

exclusive of the sewage storage and collecting tank and the steam pump. This is a high price to pay for a system of sewage purification that can't possibly work efficiently during hard frosty weather, and that gives off a disagreeable and unhealthy odor each time the sewage is run onto the land.

The engine and pump send each day's collection onto the irrigation land in the space of about two hours, so that the land gets only two hours' work and 22 hours' rest and aeration daily, and it may also be observed that the small amount of only $\frac{1}{4}$ of a gallon of sewage to one square yard of land cannot make any serious effect on the light soil, and it will be quickly absorbed during the hot dry weather of summer. If it was possible for each town to secure a light porous land, well underdrained, and to allow their irrigation filters 22 hours' aeration each day, a bright, pure effluent would be the result for several years until the porous soil got fatty.

But not one town in ten can secure suitable land for sewage purification works, and if the land has to be properly prepared and underdrained so that it cannot possibly become waterlogged, then the cost is so high as to be prohibitive, because artificial tank filters can be built at about the same price that will do fifty times the amount of work, and work efficiently both summer and winter. It is next to impossible to efficiently aerate irrigation lands, and on that account they gradually become sick and clogged with injurious microbes, therefore, in time, they become utterly useless as did the irrigation system adopted at Berlin, Germany.

A week prior to inspecting St. Lawrent sewage works I was engaged to go to the Georgian Bay district and find out why a sewage works had become totally disabled and was discharging foul odors. This irrigation filter is very similar to the St. Lawrent one, but with more advantages, because it is built on high ground and can be clearly drained to a depth of over four feet.

The whole filter at the Georgian Bay was created by piling up gravel and sand inside of a wooden fence. It is only used in the four hottest months of the year, that is during the tourist season. The population using the irrigation filter when the place is full with guests is under 300, including servants. The size of this irrigation land is 80 by 45 feet, which is ample to purify the sewage discharged when the fact is taken into account that all the solid matter contained in the sewage is supposed to be extracted by settling tanks prior to its being discharged over the irrigation filter, on the intermittent system of working 30 minutes and resting three hours, and at the rate of only 10 gallons per yard per day when working at the fullest capacity.

After working for only two months the pores of the filter got so clogged that no sewage would pass through it, the cause being that the sheet iron settling tanks were not large enough to give sufficient time for the solids to separate from the liquids and to prevent the manure matter from passing over on to the irrigation filter, and when a filter becomes badly clogged or sick it is impossible to clean it except by putting the whole of the filtrate through a furnace, and bringing it to a red heat, or by turning it all over with a hand spade and spreading it out in thin layers exposed to the purifying influence of the air for a year.

The apparent success of the St. Laurent sewage works is delusive, for like all other similar irrigation works the soil will in time become sick and clogged, and proof is already to hand, for we were told that during this summer the underdrains have not collected any effluent, yet that

during the corresponding period of last summer they did collect considerable, so the bottom and heavy portion of the irrigation land is already sick, and the sickness will grow until the light porous soil at the top is also contaminated. It must come to that state, because land will not continue to purify sewage unless it can be often and thoroughly aerated to the level of the underdrains, which is very difficult. Much stress was put on the fact that the crops grown on the land were abundant and proved the system a paying one, but if such light soil had got watered by clean rainwater of the same amount as the sewage supply the crops would have been equally abundant, and certainly more wholesome. That eminent medical authority, A. Parks, adviser to the British Government, in his book on Hygiene, written for the benefit of the British army, states that plants grown on land irrigated by raw sewage are unsafe to eat (see page 354). On pages 119 and 121 he proves that the atmosphere near all sewage irrigation farms is impure, and people living near are subject to enteric fever and other disorders, so that the surrounding land always must decrease in value.

THE MOTOR CARRIAGE INDUSTRY.

It is with satisfaction that we note the present condition of the motor carriage industry, as the business seems to have passed the dangerous stages. The period of booming is passing, and after an enormous expenditure of capital in valueless patents, unsound companies and empty advertising, autocar makers are acting upon ordinary business principles. France takes the lead, and already there is invested in the autocar business in that country the enormous sum of \$150,000,000, while 2,000 men are constantly employed in the industry. This condition of affairs is due to two causes: First, the magnificent roadways in France, and secondly, the fact that the French peasantry are very hard-working and extremely frugal, and thus have an immense sum total of money always in reserve to invest in enterprises that have the virtue of novelty as well as the promise of success. Added to this is the fact that the leaders of French society have taken very kindly to the new pastime of "motoring," and large sums from private fortunes are being lavished upon the manufacture of motorcars of all descriptions. The Count de Dion deserves special mention in this connection. Twelve years ago he prophesied the wonderful development we are now witnessing in horseless carriages; and during all these years he has lavishly spent time, thought and treasure in supporting the inventive genius of his mechanical associate, M. Bouton. It is satisfactory to note that the daring and dashing enterprise of the rich Frenchmen are being rewarded by enormous business returns. One firm, Panhard et Levassor, in a single month recently took orders for autocars amounting to a quarter of a million dollars. M. Frankel, who designed a small tricycle carriage to sell at \$400, in less than a month took orders for \$40,000 worth. All the autocar shops in France are so crowded with orders that customers have to wait from six to fifteen months for their carriages. These factories are in nearly every case huge establishments employing several hundreds of men.

There is some activity in Germany and Belgium, but nothing is being done worthy of special mention. Crossing over to the British Isles there is a perceptible improvement in the autocar industry there. True, the hand of the promoter is visible in many of the schemes that are being exploited, and a great deal of experimentation is still being done; yet in various parts of England, especially in Coventry, and also in Scotland, praiseworthy efforts are