

In several instances sewers were encountered that would not permit of the passage of the interceptor beneath them, in which event a sufficient length of the existing sewer was torn out and passed under the interceptor in the form of an inverted syphon. To secure a good grade in the connection pipe under these circumstances, the interception had to be made some distance up the line of the sewer. The most notable instance of this kind was that in connection with the interception of the Garrison Creek sewer. In this case the connection pipe, built of 72-inch reinforced concrete pipe, was 1,200 feet long, and a bellmouth chamber 30 ft. in length was required to accommodate the volume of sewage intercepted.

In several of the small sewers crossing this line of the low level interceptor the leaping weir was employed as a means of interception. The principle upon which it is worked is to leave a gap in the invert of the sewer wide enough to receive the designed amount of flow and over which the excess will leap. Due to the fact that the level of the invert of the low level interceptor is below lake level, it was necessary to place the crests of all intercepting weirs not lower than the elevation of high water. In this way lake water is prevented from backing up the existing sewers and finding its way into the interceptor.

#### The Design of the Intercepting System.

The system is designed to accommodate the sewage of Toronto in the year 1930. At this time it is assumed the city will have a population of 566,000, and provision was made for carrying sewage at the rate of 200 gallons per capita per day, with the interceptor running a little over one-half full, leaving the remaining area available for storm water. Another item influencing the grade and diameter of the interceptors was the assumption that one-half of the daily average flow would be discharged in eight hours, that is, during the 4 hours on either side of the point of maximum daily flow.

The result of these assumptions is that all the sanitary, or dry weather, flow, together with all surface water up to the capacity of the interceptor will be intercepted and treated at the tanks. During storms of great intensity the weirs in the bellmouth chambers will overflow and allow the storm water to flow by way of the existing sewer outlets into the lake or bay. Meteorological reports show that this will not occur more often than six or seven times a year, on which occasions the sewage will be so diluted with storm water that its presence in the lake will not be noticeable.

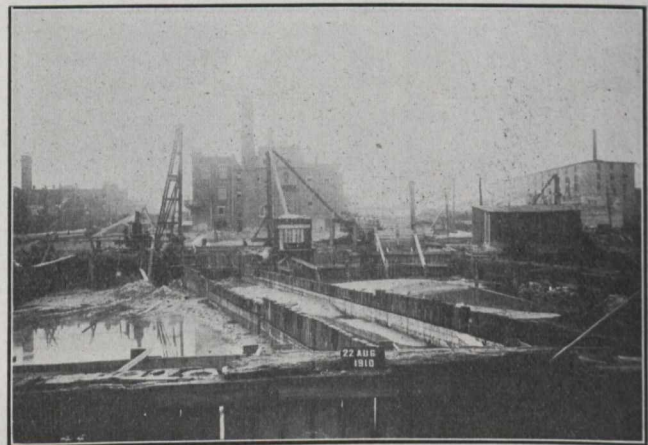
#### The High Level Interceptor.

The high level interceptor will extend from the corner of Roncesvalles avenue, where it intercepts the West Toronto trunk sewer, to the Disposal Works, which are situated at the foot of Morley avenue, its fifteen sections covering a distance of 9 miles. The line was determined roughly by the contour of the city, and is located on King and Liberty streets in the west end; and Defoe and Adelaide streets in the centre as far as Victoria street. From this point it follows a north-easterly direction, and crosses the Don river just below Wilton avenue, and thence to its destination by way of Elliott street, Dagmar, Doel and Morley avenues. Its cross-section and grade will vary from a 4-foot diameter circle at a slope of 1 in 1,800 at its western extremity, to the equivalent of a 9-foot 6-inch diameter circle at a slope of 1 in 3,200 where it enters the tanks. The smaller sections, for a distance of 2 miles, will be built of concrete pipe laid in open trench; where the line lies along important streets, for a distance of 3½ miles, tunnel construction is being employed, in which case an all-brick section is used. The larger sections in the east are being built in open cut, of mono-

lithic concrete lined on the invert with a single ring of vitrified brick.

#### The Don Syphon.

At one point, however, the continuous grade of the high level interceptor is broken. This is where an inverted syphon had to be employed in order to pass the sewage under the Don river. The length of the syphon, including entry and exit chambers, is 500 feet, and the difference of elevation of the east and west ends is 18 inches, giving an hydraulic gradient of 1 in 330. The lowest point is 21 feet below the grade of the interceptor, this great depth being necessary by the fact that the Don river will at some future date be made navigable. The syphon consists of two parallel lines of bell and spigot cast iron pipes, 3 ft. 6 in. and 5 ft. 6 in. in diameter, supported on pile bents. The former is designed to take the present maximum dry weather flow, while the latter will be used for future increase and at time of storm. At the east and west ends of the syphon there is a concrete chamber, where the flow through the pipes is controlled by means of stop logs. From the latter a 36-inch cast iron overflow (which can be used in case of flood) is run into the river. A concrete blow-off chamber is also built around the pipes at the low point in the syphon for the purpose of unwatering it should the necessity arise.



The Don Syphon, Showing the Cofferdam Unwatered.

For the purpose of construction four lines of sheet piles, 130 feet long, were driven across the full width of the river, the water, which is only 4 feet deep, being carried by two flumes 8 feet wide, one on each side of the river channel. The two rows comprising the outer cofferdam were placed 100 feet apart and composed of 16-foot Wakefield sheeting. The two inner rows, made up of southern pine timbers 6 x 12, 32-ft., tongued and grooved, followed the line of the syphon and were driven 16 feet apart. The area between the two outer dams was unwatered and the space filled with the material as it was removed from the trench. Pile bents were spaced 4 feet apart on centres. The pipes, which were craddled and bevelled blocks, were supported by 8 x 12-inch southern pine sills, bolted to the piles, which were dapped to receive them. A brace was also placed over the top of the pipes, where they ran under the river, to prevent any buoyant tendency in case they had to be unwatered. The pipes, which were 6 feet long, the heaviest weighing 5 tons, were delivered by a derrick on shore to a gantry over the trench, by which they were lowered into place.

Another syphon in connection with the high level interceptor is that to intercept the Rosedale Creek. It will be approximately one mile in length and will be built of 42-inch reinforced concrete pressure pipe. The pipe has been