connection with the St. Lawrence route during the French regime was the attempt to construct a canal between Montreal and Lachine, to overcome the Sault St. Louis or Lachine Rapids. In 1700 a contract was signed by Dollier du Casson on the one part and Sieur de Catalogne on the other to construct a canal some twelve hundred feet long and twelve feet wide from Lachine to connect with a little lake, called St. Pierre, which in turn connected with two streams, one of which ran through what is now Craig street. The work was interrupted in 1701 by the death of Du Casson, and although many attempts were made to complete it, the Seminary spending some 20,000 francs in work begun in 1717, a heavy rock cutting that was encountered finally brought all operations to a standstill.

It may be interesting to remark in view of the present endeavor to find a winter outlet for the St. Lawrence that during the French regime the harbor of Bic was designed to be improved and fortified to make it what Louisburg was to Acadia and what Halifax is to-day, a naval depot and winter port for trade. French shipping on the great lakes began as we all know with the journey of LaSalle, who built a vessel to navigate Lake Ontario, left it at the upper end of the lake, passed Niagara and on Lake Erie built the "Griffon" in 1679. She made one trip into Lake Michigan, and was lost on her return journey. As early as 1700 there were two or three brigantines on Lake Ontario, and in 1756 from six to ten schooners and brigs, as well as a number of large batteaux.

I will close this sketch of the French regime by remarking that the priesthood, who do all things decently and in order, had a series of regulations regarding travel which read quaintly to-day. They were to tuck up their robe on getting into a canoe, and were not to wear their shoes or stockings, though they might don these when portaging. Above all, they were to be careful that they took no sand into the canoe upon their feet and that the brim of their hat should not annoy the savages, an item which might bear quotation to-day in theatres, although the alternative that they should wear their nightcaps because there is no such thing as impropriety among savages, might be asking too much of the ladies.

(To be continued.)

WATER.

BY W. M. WATSON, TORONTO.

On page 39 of the June issue of this paper for 1897 I discussed public water supplies and their construction, and now propose to continue the subject in a more detailed form. No doubt it is generally known that Henry Cavendish, an English chemist, in 1781 proved that rain water, the source of all water supplies, was a composition of two parts of hydrogen and one part of oxygen gases. Thresh states that pure water may be classed as a chemical curiosity, because when it becomes exposed to the atmosphere, or when passing over rocks, earth, vegetation, or when it comes in contact with any oxidizable metals or ores it becomes partly incorporated with them. Water will attract foul gases from the air, and often attract such a quantity of chemicals or metals as to change its taste and make it unsafe to use for drinking or indeed for any domestic purpose. Bacteriology has proved that both food and water contain microbes. Professor Richardson shows in his lectures that a single grain of good cheese contains 300,000 living germs. Microbes are useful and necessary to carry out the laws of creation. There are a large number of classes, each class having its appointed duty. Several varieties assist the growth of things. These are sometimes referred to as friendly bacteria, because all their work is done for the benefit of mankind. There are also numerous classes of microbes whose duty it is to rot, to destroy, to decompose, and help everything to decay.

Strictly pure water contains very few microbes, either friendly or unfriendly, on that account it may be taken to be a risky kind of water to distribute, because just as soon as it comes in contact with air, it will rapidly absorb any foul gases that may be in the surrounding atmosphere, which also means that it attracts microbes whether friendly or unfriendly, so that if the volume of water be surrounded by uncleanliness or foul atmosphere, the water itself becomes the receptacle of dangerous germs, and unfit for use for domestic purposes. Dangerous germs are always found in connection with decaying matter, they are discharged through the pores of the skin, by the intestines, and sent into the air by the respiratory organs. A few drops of sewage that has had dirty clothes washed in it may contaminate water sufficiently to pass a quantity of deadly germs into many human systems. But we have a safeguard provided, but that safeguard is not in pure water, because pure water does not contain a sufficient quantity of the friendly bacteria to protect it from becoming the hunting ground or receptacle of the dangerous and unfriendly microbes. On the above grounds it will be obvious that it is necessary to break up into small particles and thoroughly areate all deep well water, and in many cases spring water in a pure atmosphere as quickly as possible after it is received from the springs or wells, so that the water can attract a large number of the friendly microbes from the pure air. The germs of the friendly class enter water to seek carbonaceous substances, of nitrogenous substance (which Parks says is reduced to nitrite by their growth), which they devour for food. They are rated as high breed bacteria because (they similar to man) cannot live without air. They can live in fluids as long as the fluids contain oxygen, which almost all waters do, but if the fluid be not repeatedly aerated, then they will die for want of air, which they should never be allowed to do until the supply of water intended for consumption in the town finally enters the closed water mains, and it becomes impossible for any dangerous death-dealing germs to enter the fluid and contaminate the supply. This shows the necessity of aerating all drinking water in a clean and pure atmosphere as often as the circumstances and arrangements of a waterworks plant will permit. The families of unfriendly and dangerous bacteria, as a rule, exist without air or oxygen, and when exposed for a time to the atmosphere will be destroyed. The more a town's water supply secures clean, pure aeration the better the quality and the clearer the color, therefore the more suitable for manufacturers and dyers.

To make this subject easily understood I may say that I can point out two large towns whose boundaries join each other, both collect their water from the same table land, their reservoirs and conduits are similarly built and constructed, but when the water reaches the consumer there is a marked difference in the quality, because they had different engineers. One engineer had conveyed the water without break or interruption the whole fifteen miles, the other took advantage of the high level of the collecting ground and the broken state of the land between the large collecting reservoir and the well where the head of water was established for distributing the water to the town. Between these two points two or three miniature cascades were established which aerated the water. Then when the water entered the air-tight distributing mains it was necessarily of a superior quality to the water of the