

MUNICIPAL DEPARTMENT

TO MUNICIPAL OFFICERS.

The CONTRACT RECORD is desirous of publishing, as far as possible, advance information regarding projected works of construction in all parts of Canada, such as sewerage and waterworks systems, railways, street pavements, public and private buildings, etc. Municipal officers would confer a favor upon the publisher by placing at our disposal particulars of such undertakings which are likely to be carried out in their vicinity, giving the name of the promoter, character of the work, and probable cost. Any information thus furnished will be greatly appreciated.

THE CAUSES AND PREVENTION OF WATER FERMENTATION.

Rapid progress in biological science, coming, as it does, to the aid of chemical science, and, in such cases as water analysis, furnishing what hydraulic engineers have long felt to be a needed supplement, within twenty years has changed the theories and practice of our medical authorities, and is rapidly leading, in agriculture and otherwise, to radical changes important to public welfare, writes Mr. Samuel McElroy in the Engineering Magazine.

The fermentation of water is a subject which grows in importance with the rapidly-growing demand for, and distribution of, water in the various centres of population. The careful student who has collated the experience of the more populated centres on this point finds that fermentation is an ancient and universal law of deuration in reservoirs and other bodies of water, and demands a systematic attention which it has not, as yet, received in water-supply design.

Contamination, year after year, both in summer and winter, of the most prominent supplies has shown, at times, to any careful observer, the effects of the process by which nature deaurates contaminated water. These effects have differed in period and intensity, but their occurrence has been common.

Actuated by local pride, when troubles come which should have been anticipated and prevented, city authorities have, in various times and ways, glossed over, tried to explain away, or ignored these evidences of contamination; and quite a number of those who ought to know better—chemists, biologists, engineers, commissioners—have insisted that the trouble was only temporary, its causes more or less mysterious, its effects more or less mythical, and its sanitary effects harmless. The good name of the supply is to be guarded, and the suffering consumers are cautioned against any public clamor.

The general panacea of these men is

flushing the mains at the street hydrants an operation performed at night, to save critical eyes from a shock. This shows what deposits the mains collect under their usual slow motion, and discharge under rapid currents; and it usually aggravates the trouble, since the oxids of constant pipe-disintegration are, in themselves, valuable correctives, and if the reservoir is contaminated by what it accumulates in its depths, the renewed supply more surely shows it, under the erroneous practice which neglects surface flow into the mains.

To the hydraulic engineer who has made this process a study, and is familiar with the theories and remedies of ancient practice, the causes and effects are plain, and the remedies equally so. Unfortunately, however, in the engineering profession struggling through a transition stage, studied experience has no adequate market value, and centres of population gain lessons by a prolonged suffering which is strangely universal.

Two great natural laws come into action here. From its abrasive weight, its absorbing power, its active solutions and its incessant motion, water as rain, as flowing veins and currents, as expanding ice, or when distilled by evaporation, becomes rapidly contaminated in its descent through the atmosphere and its flow over or through the earth. It rapidly takes up, or becomes impregnated with, vegetable and animal matter, diseased or dead, and mineral salts.

Then, in the wonderful provision made for man's comfort and health, come into action the sanitary forces whose office is to deaurate this organic pollution. Sunlight, as heat and otherwise, has one function; oxygen in aeration and motion has another; and the teeming sanitary police of the lower organic world, the algoid and fungoid ministry, with that of the protozoic forms, come in to fulfil their important share of the work. These forces—heat, air, and microbes—are the remedial trinity of diseased water.

The cause, then, plainly, is contamination by diseased or dead organic matter; and, since fermentation is, generally, nature's corrective remedy, the process here is putrefactive fermentation; and the odors and flavors observed are the usual evidence of this process, which must continue until deuration is accomplished. No scientific student considers heat, or oxidation, or microbes a direct cause of this phenomenon. He knows perfectly

well that each is simply remedial for a distinct organic cause.

The ancient engineers, by careful aeration subsidence, oxidized and deaurated the organic matter, and thereby, in a simple and natural way, greatly reduced the normal quantity of microbes by clarifying and removing their food supply. But in the expensive single-process sand filters of the day, so extravagantly lauded, through a bed of two and a half to four feet, all the organic matter, flood laden or otherwise, is accumulated, and with it a necessary accumulation of microbe organic slime, which pervades the entire bed, and through which every gallon the consumers drink is forced under hydraulic pressure!

EXCESSIVE RAINFALLS.

Mr. Alfred J. Henry, in the Engineering News (June 24), calls attention to the fact that, in some of the heavy storms of the past year, many central cities have found their facilities inadequate for the discharge of the precipitated water, and damage to property and litigation have resulted from these failures. In view of the importance of the subject, Mr. Henry now makes what he thinks is "a first attempt to draw some useful deductions from the records of automatic rain-gauges in use at weather-bureau stations," and has prepared a "table showing the accumulated amounts of precipitation for each five minutes during all storms in 1896 in which the rates equalled or exceeded one inch per hour at all stations of the weather bureau furnished with self-registering rain-gauges."

The records justify the division of excessive rains into two broad classes,—(a) rains of great intensity and short duration and (b) of light intensity and long duration. Of these two classes, those of the first are by far the most damaging and destructive. In extreme cases ninety-five per cent. of the downpour may quickly find its way into natural or artificial drainage channels. A rainfall of one-half inch in linear depth represents about 11,312 Imperial gallons per acre. Assuming that in extreme cases only five per cent. is absorbed, it is easily seen how great a quantity of water must flow into the drainage channels." Conditions for sudden condensation and precipitation for water vapor are "(1) a strong vertical temperature gradient; (2) high surface temperature and humidity,—in fact, the general conditions of humidity and instability of the atmosphere necessary to the formation of thunder-storms and tornadoes."

It is evident that the records of the weather bureau can be made available for the supply of needed engineering data.

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