

The bonding of the tracks on Main Street, from the river to the C. P. R. subway, is good. In addition to the rails, which are heavy (70 and 95 lbs. to the yard), a 500,000 c.m. cable runs between the rails and is cross bonded to the track. On account of the bad condition of the track returns in the other parts of the city causing stray currents everywhere, the tracks on Main Street connected to the bus bars through heavy copper returns, draw the currents from the piping along this street. This is shown by the electrolysis survey, as readings taken along this street between the high pressure hydrants and domestic water pipes show these positive to the rails. As a matter of fact throughout the whole centre of the city this condition is met.

*Damage is Widespread.*—It can, therefore, be stated that electrolysis is taking place through the entire centre of the city.

The tracks are bonded, at the corner of Main Street and Portage Avenue, to the return feeders of a total sectional area equal to 6,848,000 circular mils. The drop of potential between this point and the negative bus bars, if these carried the railway current altogether, would reach 12 volts at times. The distance is approximately 1,200 feet, that is, the drop of potential from these tracks to the station is one volt per 100 feet. This is altogether excessive; a voltage drop of one-half volt per 300 feet is usually considered large enough. The above condition is responsible for the trouble reported in district No. 4.

*Tracks in Very Bad Shape.*—Return feeders, besides the one stated above, are also used (see Plan); they are bonded to the tracks at different points of the system, but they are of comparatively small section and little current can be carried by them. To sum up it will suffice to say:

1. With the exception of Main Street from the Assiniboine River to the C. P. R. subway, Portage Avenue from Main Street to Hargrave Street, Notre Dame Avenue from Main Street to Charlotte, Corydon Avenue from Pembina Street to Lilac Street, Lilac Street from Corydon Avenue to Woodlaw Avenue, and the tracks which are being now bonded with electrically brazed bonds (i.e. Dufferin Avenue and Logan Avenue), the track returns of the Winnipeg Street Railway Company are in very bad shape.

2. The load on the Mill Street substation, and its location are such that it is not possible to return through the rails and return feeders only the large volume of current required for the Street Railway service.

Electrolytic troubles and damage to the piping system and cables result from these two conditions, and is spread out over the whole of the centre of the city, although it has appeared only so far in certain districts.