

hundred. It can be applied to greater numbers than these even, but with the sewage of three or four hundred people to be disposed of, the amount of ground necessary for the distribution bed becomes rather large, and above this figure it is questionable whether it be not more economical to introduce some form of artificial beds, which can be accommodated in much less space. However, it must be borne in mind that the final effluent from a system of artificial beds is never quite as fine as one from a land distribution bed—this is a question to be treated of later. The dimensions of the septic tank and the distribution bed are directly governed by the amount of sewage put forth from the house or institution, and as a basis for calculation I have found it good practice to take the average daily output of sewage per capita for 24 hours, to be 50 gallons. In towns on this continent this quantity would be under the average, but in country districts where usually there is no public water supply available, this figure of 50 gallons is a very fair average.

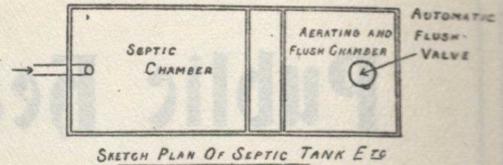
Of course, if it be known that the per capita consumption of water is greater than 50 gallons, then the fact must be taken into consideration; in other words, if the water supply be known, the output of sewage will be the same for all practical purposes.

On this understanding then, the capacity of the septic tank must be such as to accommodate the whole output of sewage for 24 hours; e.g., if there be three inmates and an average output of 50 gallons of sewage from each, the total will be 150 gallons per 24 hours, and this would be the capacity of the tank, and so on for any number.

The shape of this tank must be oblong, about twice or three times as long as it is broad, with a depth of about three feet at its deep end. The object of this particular shape is to allow the solid matter in the sewage every opportunity of settling to the bottom of the tank, and to prevent it being carried through the outlet from the chamber, which is situated as far from the inlet as the dimensions of the tank will permit.

In this chamber, which we may term the septic chamber, the first important change takes place. The change is one of liquefaction of most of the solid constituents of the raw sewage, and is brought about by

an army of microbes termed "anaerobes," i.e., germs which live and propagate in the absence of air (oxygen).



Most of their work is completed within 24 hours, and any solid matter which they have not been able to dispose of within this period, simply remains behind in the septic chamber, there to undergo the process of liquefaction at leisure so to speak.

From ordinary house sewage, it is surprising how little solid matter remains at the bottom of the septic chamber, but on the surface of the liquid a thick scum collects in course of time, chiefly composed of fat and soap curd. However, this material does not cause much trouble, for from ordinary house sewage the quantity is such that it takes on an average two or three years before enough remains over from the liquefying process to necessitate a cleaning operation. However, this very fact brings out an important point in considering the disposal of sewage by the septic tank process, viz.: if by chance the sewage to be treated contains a very large amount of soap curd, then a cleaning out of the septic tank of scum will be necessary once or twice a year. I wish to lay some emphasis on this point, because I find in practice that people are very apt to let these sewage disposal plants go without any attention whatever; fortunately, in the treatment of the ordinary run of sewage the amount of fat and soap curd is moderate, and such that most of it is disposed of by the septic action due to the anaerobic microbes, and what little remains over is, comparatively speaking, so small, that it takes a year or two before the quantity attains such proportions as to necessitate a cleaning out of the tank. This amount of trouble and attention is really a very small price to pay when one considers the benefits accruing to people having such an installation for disposing of their sewage; indeed I know of no system suitable for small institutions, which, while being efficient, gives less trouble to keep in order. Unfortunately as yet, no scheme has been devised, which will run