SEWER CONSTRUCTION IN TORONTO.

The following table from the annual report of the City Engineer, shows the length in feet of sewers constructed duriug the year 1905 :

9-inch tile pipe	1,364	lin. ft.
12-inch tile pipe	13,288	"
15-inch tile pipe in concrete	7,852	"
18-inch tile pipe in concrete	500	"
2 ft. x 3 ft. brick	2,018	"
4-tf. steel pipe	298	"
Total	25,320	"

There are in the city 245.11 miles of sewers and 71 automatic flush tanks.

During the year there were ; 121 new manholes built ; 106 manholes repaired ; 641 new gullies built ; 90 gullies repaired ; 63 miles of sewers flushed and cleaned.

Break in Sewer, Robert Street, Toronto.

AN EIGHT-TRACK REINFORCED-CONCRETE VIADUCT.

Eight tracts of the Canadian Pacific Railroad cross Main St., Winnipeg, Manitoba, overhead at an angle of 86 deg. 4 min. on a reinforced-concrete structure, which is of interest both on account of the special design of the concrete groined arches in it and from the character of the reinforcement, which consisted of scrap rails bolted and trussed together to resist stress in flexure, tension and shear. The small depths of the arch crowns is noteworthy, especially in consideration of the fact that the tracks are carried over them in ballasted troughs.

The railroad tracks occupy the full width of Point Douglass Ave. and were raised 5ft. above their former grade in order to secure a maximum clearance of 14 ft. over the two electric car tracks on Main St., and to allow the latter to remain above water level when they were depressed 11 ft. 11 in., thus permitting the subway to be built with a total length of 646 ft. 8 in. with approach grades of 1 :20. The width of the structure is 100 ft. over all, exclusive of the stairways, and it only receives about ¾ of the original street, a strip 32 ft wide being maintained at the original grade east of the subway on both sides of the railroad tracks, but not being carried across them. The structure consists of an east and west approach, with concrete retaining walls paralled to Main St. and an arched centre portion, 140 ft. long, which forms a continuous bridge floor, supported by four rows of 11 columns and abutments each.

The principal arches have their axes parallel with Main St. and are arranged in 5 spans. A 23-ft. 3-in. centre span over the double-track electric street railway is flanked by two 23-ft. 3-in. similar spans over the driveways and two 11-ft 10½in. full-centred spans over the sidewalks. The large spans are false ellipses made with seven centres each, and are relieved in elevation by triangular panels 1½ in. deep over spandrels which serve also to define the extrados.

The curves of the intrados are described with radii of 2 ft. 2 in., 3 ft. 11 in., 10 ft. 10 in. and 27 ft., the rise being 5 ft.

The tops of the columns or piers are integral with transverse beams 34 in. deep parallel to the railroad tracks and reinforced by trusses made with rails embedded in the concrete near the upper and lower surfaces of the arches and latticed together. The beams are connected and the ballast is carried by concrete slabs 18 in. thick at the centre whence they are pitched both ways for drainage, and are reinforced by rails projecting at both ends into the beams and by longitudinal transverse round rods, the latter bent upwards at the ends and continuous across the main beams on the centre lines of each to intersect the corresponding rods from adjacent panels. The under sides of the slabs and beams have concave surfaces forming the soffits of the groined arches.