

and hydraulic pressure due to heavy flow or pumping at a distance; the inflow of sand, etc., into the well and its settlement, to the bottom, whereby the yield from the lower portions is obstructed; the clogging of water passages in material near the well and of strainer orifices; the reduction of the diameter of the tube by the formation of rust or organic growths.

Some of these difficulties, it will be observed, may be removed, while others are a permanent injury. To discover the real cause of the reduced flow in any particular case is the first step, and this generally demands a careful and scientific study, although it may at times be a matter of uncertainty. The remedy may consist in the addition of one or more wells sufficient to restore the required supply. It may be sufficient to take up and clean the pipes. Silt and sand obstructing the entrance of water to the pipe has been removed by forcing a stream of water downwards; this, however, is somewhat dangerous, as the tendency of the water is to force its way upwards outside of the pipe, in doing which it may break the seal of overlaying strata and form an outlet around the pipe.

#### The Septic Tank Treatment in Berlin.

It has been announced through the public press that the town of Berlin, Ontario, is considering the septic tank system of treating sewage. The majority of towns in the Province have not, as yet, been called upon to purify their sewage before discharging it into a river or lake, but the day is imminent when such will be more largely demanded. In view of this, therefore, the step being taken by Berlin becomes of considerable interest to other municipalities as the septic system, as yet but little understood, if it proves entirely successful, as we are led to believe will be the case, offers a means of treating sewage within the means of most municipalities where treatment is necessary.

It is now a number of years since Pasteur showed that bacteria, which he called aerobic, perform their functions in the presence of air, while the remainder, called anaerobic, do not require air. The former oxidizes the organic matter, and the latter cause its putrefaction. The aerobic bacteria reduce the solid matter in suspension very slowly, but oxidize the dissolved matter rapidly. On the other hand, the anaerobes bring suspended organic matter into a dissolved condition much more rapidly, although they act more slowly than the aerobes in changing the dissolved organic matter into inorganic compounds.

It has long been the practice in many cities to remove a considerable part of the solid matter in sewage by chemical precipitation, which produces a large quantity of sludge. The pressing, removal and final disposal of this sludge is one of the most troublesome problems of this system of sewage treatment. It is avoided by using what is known as the septic tank, in

which the solids are changed into liquids by taking advantage of the anaerobic change just mentioned. The effluent from the tank is then filtered in the same manner as the effluent from chemical precipitation basins.

The eighteenth annual report of the Provincial Board of Health, just issued, contains a report by the secretary, Dr. Bryce, on the sewerage of Berlin, in which the construction of a septic tank in connection with the present sewage farm is recommended. Dr. Bryce says:

"The works instituted some nine years ago have served a notable purpose, and been a great benefit to the city of Berlin. The splendid water supply and very wide extension of the sewerage system in Berlin have played a most important part in the commercial progress of the town; and when it is remembered that, with the small stream as an outlet, the city has been able to dispose of nearly 1,000,000 gallons of sewage daily, without involving itself in legal trouble with the neighboring municipality it must be considered that the small cost, both of the original construction of the sewage farm, and for its annual maintenance afford much reason for satisfaction. Two permanent factors, however, exist, making it apparent that the town can never look upon its expenditure either in dealing with its waterworks or sewerage works as a finality, viz: The increase of population, and the constant extension of the use by the people of both public water and public sewers. This being the case, it is apparent that so far as the sewage disposal works are concerned, your committee has always to be considering, 1. The extension of the sewage farm, and 2. The making the present do the largest amount of possible work, compatible with freedom from effluvium nuisances from the beds and adequate filtration of the sewage.

Although, at the time of my inspection, on the 4th of July last, there was no serious effluvium nuisance noticeable in the afternoon, and while the discharge from the effluent tiles was clear, yet there existed in the large beds covered with sewage undergoing decomposition, a condition which must, under favorable conditions, promote effluvium nuisance, and, therefore, give cause for complaints. Of course this may be, to some extent, inevitable with all methods of sewage disposal, as with manure heaps, their distribution on land, and industries, such as tanneries, gas factories, fat-rendering, etc. The matter, therefore, is one which your board will be expected to give special attention to, so that all reasonable causes of complaint may be removed.

To this end, therefore, it will be necessary for the local Board of Health and Sewage Committee of the council to consider the following points: 1st, The institution of means by which (a) all matters, such as chemicals, which may be germicidal, are removed by private persons before the sewage from these premises is allowed to pass into the town

sewers. (b) The construction of a receiving tank of such capacity that the sewage may be deposited therein with all suspended matters, which will remain there until made soluble by decomposition, and from which only sewage in solution will go to the beds. I am convinced that effluvia, which may at present arise from the beds, are due notably to such solid matter putrefying on edges of ditches, beds, etc. (c) The beds should all be brought to a true level for purposes of cultivation, and even irrigation. If cultivation of crops on the beds were made systematic, care would be taken that only as much sewage in solution would be applied on each as would not stand and become stagnant, while regular working by cultivation would enable the ground to treat more than by present methods. The cultivation of beet-root seems peculiarly suitable on such soils as that of the Berlin Farm. (d) Such disposal of the sewage means the addition of more land to the farm, and probably, also, the preparation of an area where the surface sewage can be purified on a rapid filter-bed of either sand, coke or cinders and of an extent adequate for the increasing needs of the case. (e) That under the committee the whole farm be put under the direct management of the town engineer, so that plans, surveys, estimates, returns of crops, costs and methods, can be made and preserved, and that thus from year to year the town and all interested would be able to know exactly just what the farm has accomplished, and by what special methods.

#### Telegraph and Telephone Poles.

Where to place telegraph and telephone poles is a question which has elicited some discussion, when roadways are being improved or cement concrete sidewalks laid. Poles on the street, wherever placed, are objectionable. They are an obstruction to traffic, and the overhead wiring, in case of fire, at times is a disadvantage. Added to this is the appearance, which certainly does not add to the beauty of a street.

On residential streets, the difficulty can sometimes be solved in a measure by placing them on the boulevard on either one side or the other of the walk. The tendency at present is to take the sidewalk from the fence and place it immediately outside of the row of trees. By narrowing the roadway to between twenty and thirty feet this will generally leave room for a narrow strip of sod, about two feet wide, between the sidewalk and the kerb. In this strip of sod is the most suitable place for telegraph and telephone poles, as they do not interfere with vehicles on the road, nor with users of the sidewalk, and the wires are removed as far as possible from contact with the tree tops.

One matter of detail in connection with this strip of sod between the sidewalk and kerb of the road, is to have it of sufficient width to allow a lawn mower to run over