

received special treatment in any way, the practice of the road being to thoroughly clean and inspect the equipments on a 1,500 mile basis, and to give them a general overhauling on a 45,000 mile basis.

In the modern railway motor the armature and axle liners are liberally designed; and a direct result of this, combined with modern methods of waste lubrication, is the increased life of, and the decreased attention required by, the liners. In the earlier motors it was the practice to lubricate bearings every night, and from 10,000 to 20,000 miles life of armature liners was considered normal. Modern motors are lubricated once in 10 days to 3 weeks, and the life of the liners has increased in many cases to 200,000 miles. Improvements in material and manufacture, as well as in design, have contributed to these results. It has been found good practice to set the maximum allowable wear of armature liners at 1/16 in. and axle liners at 1/8 in.

Every detail in the design of the modern railway motor is a case of the survival of the fittest. Only through repeated trials of various designs has it been possible to select the best types for this exacting service; and as a result motors which a few years ago represented a high standard of design have been superseded by others able to perform their work with greater economy and lower maintenance costs.

With reference to motors designed for operating on line voltage higher than 600 volts. Two roads in Canada are now operating on 1,500 volts d.c.—the London & Port Stanley Ry. and the Lake Erie & Northern Ry., and the Toronto Suburban Ry. will shortly be added to the list. The Canadian Northern Ry.'s Montreal tunnel zone will operate both locomotives and car equipments on 2,400 volts d.c. The operation and maintenance of the higher voltage motors have proved to be quite as satisfactory as in the case of the modern railway motor operating at 600 volts. For operation on a 1,500 volt line the motors are wound for 750 volts each and insulated for 1,500. This arrangement permits operation on 600 volt connecting lines. For 2,400 volt operation the motors are wound for 1,200 and insulated for 2,400 volts. In all cases where designed for operation on these higher voltages, the motors conform mechanically and electrically to the best modern practice.

(To be concluded in next issue.)

Toronto Civic Railway Earnings, Etc.

Following is a comparison of the earnings and mileage for the years 1915 and 1914:—

	1915.	1914.
Passenger revenue.....	\$198,320.87	\$166,994.88
Advertising.....	968.03
Mileage.....	\$199,288.90	\$166,994.88
Passengers.....	1,219,984.4	1,097,088
	11,712,390	9,829,765

The Bloor St. line did not start operation until Feb. 23, 1915.

Toronto & York Radial Ry. Appeal.—The T.&Y.R.R.Co. has decided to appeal to the Imperial Privy Council against the Ontario Appellate Court's decision refusing the company's Metropolitan Division the right to cross Yonge St., at Farnham Ave., Toronto, to the proposed new terminals there. The Ontario Railway & Municipal Board decided that the company might make the crossing, but the Appellate Court reversed this.

Proposed Hydro Electric Radial Railways in Western Ontario.

It was announced in Toronto, Mar. 8, that the Hydro Electric Power Commission of Ontario had completed surveys and estimates of the cost of construction, with traffic data, for a number of proposed electric railway lines in western Ontario. These figures relate to the following districts: Toronto, Port Credit and Oakville to Hamilton; Hamilton, Grimsby and St. Catharines to Niagara Falls; St. Catharines, Welland and Port Colborne; Dunnville, Port Colborne, Fort Erie, Bridgeburg and Niagara Falls; Elmira, Waterloo, Berlin, Preston, Galt and Hamilton; Owen Sound, Chesley, Brussels, Seaforth, Woodham and Kirkton, connecting with the St. Marys-Stratford-Toronto line. When the figures are got into proper shape they will be submitted to the various municipalities concerned, with copies of the bylaw as voted on in other localities, for further action. A portion of the foregoing, viz., that between Toronto and Port Credit, is covered by the Toronto-London line already voted on, and as a matter of fact, is a part of the Toronto & York Radial Ry., which, it is said, the Commission proposes to purchase, together with the Toronto Suburban Ry. extension from Lambton to Guelph.

The bylaw relating to the Toronto-London line was re-submitted to a vote of the ratepayers, in Blanshard Tp., Mar. 13, the voting being 165 for, and 142 against. When it was voted on Jan. 3, the voting was 102 for and 158 against.

Lethbridge Municipal Railway Operating Results.

Following is the statement of the Lethbridge, Alta., Municipal Ry. for the calendar year 1915:—

EARNINGS.....	\$41,740.51
EXPENDITURE—	
Motormen's wages.....	\$10,996.75
Salaries.....	1,683.75
Power.....	14,864.80
Auditors.....	245.40
Employees' insurance.....	144.21
Uniforms.....	340.21
Car barn foreman.....	1,320.00
Car barn wages.....	2,784.50
Track cleaning.....	1,516.94
Car barn expense.....	572.79
Car heating.....	206.00
Damages.....	156.32
Repairs overhead.....	220.11
Stores.....	1,398.55
Repairs track.....	1,080.65
Advertising.....	92.91
General expense.....	163.03
Amusements.....	33.29
Printing and stationery.....	158.09
Office expense.....	84.57
	\$38,062.87
Surplus from operation.....	3,677.64
	\$41,740.51

OVERHEAD CHARGES—	
Debt interest.....	\$18,801.50
Sinking Fund.....	8,756.28
Taxes.....	5,143.19
Insurance.....	682.40
	\$33,383.37
Surplus from operation.....	3,677.64
	\$29,705.73

Saskatoon Municipal Ry.—The receipts for the first 51 days of the current year, were \$27,391.45, against \$17,970.30 for same period 1915.

The cost of operating the special market cars on the Calgary, Alta., Municipal Ry., is \$70 for the two days a week on which they are run, and this was on Mar. 4, transferred to the market account from the street railway account on Commissioner Graves' recommendation.

Additional Car for Toronto Civic Railway.

The Toronto Works Department received tenders to Mar. 14, for the supply of one single truck, double end city car, completely equipped and ready for operation for the Bloor St. division of the Toronto Civic Ry. We have been advised that the contract will be awarded early in April. The specification provided for a car with single arch roof with platform arranged for separate entering and leaving of passengers and to permit of fare collection as passengers enter the car. The bottom framing is to be of steel, the side members to be of steel plate reinforced at bottom by steel angle and rivetted to side sill plate. The sill is to be of steel plate reinforced at bottom edge by steel angle, the platforms with steel knees sheared to shape and reinforced top and bottom by angles, bumper of 6 in. channel from knee to knee and conforming to the shape of the vestibule, with anti-climber section, 3½ ft. long placed on face of each bumper. Steps 11 in. wide, to fold and work in unison with the doors, step to be entirely down when door is open sufficiently wide for passengers to alight, the mechanism to be of the same type as now in use on civic railway cars. There are to be no bulkheads in ends of the car. The interior finish is to be of quartered oak throughout, dull finish. Three automatic ventilators to be provided on each side of the roof, with openings 5¼ by 7¼ ins. with rounded tops on the roof. Eight windows on each side of car at 30¼ in. centres, the lower sash to drop into a well and the upper sash to remain stationary. The seating accommodation to consist of eight transverse seats of the walkover type, and four longitudinal seats, the latter to be closed underneath. The following specialties are also specified, Headlight, Crouse-Hinds type; electric bell circuit and heating, Consolidated Car Heating Co.; fare boxes, Coleman Farebox Co's type 4, as now used on the civic cars. The motors to be of the Westinghouse 533-T-4 fully ventilated interpole type. The trucks to be 8 ft. wheel base, journals 4¼ by 8 ins., car wheels, chilled cast iron, open spokes, 33 ins. dia. The dimensions of the body are as follows:

Length.....	21 ft.
Length of vestibule.....	6 ft. 4¼ ins.
Length of car over all.....	34 ft. 8¼ ins.
Width of car over sheathing.....	8 ft. 5¼ ins.
Height from rail to top of roof.....	10 ft. 9¼ ins.
Height from rail to top of vestibule.....	13 ins.
Height from top of step to floor of vestibule.....	12 ins.
Height from floor of vestibule to floor of car.....	11 ins.
Weight of car body not to exceed.....	13,500 lbs.
Seating capacity.....	32

Regina Municipal Railway Earnings, Etc.

Following are earnings, expenses and other statistics for January, compared with Jan. 1915:

	1916.	1915.
Total revenue.....	\$16,746.87	\$15,093.54
Operating expenses.....	19,281.31	17,965.87
Capital charges.....	8,466.61	9,137.57
Operating deficit.....	2,534.44	2,872.22
Total deficit.....	11,001.05	12,009.90
Expenses per car mile without power.....	21.35c.	17.15c.
Expenses per car mile with power.....	28.80c.	22.41c.
Platform wages per car hour.....	75.71c.	78.36c.
Passengers carried.....	360,263	323,484
Expenses, less capital charges, percentage....	115.13	
Expenses, with capital charges, percentage....	165.69	