MUNICIPAL DEPARTMENT

PURIFICATION OF DRINKING WATER BY MEANS OF FILTRATION.

The importance of pure water in determining the health of a community has long been recognized and cannot be over-estimated.

At the present time it is impossible for many cities and large towns to obtain the required amount of water from a naturally pure source, and in the future, with the enormous increase in population and the number of manufacturing towns established along the banks of the small strems and rivers, this difficulty will be manifestly greater. Therefore the possibility of purifying, by artificial means, water which has been polluted by sewage and which contains both organic matter and bacteria, has become a question of great importance in many communities.

In considering any method for accomplishing this object, two things must be borne in mind, viz., its efficiency and its cost. The objections which have been urged against filtration are:

First, that while a filter might remove the coarse material in suspension, it would allow all the organic matter in solution and the bacteria to pass through unchanged.

Second, that even if a filter were efficient for a short time, it soon becomes clogged and saturated, and then the condition of water which passes through is worse than when it entered.

Third, that the cost and maintenance of a properly constructed filter is so great that it cannot be universally adopted as a means of purifying water.

The report of the Massachusetts State Board of Health for the year 1894 contains some very interesting and important facts upon all these points.

For the past seven years the board has maintained an experimental station at Lawrence for the sole and express purpose of testing the efficacy of the filtration of water to purify it and render it fit for household purposes. The water tested was that of the Merrimac river, which is lined from source to mouth with manufacturing towns and which may be taken as a fair sample of river water contaminated with a considerable amount of organic matter.

The filters were of all sizes and thicknesses, from those a few feet square and ten inches in depth to the large filter covering two and one-half acres, through which the water supplied to the city of Lawrence has been filtered since 1893.

Chemical and bacteriological examinations were made weekly, and sometimes daily, of the water of ingress and egress. Sand of different sizes was used, and the filters were run both intermittently and continuously. The results of this careful and painstaking investigation, extending over a number of years, and every source of error being eliminated, are both astonishing and gratifying.

From a bacteriological standpoint they prove that a properly constructed and properly managed filter will remove from 98 to 98.84 per cent. of the ordinary bacteria in water, and that if such bacteria as the bacillus prodigiosous, which is very similar to the typhoid bacillus, be added to the water in varying proportions, the filter will remove from 99 to 99.993 per cent. The organic matter in solution is greatly diminished and the water is chemically purified.

Moreover, the efficiency of the filter, instead of diminishing, increases with age and use, owing to the formation of a gelatinous coating about each grain of sand, which serves to entangle the bacteria in their progress.

The rate of filtration may reach five million gallons daily per acre of filter without impairing the efficiency. If the surface clogging is properly removed, there will be no appreciable difference in the quality of the filtered water during or after the process of removal.

Finally, the cost of construction and maintenance of such filters is not so great as was supposed, and is not to be compared with the benefits derived from their use. The one which has been in successful use in the city of Lawrence proves that the plan is practicable in supplying cities with potable water. It seems to us that the knowledge derived from these experiments should be spread abroad and the attention of municipal authorities called to them.—Medical Record.

SPECIFICATION FOR BRICK PAVING.

The specification for brick paving adopted by the city of Peoria, Ill., for the coming year's work, includes the following:—The foundation is to be 6 in. of concrete, composed of one part natural cement, 1½ parts sharp sand, and four parts broken stone concrete, covered with a 2in. cushion of sand. The size of the bricks is to be 2½ in. by 4 in. by 8 in., or 3 in. by 4 in. by 9 in., and they are required to withstand the following tests:—(1) A transverse tests flatwise, in which they shall show a nodulus of rupture of 2,200 lb. per square inch; (2) an absorption test, in which, after forty-eight hours' immersion, they shall show an absorption of not more than 2 per cent. of their own weight; (3) an abrasian test, in which twelve bricks are placed in a cylindrical rattler, 24 in. by 3 ft., with 300 lb. of smoothly-worn scrap iron, in pieces varying from ¼ lb. to 5 lb. weight, and revolved one hour at fifteen revolutions per minute, after which the loss by weight for the smaller brick is to be not more than 9 per cent., and of the larger brick not more than 7 per cent. The cement is to be tested for fineness, time of setting, soundness and tensile strength. In the pavement the bricks are to be set on edge in rows running transversely across the street, except at street intersections, where the rows shall make an angle of 45 deg. with the curb lines. After laying, the bricks are to be settled by a roller weighing not less than 250 lb. per lineal inch, or by tamping by a 60 lb. rammer on a 2 in. by 12 in. by 12 ft. plank. The joints are to be filled with sand.

NEW YORK'S GREAT SEWER.

In their report to the Bronx Valley sewer commission, of which Mayor Strong and other prominent New Yorkers are members, the engineers of the commission recommended that the location of the sewer southwardly through the valley follow closely the general line of the river through the low land to the northerly end of Bronx park, and should then take a general easterly course to the outlet at High Island. This great sewer will be one of the largest drainage channels in the world. The size of the sewer, based on a prospective population, is submitted as follows. Kensico to White Plains, pipe sewer two feet in diameter; White plains to Hartsdale, brick sewer equivalent to circular sewer, three feet in diameter; Hartsdale to Tuchahoe, three and a half feet in diameter; Tuchahoe to Woodlawn, four feet in diameter; Woodlawn to outlet, five feet in diameter. The length of the sewer from Kensico to outlet at High Island will be 21.7 miles.

The cost of the sewer from High Island to Kensico, inclusive of land damages and improvements on the river, is estimated by the engineers at $3,617,310.

ONTARIO GOOD ROADS ASSOCIATION.

The annual meeting of the Ontario Good Roads Association will be held at the grounds of the Industrial Exhibition, Toronto, on Tuesday, the eighth day of September.

Arrangements will be made for a special exhibit of modern roadmaking machinery, crushers, bridges, culvert pipe, etc., during the fair. For this purpose the exhibition authorities will set apart sufficient ground to enable exhibitors to show the working of their machines. A. W. Campbell, C. E., Provincial Instructor in Roadmaking, will assist in completing arrangements.

The Association desires and is justly entitled to the co-operation of all manufacturers and others interested.

ARPHALT BETON.

Another kind of asphalt beton has been introduced in Austria, under government direction, a principle recommendation being the quickness of hardening which characterizes it. It is described as an earthy brown powder, having a slight odor of tar, and consists mainly of sulphur and iron slag, analysis showing 33.53 per cent. of sulphur, 8.21 of tar, 27.82 of iron slag, and 0.43 water, the iron slag containing 43.01 per cent. of silica, 22.42 of ferrous oxide, 30.9 of alumina, and 4.16 of lime. The hardness is attributed chiefly to the formation of an iron sulphide, the tar acting as a reducing agent. The silica, clay, and lime, though possibly combining at a slower rate, are regarded simply as impurities.