

deter a smaller corporation it is not surprising that these smaller places postpone the construction of a system of sewerage.

It is a great mistake to look to the larger cities for model sewerage. Within the last twenty, within the last ten years, even within the last five years, sanitary engineering has taken gigantic strides, and the best, safest, and cheapest systems of sewerage are those that have been commenced and completed in the smaller cities within the last five years.

In the United States the following towns and cities have constructed sewerage systems since 1880—adopting in each case the separate system: Memphis, Tenn.; Keene, N.H.; Norfolk, Va.; Pullman, Ill.; Stamford, Conn.; Chelsea, Mass. (in part); Kalamazoo, Mich.; Omaha, Neb., (in part); Little Rock, Ark.; Birmingham, Ala.; Pittsfield, Mass.; Leavenworth, Kan.; Schenectady, N. Y.; Amsterdam, N. Y.; Green Island, N. Y.; West Troy, N.Y.

In Canada the town of Brockville is now constructing a complete system of sewers, and the town of Cornwall has made a commencement. Both of the towns have also adopted the separate system.

In the small cities, towns and villages the element of cost is often a controlling factor. The writer has given his reasons why he considers the separate system better than the combined system from a sanitary standpoint, and as a system of sewers designed to carry the rainfall will cost from twice to five times as much as a system to carry sewage only, there are few valid reasons for adopting a combined system.

It is often objected against the separate system that additional sewers are necessary to carry the rainfall. This may be true in large cities with large roof area, paved courts and streets, where storm water would do injury if not immediately carried off, but in the majority of towns and cities in Ontario the surface gutters and present drains are quite sufficient to carry the rainfall. In special cases it may be advisable to allow a limited amount of roof water, or even street water in the sewers; all depends upon local conditions.

In moderate earth excavation the average cost of a completed system of sewers built on the separate system should not exceed \$1.50 per lineal foot of sewer constructed. This is a sum that any town not already bankrupt can afford, being at the rate of \$7,500 per mile approximately.

In the system of sewerage designed for the town of Cornwall by the writer, any sewage entering the system at the greatest distances from the outlet will be discharged in less than ninety minutes. In the Brockville system, now under construction, the time required to discharge at the main outlet from buildings farthest removed from the outlet along the line of sewer is also less than ninety minutes. The main outlet at Brockville is a submerged iron pipe 923 feet long extending from shore line out into the River St. Lawrence, the outer end being in 45 feet of water.

Plumbing.—It is a fact well understood among sanitary engineers that the greater amount of the dangerous sewer air that pervades our dwellings is "home-made"—manufactured on the premises—that is, it comes from putrescent matter lodged in the traps, pipes and fixtures in the building itself. It is human nature to remove the cause of a wrong as far as possible, and there is but little doubt that the public street sewer, built by a conscienceless corporation, is binned for many foul emanations that come from defective plumbing.

The science of plumbing, depending as it does upon a knowledge of some of the laws of physics, hydrostatics, hydraulics and pneumatics, is but little understood by the average citizen, and the ordinary plumber has not kept pace with the requirements of his calling during the last decade of advancement and improvement.

For these reasons all plumbing should be under the control and supervision of the city or town engineer.

In conclusion, the writer is of the opinion that the time has arrived when those *twin relics of ignorance and barbarism*, the "privy vault" and "cesspool," should be abolished in all cities and towns, and some system of direct removal substituted temporarily until a complete system of removal by water carriage is constructed. These nuisances are only tolerated from familiarity, and should be stamped out by sanitary officers, totally out of reach of local prejudice or political influence.

TUBERCULOSIS.

C. W. PURCELL; READ AT FIRST MEETING OF VETERINARY MEDICAL ASSOCIATION IN THE ONTARIO VETERINARY COLLEGE.

DR. T. HENRY GREEN says: "By tuberculosis is understood, an infective disease, which is characterized anatomically by the formation of those small nodular lesions, known as tubercle."