

pollute the air. We would say that all these go to show that Ottawa, so far as local atmospheric conditions are concerned, is singularly fortunate, also as to general atmospheric conditions, such as occur during epidemics of cholera and famine fever, etc. I find on turning up the mortuary statistics for the month of November that the death rate of Ottawa from typhoid fever was 15; that of Toronto 2; Montreal 9; Quebec 3; Halifax 1; Winnipeg 1; London 1. That is, that the number of deaths in a combined urban population of 555,000 souls, was equal to Ottawa with 35,000 souls, many of these cities being situated less favourably as to local conditions than Ottawa. These facts seem to me to exclude atmospheric causes, local or general. Next taking contamination of milk as a cause, we find the disease in houses in every ward in the city, I might say on every street. It is not to be supposed that one milkman could supply the town with milk, nor is it to be thought that the milk coming from farms situated north, south, east and west is all infected or that any considerable number of cows on these farms are drinking sewage water. The exclusion of these two causes leaves but two factors for our consideration. I propose taking up next the conditions of the drains as a possible cause. The main sewer of Ottawa has been constructed of brick lined with Portland cement. It has an excellent fall throughout and discharges into the Ottawa in the vicinity of New Edinburgh. It has been pronounced by eminent engineers to be well built. The subsidiary drains are constructed of tile pipe with a fall of one foot in every 200 feet, that is they are self-cleansing. Had they a fall of 6 or 8 feet the water would run off and leave the accumulations behind, but with barely sufficient fall, all accumulations must come away wherever water flows through the pipes, or damming back of the sewage and flooding of the cellars must occur. Under these conditions, granted a sufficient supply of water, accumulations could not remain in the drains. In every textbook on the subject, it is stated that in large cities with a scanty water supply, after a long dry season, accumulations may occur; when to the decomposing matter is added the typhoid germ which is never wanting in cities, either imported or present from the excreta of an infected person, then we have conditions present which may spread the disease. But where would these germs manifest

themselves? Would it not be in those houses where there are no proper traps, or where these are defective, and not elsewhere? Has this been the experience of any medical man in Ottawa? No, I am afraid not. There have been cases in the houses of the rich; in those of the poor; where the drainage is perfect and the plumber has exhausted his art in providing perfect sanitation; where the drainage is bad and scandalous—where there are no drains whatever and in some cases none within some hundreds of yards. Many instances might be cited. I know of twenty cases in houses not connected with the city drains. The fact is that our present system has been here for years, and has been steadily improving; that we have had dry seasons many times, but never anything like the present epidemic of typhoid. I believe that in a few streets in this city the drains would have better served their future use had they been sunk lower at their starting point, but they serve their purpose well; they drain the houses they were built to drain. The trouble will be when approaching Stewarton they will fail to drain houses on a lower level. This will necessitate a new main sewer down Frank or Ann street. Having by exclusion dismissed the drains as a possible cause of the present sickness, we have only the water left.

Liebermeister, a leading German sanitary authority, states "that over 80 per cent. of all cases of typhoid fever are caused by impure drinking water." The persons infected during the outbreak were, in nine out of ten cases, water drinkers, and were generally under 30 years of age. Is the water supply of Ottawa above suspicion? Let us see. The aqueduct runs from the bay above the Chaudière 440 yards to the pump-house. It is open, and serves as a surface drain for a large portion of the Flats and one-half of the Richmond Road as far as the station. Granted a few cases of typhoid along the course of this stream on either side, and a copious rainfall, would it not be probable that the drainage of the back yards, etc., would filter in and pollute the water main, constructed over 12 years ago of wood bound with iron hoops. Considering the alternate contraction of heat and cold; the action of rust on the iron hoops; the pressure on the wooden main in times of emergency at fires, etc., would it not be reasonable to suppose that the hoops have loosened and caused leakages in the