Pending

READ-WYL-U-RYD

FULLY PATENTED

PATTERSON BLDG. DAYTON, OHIO

SEARCHLIGHT SECTION

EMPLOYMENT-BUSINESS OPPORTUNITIES-EQUIPMENT

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

E. R. J.

POSITIONS VACANT

MAN wanted; experienced in the repair and maintenance of electric motors and controllers. Gary Street Railway, 567 Broadway, Gary, Ind.

MASTER mechanic wanted to supervise shop for property operating 40 cars. State age, experience and give references in first reply. Also whether married or single. P-561, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

NIGHT car barn foreman; middle west; 14 interurban, 2 Westinghouse locomotives; must be a willing worker and competent to inspect and supervise; give detail of experience, salary expected and when available in first letter. P-564, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

SUPERINTENDENT of electrical equipment wanted for small interurban road, in Pennsylvania. Salary $200.00 per month. Address to P-558, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

WORKING shop foreman wanted, familiar with brakes, car wiring and controliers. State age, experience, references and salary expected in first letter. P-554, Electric Railway Journal, 10th Ave. at 36th St., New York.

POSITIONS WANTED

ACCOUNTING executive, thoroughly experienced in all branches of large properties: street railway, light, power and gas utility, open for engagement. Capable of assuming full control of all accounting work. PW-543, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

MANAGER or superintendent railway, light and power properties, technical, successful organizer and tactful in public relations and very resourceful in rehabilitating properties. Member A. I. E. E. Available in 30 days. PW-557, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

MASTER mechanic wants position with chance for improvement; experienced in cars, locomotives and substation maintenance; platform and multiple unit control, straight and automatic air; building trucks both passenger and locomotives, bodies and rebuilding same. Voltages from 500 to 2000 volts D.C. Would like to make connection with electrified steam road or heavy interurban Railway Company; state complete offer and equipment first letter. PW-565, Elec. Ry. Journal, Leader-News Bldg., Cleveland, Ohio.

SUPERINTENDENT of transportation with a successful record of 19 years on large properties, desires a change, and solicits correspondence with managers that are in need of a capable, progressive superintendent who knows how to get results and has a record as an economical operator. At present with large property. Personal reasons for making a change. High grade references as to character and ability. PW-559, Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

POSITIONS WANTED

SUPERINTENDENT of schedules or transportation; twelve successful years' experience on five different properties as conductor, motorman, supervisor, dispatcher, student instructor, station clerk, chief transportation clerk, and at present successfully building schedules on property operating 900 cars; guarantee to effect most economical, efficient and congenial operation of your present facilities. PW-562, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

WANTED: Position as R. M., supervisor or inspector by man, twenty years on electric railways. Best of references. Available on short notice. Interview. PW-560, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

Additional Searchlight ads on Opposite Page

WHAT AND WHERE TO BUY

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

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

Air Receivers, Aftercoolers
Ingersoll-Rand Co.

Anchors, Guy
Electric Service Sup. Co.
Ohio Brass Co.
Standard Steel Works Co.
Western Electric Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Electric Service Sup. Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
St. Louis Car Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Westinghouse E. & M. Co.

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

Babbitt Metal
Ajax Metal Co.
More-Jones Br. & Metal Co.

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

Badges and Buttons
Electric Service Sup. Co.
Internat'l Register Co., The

Bearings an Bearing Metals
Ajax Metal Co.
Baldwin Locomotive Works
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Gilbert & Sons, B. F. A.
Le Grand, Inc., Nic
Westinghouse E. & M. Co.

Bearings Center and Roller Side
Stucki Co., A.

Bearings, Roller
Stafford Roller Bearing Car Truck Corp.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car-Heating Co.
Electric Service Sup. Co.
Western Electric Co.

Boilers
Babcock & Wilcox Co.
Edge Moor Iron Co.

Boiler Tubes
Edge Moor Iron Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Sup. Co.
Ohio Brass Co.
Rail Welding & Bonding Co.
Railway Track-work Co.
Western Electric Co.

Bonds, Rail
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Rail Welding & Bonding Co.
Western Electric Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms (See also Poles, Ties Posts, etc.)
Bates Exp. Steel & Tr. Co.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Br. Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.

Brakes, Brake Systems and Brake Parts
Ackley Brake & Supply Corp.
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
Westinghouse Tr. Br. Co.

Brooms, Track, Steel or Rattan
Amer. Rattan & Reed Mfg. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
U. S. Graphite Co.
Westinghouse E. & M. Co.

Brushes, Graphite
U. S. Graphite Co.

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

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Buses, Motor
Brill Co., The J. G.
St. Louis Car Co.

Bushings
National Vulcanized Fibre Co.

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

Bus Seats
Hale & Kilburn
Heywood-Wakefield Co.

Cables (See Wires and Cables)

Cambric, Tapes, Yellow and Black Varnished
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes Carbon)

Car Lighting Fixtures
Electric Service Sup. Co.

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

Cars, Dump
Differential Steel Car Co.
St. Louis Car Co.

Cars, Gas Rail
St. Louis Car Co.

Cars, Passenger, Freight Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
General Electric Co.

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

Castings, Gray Iron and Steel
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Le Grand, Inc., Nic

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

Catenary Construction
Archbold-Brady Co.
Western Electric Co.

Change Carriers
Cleveland Fare Box Co.

Circuit Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Dossert & Co.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

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

Coils, Armature and Field
Columbia M. W. & M. I. Co.
General Electric Co.
Rome Wire Co.

Coils, Choke and Kicking
General Electric Co.
Westinghouse E. & M. Co.

Coin-Counting Machines
Cleveland Fare Box Co.
Electric Service Sup. Co.
Internat'l Register Co., The

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrapping Machines
Cleveland Fare Box Co.

Commutator Slotters
Electric Service Sup. Co.
General Electric Co.
Westinghouse E. & M. Co.

Commutator Truing Devices
General Electric Co.

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

Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Western Electric Co.
Westinghouse Tr. Br. Co.

Compressors, Air, Portable
Ingersoll-Rand Co.

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Condensor, Papers
Irvington Varnish & Ins. Co.

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

Connectors, Trailer Car
Consolidated Car-Heat'g Co.
Electric Service Sup. Co.
Ohio Brass Co.

Controllers or Parts
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Electric Service Sup. Co.

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

Converters, Rotary
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

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

Copper Wire
Anaconda Copper Min. Co.
Page Steel & Wire Co.

Cord Adjusters
National Vulcanized Fibre Co.

Cord, Bell, Trolley Register, etc.
Brill Co., The J. G.
Electric Service Sup. Co.
Internat'l Register Co., The
Roebling's Sons Co., J. A.
Samson Cordage Works
Silver Lake Co.

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

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

Cranes
Allis-Chalmers Mfg. Co.

Cross Arms (See Brackets)

Crossings
Ramapo Ajax Corp.

Crossing Foundations
International Steel Tie Co.

Crossing Frog and Switch
Ramapo Ajax Corp.
Wharton, Jr., & Co., Wm.

Crossing, Manganese
Ramapo Ajax Corp.

Crossings Track (See Track, Special Work)

Crossings, Trolley
Ohio Brass Co.

Crushers, Rock
Allis-Chalmers Mfg. Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Electric Service Sup. Co.
Morton Mfg. Co.

Dealers Machinery
Electric Equipment Co.
General Electric Co.

Derailing Devices (See Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.

Detective Service
Wish Service, P. Edward

Door Operating Devices
Con. Car-Heating Co.
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

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

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.

Draft Rigging (See Couplers)

Drills, Rock
Ingersoll-Rand Co.

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

Dryers, Sand
Electric Service Sup. Co.

Ears
Ohio Brass Co.

Electrical Wires and Cables
Amer. Electrical Works
American Steel & Wire Co.
Roebling's Sons Co., J. A.
Western Electric Co.

Electric Grinders
Railway Track-Work Co.

Electrodes, Carbon
Railway Track-Work Co.

Electrodes, Steel
Railway Track-Work Co.

Enamels
Beckwith-Chandler Co.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. R.
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Bibbins, J. Rowland
Day & Zimmerman
Ford, Bacon & Davis
Hemphill & Wells
Holst, Englehardt W.
Jackson, Walter
Ong, Joe R.
Parsons, Klapp, Brinkerhoff & Douglas
Richey, Albert S.
Robinson & Co., Inc., Dwight P.
Sanderson & Porter
Stevens & Wood, Inc.
Stone & Webster
White Engineering Corp., The J. G.

Engines, Gas, Oil or Steam
Allis-Chalmers Mfg. Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Fare Boxes
Cleveland Fare Box Co.
National Ry. Appliance Co.
Ohmer Fare Register Co.

Fences, Woven Wire and Fence Posts
American Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Consolidated Car Fender Co.
Electric Service Sup. Co.
Le Grand, Inc., Nic

Fibre and Fibre Tubing
National Vulcanized Fibre Co.
Westinghouse E. & M. Co.

Field Coils (See Coils)

Flangeway Guards, Steel
Godwin Co., Inc., W. S.

Forgings
Carnegie Steel Co.
Columbia M. W. & M. I. Co.

Frogs and Crossings, Tee Rail
Ramapo Ajax Corp.

Frogs, Track (See Track Work)
Wharton, Jr., & Co., Wm.

Frogs, Trolley
Ohio Brass Co.

Furnaces, Electric
Pittsburgh Elec. Furnace Corp.

Fuses and Fuse Boxes
Columbia M. W. & M. I. Co.
Consolidated Car-Heating Co.
General Electric Co.
Western Electric Co.
Westinghouse E. & M. Co.

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

Gages, Oil and Water
Ohio Brass Co.

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

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse E. & M. Co.

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

Gear Blanks
Carnegie Steel Co.

Gear Cases
Chillingworth Mfg. Co.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
Westinghouse E. & M. Co

Gears and Pinions
Ackley Brake & Supply Corp.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Sup. Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
Allis-Chalmers Mfg. Co.
Western Electric Co.
Westinghouse E. & M. Co.

Girder Rails
Lorain Steel Co.

Goggles, Eye
Smith Heater Co., Peter

Gongs (See Bells and Gongs)

Greases (See Lubricants)

Grinders and Grinding Supplies
Railway Track-work Co.

Grinders, Portable
Railway Track-work Co.

Grinders, Portable Electric
Railway Track-work Co.

Grinding Bricks and Wheels
Railway Track-work Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail and Manganese
Ramapo Ajax Corp.

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

Hammers, Pneumatic
Ingersoll-Rand Co.

Harps, Trolley
Anderson Mfg. Co., A. & J. M.
Electric Service Sup. Co.
Nuttall Co., R. D.
Star Brass Works
Thornton Trolley Wheel Co.

Headlights
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.

Heaters, Car (Electric)
Consolidated Car-Heating Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter

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

Heaters, Car (Stove)
Electric Service Sup. Co.
Sterling Varnish Co.
Westinghouse E. & M. Co.

Helmets, Welding
Railway Track-work Co.

Hoists and Lifts
Columbia M. W. & M. I. Co.
Ford-Chain Block Co.
Ingersoll-Rand Co.
Hose, Bridges
Ohio Brass Co.
Hydraulic Machinery
Allis-Chalmers Mfg. Co.
Instruments, Measuring and Recording
Electric Service Sup. Co.
General Electric Co.
Western Electric Co.
Westinghouse E. & M. Co.
Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
National Vulcanized Fibre Co.
Okonite Co.
Standard Underground Cable Co.
Westinghouse E. & M. Co.
Insulating Silk
Irvington Varnish & Ins. Co.
Insulating Varnishes
Irvington Varnish & Ins. Co.
Insulation (See also Paints)
Anderson Mfg. Co., A. & J. M.
Electric Ry. Equip. Co.
Electric Service Sup. Co.
General Electric Co.
Irvington Varnish & Ins. Co.
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Electric Service Sup. Co.
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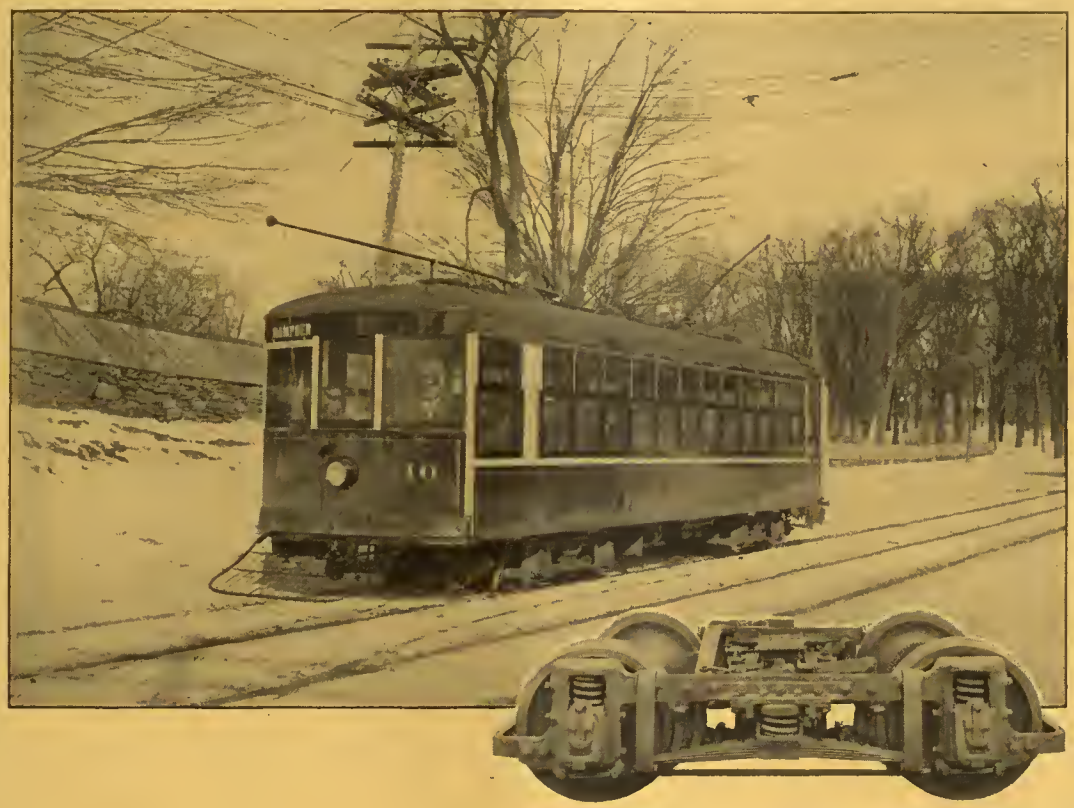

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