which the line commences an ascent on a grade averaging about 2.5% the greater portion of a mile, with a final steep ascent of 4.2% to the higher level entering East Toronto, the terminus of the line. Several curves are encountered, but with the exception of the two corner turns, these are negligible. On the Danforth Ave. line, the gradients are very light, the heaviest being a short section of about a quarter of a mile, where there is an ascending grade from the west of 0.9%, changing through a verti-cal curve to a 3.0% ascent, dropping off

of the fill, the centre span being 100 ft., with two 40 ft. approach spans. The bridge width is 86 ft. This bridge is midway between Spadina Rd. and Bathurst St., near the centre of the line, and will allow of a ravine drive being carried under St. Clair Ave.

There are several small culverts. The Gerrard St. line has two flat top concrete culverts, 21/2 ft. square. On the Danforth Ave. line, there are about 6 small corrugated iron pipe culverts under small fills. On the St. Clair Ave. line, there is a 3 by 4 ft. cedar



## Substructure of the St. Clair Avenue Municipal Car Line.

finally to an approximately level stretch the balance of the way. There are no curves on the line. The profile of the St. Clair line is undulating in its character, both ends of the line being at practically the same elevation, whereas the other two lines follow an ascending course. The major portion of the gradients on the St. Clair Ave. line are in the neighborhood of 1.0%, with a maximum short stretch of 3.8%. The majority of the steeper gradients have been eliminated on this line by heavy grading.

Electrical energy is to be obtained from the Toronto Hydro Electric System, from the several substations most conveniently located to each line. The Gerrard St. line receives power from the East Toronto pumping station on Gerrard St., about 1,500 ft. beyond the end of the railway line. From there to the end of the line, there is a feeder and return line, each 350,000 c.m. The feeder line parallels the railway line o within 1,400 ft. of the city end of the line. The power question for the Danforth Ave. line has not as yet been settled. The St. Clair Ave. line receives its power from the substation on Macpherson Ave. near Avenue Road, a f eder and return, each 500,000 c.m. leading along Macpherson Ave. and up Spadina Road to the line, the feeder extending in each direction from this point.

Along the several lines, the St. Clair Ave. line particularly, there has been some heavy cut and fill work to eliminate grades. On the St. Clair Ave. line, two ravines have been negotiated. All this work, where heaviest, has been carried out in approved railway line methods with steam shovel and dump cars hauled by a dinky engine. In one of the St. Clair Ave. fills, the original plans called for a large concrete culvert, which collapsed and has been replaced by a plate girder bridge over the central part

box culvert, and one 6/ft. square flat top concrete culvert.

The facilities for handling the equipment are very limited as yet, as the operation of the lines has only recently commenced. The only shed is a small sheet metal shed, of very light construction, on the Gerrard St. line, near its east end, where the four cars operated on that line are stored.

To facilitate the construction work, each of the three lines had its own separate storage yard adjacent to the nearest steam railway line. For the Gerrard St. line, a strip of the G.T.R. right of way a short distance to the west of York station was acquired by

States. The four cars on the Gerrard St. line are 45 ft. long, weighing 46,000 lbs., having a seating capacity for 40. The centrai seats are cross, with the end ones lengthwise. The cars for the St. Clair Ave. line, 20 in all, are being delivered to the city, and are being assembled as fast as they arrive from the builders. These cars are similar in most particulars to those on the Gerrard St. line, except that the seating capacity is increased to 48, there being 8 cross seats and 4 longitudinal seats at the ends. These cars are mounted on two 11 ton Baldwin trucks, on each of which are two GE 80 railway motors. The con-trollers are SGE K 28B. Turtle back construction is followed in the car design, and they use straight air control with a GE type CP 27 electrically operated compressor unit. On each end of the cars there is a 6 ft. platform with entrance and exit railing, both vestibules being completely enclosed. The front exit door is operated by a lever in front of the motorman, and the rear entrance and exit doors from double levers in front of the conductor, adjoining his fare box stand. A portable fare box is employed. The opening of each door drops a step, and at the same time an electric light under the vestibule back of the step is lighted in night operation. The new cars for the Danforth Ave. line are to be similar in all particulars to the ones for the St. Clair Ave. line.

The work on these lines has been carried out by the City Works Department, R. C. Harris, Works Commissioner. The design and general supervision of the work came under the charges of E. L. Cousins, now Chief Engineer of the Toronto Harbor Commission, succeeded by C. W. Power, Engineer of Railways and Bridges, while the actual construction work was supervised by A. E. K. Bunnell, succeeded by D. W. Harvey, Assistant Engineer of Railways and Bridges.

The Canadian Autobus Co., which is preparing to operate a service of autobusses in Montreal, is working in conjunction with the London General Autobus Co., London, Eng. G. Poloquin, representing the Brit-ish company, has arrived in Montreal to arrange for the operation of the first consignment of vehicles for the new service. Duncan McDonald, Montreal, is in London, Eng., looking after the shipment of the buses. It is stated that 350 of these vehicles are being built by the London Gen-eral Autobus Co., for the Canadian Autobus Co., and that 150 are ready for shipment.



Substructure of the Danforth Avenue Municipal Car Line.

the city, and running rights obtained for a narrow gauge line from this yard to the line under construction. For the Danforth Ave. line, a piece of private property on Coxwell Ave., on the north side of the G.T.R. main line, was acquired for the yards. For the line, was acquired for the yards. For the St. Clair Ave. line, Station St. at the ex-treme west end of the line was closed by the city, forming a yard on the east side of the G.T.R. North Bay line. The cars on the civic car lines are all of the pay as you enter and double end control type, and were built in the United

Trolley Traffic in Great Britain.—Board of Trade statistics show that during 1912 the trolley lines of Great Britain carried over three billion passengers. Figures such as this give an impressive sense of the magnitude of modern railway facilities, and the statistics are the more remarkable when it is remembered that this traffic was carried on 2,642 miles of track and in less than 13,000 cars. Significant, also, is the fact that whereas in 1900 there were 37,000 horses employed in hauling street cars, in 1912 there were only 1,500.