

This oxygen he supplied by adding pure water (which always contains a certain amount of dissolved oxygen) to the polluted sewage water, and if sufficient was added purification was completed, but if not, putrefactive fermentation would take place. His examination revealed two distinct stages of bacterial fermentation; the first he called carbon oxidation, and the second nitrification or nitro-oxidation. The first takes place much quicker than the last and the liquid during the last stage will generally take oxygen from the air quicker than the organisms take it from the liquid. The conclusion which Mr. Adeney draws is that if the first stage, viz., bacteriolysis, can be made to take place at the disposal works, then the final stage can be allowed to take place in the river or lake into which the effluent is discharged, provided these bodies of fresh water yield the necessary amount of oxygen to complete the last stage of purification. I have thought that the method of purification advocated by Mr. Adeney is worthy of great consideration, as filters in our climate may not be successful unless covered over, and then the cost of roofing would be very great and require frequent repairs. Especially would this be the case in very large works where the filters would cover many acres. The buildings at the sewage disposal works should be neat in appearance, well lighted, ventilated and provided with all modern conveniences for the employees. Garbage destroyers should be built near the disposal works, so that the heat generated may be utilized to raise steam to run the machinery of disposal works, light the works and dry the sludge where precipitation works are in use.

Before concluding this paper I would draw your attention to one very marked improvement effected by our disposal works. Formerly at the outlet of the Ferguson avenue sewer, large quantities of excreta, animal substances, orange peels, paper, rags and offensive matter imprisoned in grease were discharged from the sewer, and at times were deposited by the wind along the shore where it became putrid and rendered the shore of the bay most offensive. Sometimes huge masses floated out into the bay and were deposited at the beach. Now this has been entirely done away with, and although we contemplated putting in filters at Ferguson avenue works, still I believe very good work has been already done.

SANITARY EXCESS.

BY WM. WATSON.

The Surveyor of London, England, reports an important meeting of municipal engineers held in Greater London, on Feb. 25th, to discuss the various methods of deodorizing and ventilating sewers, and to decide upon a uniform system throughout the municipalities, of public sewer ventilation. The meeting was necessary on account of the difficulties encountered by the municipalities (which have unwisely adopted the United States sanitary system) through the almost constant discharge of sewer gases from the ventilation grates in the centre of the street, and the failure of many expensive experiments made with the object of remedying the evil.

The examinations of the drainage plans of a recently built school in the South of England show the dangerous practices persons will resort to to act up to the fashion of the age. The drain in this case is taken the longest way round to the water closets and lavatories, bending squarely three times, and at each bend there is a catch pit or inspection chamber. There is also an interception trap, a breather, and large inspection chamber, which form impediments to the flow of the solids from the closet to the street sewer, causing a sluggish stream, that deposits the filthy matter

at each and every angle and at the interception traps, there putrefying and generating gases that will find somewhere an exit and contaminate the atmosphere. The proper way to have drained the school was to avoid any impediments and run the drain pipe lines as straight and direct as possible from street to lavatories and then vertically above to the highest point of the school roof, having all rain-water leaders branched into the sewage pipe line.

The placing of interception traps on private drains cuts off the ventilation of public sewers, which they formerly secured through the house soil pipe that was carried forward through the roof, and the untrapped drain water leaders which, when in action, discharge large volumes of atmospheric air into the public sewers each time the sewage was discharged down the soil pipe, or when rainwater passed down the leader pipes. Then each and every soil pipe and rainwater leader formed a ventilation up cast shaft for the street sewers at short distances of only a few yards apart, which compelled the rapid circulation of fresh air down the surface grates of the streets and up the local pipes to the housetops. All this purifying element is abolished when the American system of sewer construction and the interception trap is adopted. Most cities and towns of Great Britain which have employed that system have to provide for the deodorizing of large quantities of foul gas that is constantly generating in the sewers, because they cannot now get the circulation of air needed to prevent the sewage and solid matter the sewage contains from putrefying during the time they are passing through the sewers to the outfall at the sewage disposal works. Thus we find that the natural ventilation is prevented. On the other hand it is proved that if sewage be not immediately treated by aerating influences it will commence at once to putrefy in the sewers and work mischief, and artificial methods of aeration or deodorizing must be resorted to or the public health will quickly suffer. It is known by experience that artificial means cannot be relied upon, though they are very expensive.

Under the old dispensation, when owners were permitted to put in their drains of broken pipes, bricks, or wood, with no regard for grading, for fall, or tight jointing, often pointing towards and following quite in the wrong direction, and when there were no general rules or designs adopted for the sewage disposal of the municipality on a comprehensive plan, a large number of such drains were totally useless as sewage carriers, and were nothing but cesspools generating sewer gases and distributing poisonous fluid into the surrounding subsoil. The Government became alive to the dangers of these evils and gave permission for each municipality to enforce such improved sanitary regulations as would effectively stamp out such dangerous practices and compel all drains to be constructed with good material and expert workmanship. When the Act of Parliament became operative a swarm of professional theorists, sanitary appliance manufacturers, interested tradesmen and public works contractors gathered round the various municipal authorities and pointed out to them that it was necessary to thoroughly remove the old sanitary abuses, that intricate and costly appliances, coupled with extremely drastic regulations that required an extensive staff of inspectors and other arrangements to apply them, were needed. Most unfortunately for the public health many municipalities were guided by such advisers and adopted their extreme ideas and thus spoiled the good work begun by overdoing it.

When the unnecessarily drastic regulations were enforced they naturally created a necessity for appliances to counteract the evil done. The natural ventilation which