

for the defined purpose of sludge elimination, there appears to us to be no patent rights.

In the case of the old-fashioned cesspool, covered in and neglected, septic action certainly took place. Such tanks were, however, not designed for the special purpose of sludge elimination by putrefaction, but only as catch pits for solids. Again in many sewerage systems, when gradients are flat and pipes are large, the sewage takes so long to travel to the outlet and so much deposit is formed in the pipes, that septic action is set up in the sewers themselves, and the sewage arrives at the outlet in a highly septic state.

In the case of ordinary continuous flow, sedimentation tanks designed for sedimentation of solids only, by accident or neglect, they may be left unattended to, and septic action naturally is set up without any wish or consideration being given to the benefits, if any, of such action. We take it, that in all such cases no patent rights are implied.

(c) That the process is patented in the United States, in Canada, and in Great Britain also, is taken for granted, but we note that only in the United States has the question been subjected to legal decision. No royalties as such have been apparently collected in Great Britain, and we gather that this is also true in Canada, any payments as royalties appear to have been included or covered by the profits which the company has made in providing apparatus to their clients or in charges made as engineers for supervision of the works. In fact, the company advertise in their printed matter, that when they are directly employed, no royalty charges are made. It would appear, therefore, that there is no precedent in Great Britain or Canada for the payment directly of specific royalty charges.

(d) That the process may consist of: first, septic action only for the elimination of solids, and second, septic action combined with the well-known and understood methods of nitrification, which, of course, are in themselves unpatentable, and previous to the septic patents. This appears to be the meaning of the Saratoga Springs decision. Whether this means that the company can in addition to royalty charges, based on the cost of the septic tank, also claim royalty of the (by itself) unpatentable system of nitrification or aerobic action, when combined with the septic tank, we are not quite clear. If so, it appears a great hardship that royalties can be demanded not only upon the minor and less costly part of a sewage disposal plant, viz., the sedimentation tank, worked intentionally as septic, but also upon the most important and more costly part of the plant, viz., the filtration methods.

(e) The United States' decision in the Saratoga Springs case. This affirms the validity of the process patents.

We would here point out, however, that since this decision was given, further light has been shed upon the whole process of septic action and especially upon the chief benefits which the company claim are connected with the process.

How far any legal decision would be effected by the newer knowledge, we are not so versed in the law that we can give any opinion.

We will, however, here draw attention to the findings contained in the fifth report of the Royal Commission on Sewage Disposal, (Great Britain), the findings of which have recently been further substantiated by the long and careful experiments made at the "Hamburg State Institute of Hygiene," by Professor Dunbar, and further by many other competent and reliable authorities.

The Royal Commission state (page 21, par. 31.):

"The motion that the solid matter of sewage would be digested by passing the sewage through a sealed tank, is by no means novel, but it does not appear to have had any extensive practical application until Mr. Cameron, who held the office of City Surveyor of Exeter, proposed the adoption of the "Septic Tank Treatment" for that city.

"At that time it was claimed that the septic tank possessed the following, among other advantages:—

"That it solved the sludge difficulty, inasmuch as practically all the organic solid matter was digested in the tank.

"That it destroyed any pathogenic organisms which there might be in the sewage.

"That sewage which had passed through a septic tank was more easily oxidized than sewage from which the solids had been allowed to settle, either with or without the aid of chemicals, in tanks which were frequently cleaned out."

The Commission conclude on the above claims as follows, (page 229, par. 240):—

"All the organic solids present in sewage are not digested by septic tanks. The actual amount of digestion varying with the character of the sewage, the size of the tank relative to the volume treated, and the frequency of cleansing. With a domestic sewage, and tanks worked at a 24 hour's rate, the digestion is about 25 per cent.

"The liquor issuing from septic tanks is bacteriologically as impure as the sewage entering the tanks."

"Domestic sewage which has been passed through a septic tank is not more easily oxidized in its passage through filters than domestic sewage which has been subjected to chemical precipitation or simple sedimentation."

It will be at once seen that many of our preconceived ideas relating to septic tanks require considerable modification, and in the light of this further knowledge, it will be well to find out just where we stand in regard to the whole matter, before determining to hand over any fees to a company for royalties or patents which have received such drastic criticism by one of the most authoritative pronouncements we can point to.

Not only have the above points been lately substantiated, but Dr. Dunbar, of Hamburg, has shown that with Hamburg sewage, three times the quantity of ordinary sedimentation liquor over that of septic liquor can be treated satisfactorily on the same area of contact beds.

Septic action is not, however, altogether condemned by the Royal Commission, they state (par. 36, page 22):—

"It must, therefore, be said that some of the more important claims which were originally advanced in favor of septic tank treatment, have not stood the test of experience. At the same time, we think that in certain circumstances the adoption of the method of treatment, as a preliminary process, is efficient."

Just where these particular circumstances may occur is a matter of engineering and economic consideration in connection with each particular case. It may be broadly stated, however, as follows:—

(a) When it is not necessary to purify the sewage, but only to remove the grosser solids by precipitation and turn the sewage liquor direct into a source where any nuisance will be minimized by dilution, the benefit of the 25 per cent. reduction in sludge by digestion, may be taken advantage of, and the tank run in long periods without sludge removal and so maintenance cost kept down.

(b) In the case of small installations where the cost of maintenance is a serious item, tanks may be run for say, six to nine months, and the sewage liquor further treated in good open friable land or rough, coarse contact or percolating filters.

Otherwise than in such above cases it would appear desirable to remove the sludge before full septic action commences, say every two months, and convey it to sludge dug out drying beds made in the vicinity of tanks. This would not be necessary in winter, as with our climate practically no septic action takes place in the colder months of the year.

The present known advantages and disadvantages of septic treatment appear to be as follows:—

#### Advantages.

1st.—Elimination or digestion of about 25 per cent. of the sludge retained in the tanks by hydrolisis and gasification.

2nd.—A more solid form of sludge produced in the tanks containing about 80 per cent. of moisture as against 90 per cent. with ordinary sedimentation.

3rd.—The sludge digested into finer particles and less apt to produce a nuisance if used for reclaiming land or filling in purposes.