

have two plants in the city of Winnipeg—one, the old steam plant, at the foot of Main Street, corner of Assiniboine Avenue; the other a substation on Mill Street. The first plant is kept as a reserve; the second plant, which furnishes the whole of the electric current for the street railway system, receives its electrical energy from the hydro-electric plant at the Pinawa channel of the Winnipeg river. The average current for the railway service fed out from this plant approximates 6,000 amperes, but reaches as high as 9,000 amperes at times of heavy load in the winter months.

The street railway tracks are bonded at the corner of Main Street and Portage Avenue to return feeders connected to the negative bus bars at the station. Other return feeders connected at different points to the track are also used (see Plan No. 1.)

It was apprehended at once from a study of the geographical location of the power station, its distance from the street railway tracks, the large volume of current that required to be returned to it, the run of the underground piping system and telephone cables, and the proximity of the river, that unless the track returns were of the very best, and unless there was a very generous amount of copper used for the negative feeders, the conditions were such as to point to great possibilities for stray currents.

Electrolysis Investigation and Survey.—The electrolysis survey, which was carried out, involved not only mere readings of potential difference between the rails, the piping system and telephone cables, but it embraced an examination of the feeder circuits, the general condition of the roadbed and the sizes and efficiency of the returns. A complete and thorough examination of the points where the City Electrician had reported damage to pipes through electrolysis was also made.

The following summary states concisely the conditions existing in the city.

District Affected by Stray Currents.—The report of your City Electrician, giving location of pipes damaged dating from January, 1905, to June 4, 1909, shows that electrolytic action has mainly taken place in the following districts:

- 1st. Princess Street, from Logan Avenue to Notre Dame Avenue.
 - 2nd. Portage Avenue, from Hargrave Street to Fort Street.
 - 3rd. District enclosed by Main, Broadway, Hargrave and the river.
 - 4th.—Notre Dame Avenue, from Main Street to Winnipeg Electric Railway Company's substation.
 - 5th.—Ellen Street, from Notre Dame Avenue to McDermot Avenue.
 - 6th.—Langside Street, from Portage Avenue to Ellice Avenue.
- (These districts are shown shaded in Plan No. 1.)