CANADIAN CONTRACT RECORD.



NEW ENGLAND WATER WORKS ASSOCIATION.

The monthly meeting of the New England Water Works Assocation will be held at headquarters, Tremont Temple, Boston, on Wednesday, January 11, 1899. The following papers will be presented : "Cast iron pipes used in the Metropolitan water works," by Dexter Brackett, C. E., engineer of the distribution department of the Metropolitan water board ; "Descripton of the new steel force-main of the New Bedford water works," by George S. Rice, C. E., Boston, Mass. ; "Steel pipes," by L. M. Hastings, C. E., city engineer, Cambridge, Mass. ; " Description of the new salt water fire system of Boston, Mass., " by Frank A. McInnes, C. E, assistant engineer of the engineer-ing department, Boston; "Wonden stave-pipe," by Arthur L. Adams, C. E., Los Angeles, California; "Short description of the wooden stave-pipe at Manchester, N H," by Chas. K. Walker, superintendent ; "Improved Wyckoff water pipes, ' by Geo. L. Wells, C. E., Yazoo City, Miss.; "A compilation of recent data relating to the flow of water in pipes of wooden stave, steel riveted, and cast iron," by F. F. Forbes, C. E., superintendent, Brookline, Mass.

SEWAGE DISPOSAL BY BACTERIA BEDS AND THE SEPTIC TANK.

The interest in bacterial or biological methods of sewage disr and seems to be increasing, if anything, Great Britain, and it is noteworthy that Mr. Baldwin Latham and other engineers, who were somewhat skeptical concerning these methods of treatment when they were first talked about three or four years ago, are now convinced of their importance. Among recent valuable contributions to the literature of the subject is a lecture delivered before the Society of Engineers by Mr. George Thudichum on the design of such plants as employ coarse bacteria beds, like those at Sutton, or a septic tank, like that introduced at Exeter.

In preparing plans for such works there are three governing conditions, the available fall, the nature of the soil, and the possibility of the sewage containing substances injurious to bacteria. Of these, he states that the first two determine which system should be adopted, for if the sewage is delivered at an elevation of less than 4 feet above the point at which it must be discharged, the septic tank possesses an advantage, because no head is lost in the tank and the whole fall can be utilized for the final filtration. If the sewage must be pumped in any case, or is delivered by gravity at a sufficient height to allow the two filtrations of the Sutton system, the adoption of one or the other system is to be decided upon other

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considerations. The extent of the beds for the final filtration will be the same in either case, and the difference in first cost will be the difference between the expense of a coarse-grain bacteria bed and that of a septic tank. "Where the soil is light and porous, so that all tanks and beds must be built of brickwork on concrete bottoms, it is possible that such a difference may be extremely small, since the extra cost of covering the septic tank will be compensated by its being of smaller cubic contents than bacteria beds to do the same work, and by its requiring no Where, however, the bed material. nature of the soil is such as to permit of the construction of bacteria beds in the open ground, merely puddling the bottom and sides, the advantage from a pecuniary point of view is entirely with the system adopted at Sutton. On suitable land, such as the heavy clay at Sutton itself, bacteria beds can be made by merely excavating and burning the soil, laying drains on the bottom and returning the burnt ballast ; and this has actually been done at a cost, for a bed 3 feet in depth, of 8 cents per square foot or about \$3,530 per acre. In places where the bacteria beds must be erected above the ground level, but where clay is readily obtainable, such beds can be prepared at a relatively small cost; and in these instances, also, the first installation will cost less on the Sutton than on the septic system."

With regard to the third consideration, that of the sewage possibly containing matter injurious to the life of microbes, Mr. Thudichum has found, as a matter of experience, that the majority of manufacturing effluents, especially if diluted with a reasonable proportion of ordinary domestic sewage, will yield to the influence of either aerobic or anaerobic organisms. This was shown by experiments with sewage from Leeds containing effluents from tanneries, galvanizing and copper works, and the solid matter from shoddy; in the case of Maidstone, waste liquids from tanneries and breweries; at West Bromwich, pickle liquor from galvanizing works; at Yeovil, the effluent from the yards of fellmongers and leather dressers; and in various instances in which the sewage to be treated was highly charged with refuse from gas works, margarine factories, dairies and distilleries. "Taken as a whole, the experience of the last two years goes to

prove that in the large majority of cases the manufacturing refuse which may be present in the sewage does not prevent the application of the principles of biological treatment throughout, while in cases in which preliminary precipitation or other treatment is necessary the final purification can be best effected by means of the fine bacteria bed."

As an example of the truth of these statements, the case of the Worcester Park outfall works is cited. The successful working of the sewage farms is rendered practically impossible by the nature of the ground, which is a heavy clay, waterlogged in wet seasons, and full of cracks when dry, which allows the sewage to pass directly into the underdrains without being purified. A part of the sewage containing considerable quantities of brewery refuse is delivered by gravity near the highest part of the farm. While coarse and fine bacteria beds were under construction, an instructive expedient was adopted as a means of treating the sewerage which was the only portion of the total 960,000 gallons received at the farm that had caused annoyance. The author's account of this temporary system of treatment reads as follows

"A plot of land of about 1 acre in area having been selected, the main efficient drain was locked, and the sewage (which in order to reach the highest portion had to be backed up in the outfall sewer) was allowed to flow onto the land until no more could be received; in fact, the whole plot was considered and treated as a Sutton bacteria bed. This operation occupied about three days. At the expiration of this period the damming of the outfall sewer was stopped, and the sewage allowed to flow freely for a short time into precipitation tanks, in order to remove any accumulation of sludge from the sewer; the backing up was repeated, and the sewage diverted on to a second plot treated in a similar manner to the first. The valve locking the latter was opened and the water gradually discharged from the plot. The work was continued in this way, using the plots alternately, and the result was a remarkable improvement in the quality of the effluent. That which before was black and stinking was clear and had only a slight sewage odor, analysis bearing out the conclusions arrived at from inspection by sight and smell. Such an operation must, of conrse, not be looked upon as a typical bacterial treat-ment. The time occupied in filling the bed, and consequently the period during which the organisms are submerged, is far too long, while the bed material is so fine that the re-entry of air is necessarily imperfect, and choking of the surface by the suspended matter in the raw sewage would take place probably at an early date."

(To be Continued.)



NURTR'S "CONDOR" BRIND AWARDED FIRST PRIZE AND GOLD MEDAL AT THE ANTWERP EXHIBITION