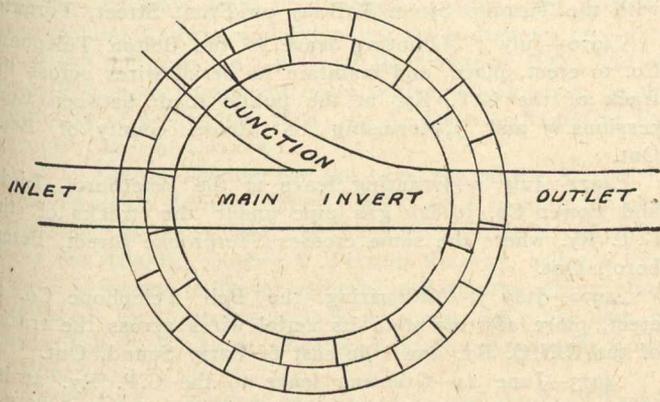


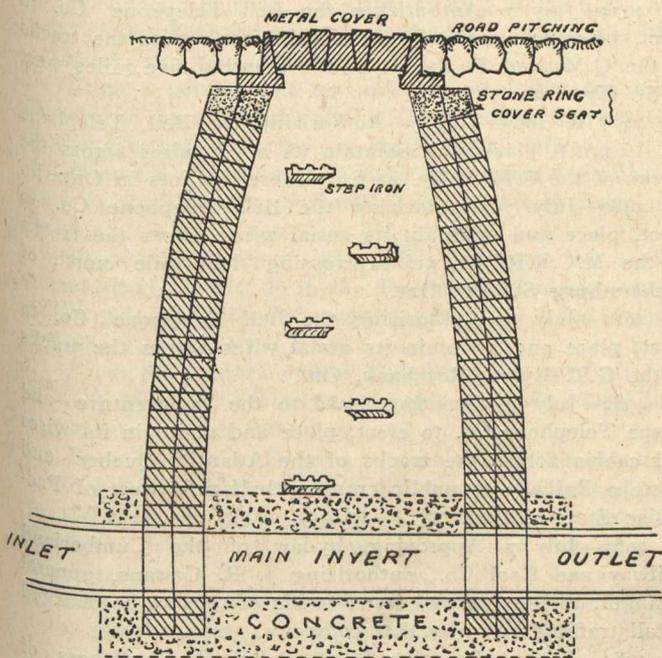
**Filling in Trenches.**

The filling of the trenches requires great care and most careful supervision. Many lengths of sewer are ruined by careless filling, throwing in large stones immediately over the pipes, treading on the pipes, and ramming the earth before there is sufficient cover to protect them. It should always be borne in mind that a length of sewer jointed with cement forms a rigid tube. In filling, loose earth should first be carefully packed around and over the pipes, and no ramming should commence till there are at least two feet of covering.

**FIG. 3. MANHOLE**



PLAN



SECTION  
Manholes.

Manholes should be built on the line of sewer at every change of gradient and direction, and at distances of not more than 300 feet apart. These will allow the sewer to be examined at any time, as a clear view through the sewer must be presented between each manhole. They also allow of any choke being removed by the use of drain rods. A well-arranged manhole system is a saving of money, and guards against the future breaking up of the road for examination purposes. Fig. 3 gives a useful and cheap form of manhole. Built circular, it is very strong, and will stand any weight of traffic. Such can be built of 9-inch brickwork with radiated bricks, or in concrete rings, either reinforced or otherwise.

**Ventilation.**

A common practice is to ventilate the sewers by means of open gratings over the manholes. In a first class system of drainage, where the sewers are self-cleansing, there is not much objection to this, as the sewer gas is seldom of a character causing any nuisance. The better plan, how-

ever, is to provide close covers on the road surface, and provide separate vent-pipes from the manholes to the sides of roadways, and carry up 6-inch iron pipes up the sides of buildings clear of all windows and chimneys. The vent-pipes may be carried in connection with gas lamps, and the organic impurities in the sewer gas destroyed by combustion. Special vent-pipes are often required at the head of sewers. Sewer gas, being generally warm, has a tendency to rise and become more concentrated in the higher reaches of a town. Ventilation to sewers is always necessary, so as to relieve house fittings from any undue pressure.

Much more in detail may be stated, but the object here is simply to show what should generally be insisted on in connection with a good, honest and serviceable system of sewerage. Special circumstances are always arising, such as waterlogged land, running sand, etc., which may require special pipes with special joints. If, however, sufficient has been said to make it clear that a sound and durable system of sewerage is within the reach of every municipality, the author will feel that his object has been achieved in this chapter.

[Any question arising out of statements contained in these articles will be gladly answered by the author.]

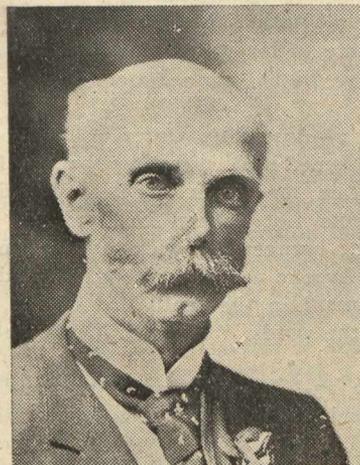
(To be continued.)

**SOCIETY NOTES.**

**Engineers' Club, Toronto.**

The annual outing trip of the Engineers' Club, Toronto, took place on July 15th and 16th, and consisted of a railway trip from Toronto to Peterboro', a sail through the Trent Valley Canal from Peterboro' to Bobcaygeon, where the train was again taken for Toronto.

The party left Toronto in a private car Wednesday evening, and found that President J. G. Sing, with the assistance of his Executive, had made complete arrangements for a successful outing. Besides President Sing, the other members of the Executive on the excursion were Second Vice-President C. M. Canniff, Treasurer L. J. Street, and members of the Executive Committee, W. J. Fuller and R. G. Black. Among those in the party were: F. L. Somerville, C. H. Heys, A. Pense, A. F. Macallum, W. Vandeleur, C. H. Hamilton T. T. Black, W. A. Young,



**Mr. J. C. Sing, President Engineers' Club.**

S. D. Chadsey, J. Williams, J. D. Shields, E. L. Merrill (late of Winnipeg), A. W. King, D. D. James, A. Lemay, O. W. Smith, A. J. VanNostrand, E. T. Ward, C. R. Young, E. A. James, W. Rubidge, W. A. Bucke, R. A. Baldwin, W. A. Johnson, J. H. McClelland, and Jas. J. Salmund, of the Canadian Engineer.

Early Thursday morning the party left Peterboro' on the Government boat, "Bessie Butler," the guests of Superintendent J. H. McClelland.

The Peterboro' lift lock is not new to Canadian engineers, yet the "locking through" was a matter of con-