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METHODS OF TREATMENT OF SEWAGE SLUDGE

PROF. P. GILLESPIE, C.E., REVIEWS THE METHODS IN VOGUE IN AMERICA AND EUROPE — ABSTRACTS FROM A VALUABLE PAPER TO THE CANADIAN SOCIETY OF CIVIL ENGINEERS.

A VALUABLE addition to literature on sludge disposal is contained in the paper presented on December 17th to the Canadian Society of Civil Engineers by Prof. P. Gillespie, of the University of Toronto. The formation of sludge is described, the paper confirming the frequently expressed generalization that American sewage contains up to one part per thousand of solid matter. It is with the treatment of this solid matter, partly in suspension, partly in solution, and partly in colloidal state, that Prof. Gillespie's paper deals, this treatment being such that the sludge ceases to possess properties in virtue of which it may prove a nuisance to the community or a menace to its health. The speaker calls attention to the fact that while the noted fifth report of the Royal Commission on Sewage Disposal devotes much space to detailed descriptions of various methods of sludge treatment, including conversion into fertilizer, depositing at sea, pressing, burning and trenching, and while in its recommendations every other matter is referred to, no specific recommendation is made with respect to the disposal of sludge.

The values of the fertilizing constituents (potash, nitrogen, phosphates, etc.) are dealt with, and the methods employed in this field outlined. The effect of decomposition on the fertilizing value of sludge is emphasized, it being due to dimunition of nitrogen content and of phospherous, a more porous non-fibrous constitution of nitrogenous material and a finely divided and more uniformly distributed condition of contained grease.

The paper divides methods of sludge treatment into (1) those which deal with crude sludge and (2) those which deal with decomposed sludge, owing to the radical differences and the methods of disposal best suited to each. These differences are described and explained.

The various methods of treating crude sludge are described. Disposal at sea, for cities fortunately located, is a method in quite general use, satisfactory and reasonably cheap. This method is practised in Providence, R.I.; Boston, Mass.; London, Salford, Manchester, Dublin, Belfast and Glasgow. The latter city reports a cost for this work equal to 3.1d. per long ton of sludge handled, including .9d. per ton for land charges. In London the cost is about 7 cents per ton of sludge, not including the cost of precipitation and pumping into barges.

The following costs per ton of 2,000 pounds of dry matter are reported: London, $1.03; Glasgow, 87 cents; Manchester, $1.26; Salford, 90 cents, and Dublin, 91 cents. Precaution must be taken to avoid pollution of shellfish layings and the deposition of solid matter where it can possibly be carried to any foreshore.

Methods of land disposal include air drying, trenching, and lagooning, none of which have been attended with anything better than partial success. The next method considered is that of treatment by use of the centrifugal machine, whose operation is described in detail. The process of pressing, whereby handling is facilitated, odor diminished, and capacity for putrefaction lessened, is explained. The sludge is here subjected, between plates, to a pressure of about 75 pounds per square inch. Its volume is about 1/5, after the treatment, and the water content is reduced 50 per cent. This method is in use in Hamilton, Ont.; Worcester, Mass.; Providence, R.I., and Bradford, England.

The writer claims the treatment of rotted sludge by filtering it on properly constructed beds, as being the only satisfactory method. The procedure in Great Britain (at Birmingham) and on the European continent (in the Emscher Valley) is described, it being strikingly similar in both cases, the main difference lying in the manner of sludge preparation.

At Birmingham plain sedimentation is employed. The sewage after passing through a grit chamber and being roughly screened is passed into sedimentation tanks, where the sludge is deposited. This sludge is removed from each tank weekly in summer, less frequently at other seasons, and deposited in one or more of a series of twenty tanks where septic action and digestion take place. Following this, the sludge is pumped to the drying beds which are each 150 feet square in area, consist of 6 inches of clinker and ashes, and are underdrained with 4-inch tiles laid in herring-bone fashion toward a main leader, which in turn takes the drainage to the well whence it is pumped to the filtering beds. Each bed gets two fillings per year

In the Emscher Valley the sludge is rotted in the lower compartment of two-story tanks, the upper compartment being the sedimentation chamber. It is periodically removed and dried on prepared beds, similar in construction to those at Birmingham. The drying period is considerably longer.

The writer deals to some length with plain sedimentation, the term denoting the subsiding of solids heavier than water, which takes place when conditions are favorable. The influences affecting it in the treatment of sewage are the velocity of flow, time of retention, specific gravity and size of settling solids. The observations of