

that cold *per se* accounts for the falling off in the bacteriological results during the winter. Moreover, there are glaring inconsistencies to be explained away on a cold-weather basis. For example, in December, 1906, 1907, 1909, 1910, 1911, 1912, 1914 and 1915, the bacteriological results were far from satisfactory, often most unsatisfactory in a relative sense, although the temperature for the month in question was 1.9, 2.8, 1.3, 4.9, 5.0, 6.1, 2.7 and 4.2 respectively above the average for that month. Nevertheless, although temperature is seemingly not the direct vital governing cause of bad results, it is a most potent indirect factor in influencing unsatisfactory "findings." Nor are the reasons far to seek. Intensely cold weather may interfere seriously with filter bed operations, and may, through burst pipes, taps left running, etc., lead to greatly increased consumption of water, which inevitably means increased rates of filtration, with consequent deterioration of the supply.

### Algal Policy

At the very commencement of the year 1918 two of the Walthamstow reservoirs (East and West Warwick) showed slight evidence of the beginning of growths of *Asterionella*, etc. An immediate decision as regards treatment seemed to be imperative, and, in consultation with the engineering department, it was agreed to adopt measures to restrain forthwith the growths in the reservoirs already affected, and to anticipate development as far as possible in the other non-affected ones by treating the raw Lee water as it entered the first (High Maynard) of the chain of reservoirs in the Lee Valley, and continuing such treatment, according to the daily consumption of water, until the time of the year had passed when these troubles are especially active and seriously embarrass the work of sand filtration.

The whole of the water from these reservoirs (excepting Banbury and Lockwood) eventually passes down the East London aqueduct to be filtered at Lee Bridge (Clapton). The laboratory filtration figures for the critical month of March were 122 c.c. per minute in 1916, 77 in 1917, and 239 in 1918. It is too early to speak with assurance yet, but the results so far obtained are most gratifying, assuming always that laboratory results can be trusted to indicate actual sand filtration experiences. The cost of copper sulphate has gone up greatly from a pre-war cost of £21 17s. 6d. to £64 2s. 6d. a ton, but the price of labor and the extraordinary difficulty of securing extra assistance for filter-bed work probably goes far to counterbalance this disadvantage. It remains, however, for the engineering department to estimate the increased cost to the board when filter beds choke up in a few days instead of working for several weeks or even months. The matter, for a variety of reasons, is not a proportional one, and so the "number of acres of filter beds cleaned" is not necessarily the true criterion of the actual expenditure incurred. It is desirable, however, that some approximate figures should be available to compare with the cost of treatment, which involves no calculations beyond the price of the chemical, the number of gallons treated, and the working expenses associated with such treatment. For example, with a dose of 1 in 4 millions (= 2.5 lbs. per million gallons) the war price would be about 1s. 5d. per million gallons of water treated. The balance in favor, or the reverse, of artificial algicidal treatment does not end here, for filtration difficulties, as is freely admitted by the engineers, tend in the direction of a less pure water being supplied to consumers, apart from questions of taste, which are liable to develop at any time. The writer considers that some note should also be taken of the

circumstance that serious filtration troubles may, and indeed do, turn the attention of the staff, in more than one department, from other matters which are of equal, if not more pressing, importance in the interests of the Board. The subject is neither simple nor unimportant, and demands a policy of imagination rather than one of stagnation.

Of course, it may be said that there is no proof that the good filtration results were really due to the treatment. Against this there is the evidence of what took place in March and April of last year, when the filtration difficulties were almost insurmountable. Further, a comparison between Banbury reservoirs (untreated water) and East London aqueduct (treated water) on the same date (March 14th, 1918) shows a great growth of *Asterionella*, *Cyclotella*, and some *Fragillaria* in the former, and hardly any growth in the latter. The presumption is very strong that the East London aqueduct water would have presented a parallel picture to the one of the Banbury reservoir water, had not treatment been promptly put into operation.

### ENGINEERING MEETING AT HALIFAX

**F**OLLOWING is the tentative programme announced for the third general professional meeting of the Engineering Institute of Canada, to be held September 11th to 13th, inclusive, at Halifax, N.S. :—

Wednesday morning session—Address of welcome by the Lieutenant-Governor of Nova Scotia; Address by the Mayor of Halifax; Business, if any; Papers; Lunch at the Green Lantern.

Wednesday afternoon session—Automobile trip to terminals and devastated area; tea at Waegwoltic.

Thursday morning session—Papers; Luncheon given by the Commercial Club.

Thursday afternoon session—Papers; Excursion around harbor.

Thursday evening session—Paper on the "Quebec Bridge" by G. F. Porter.

Friday morning session—Papers.

Friday afternoon session—Excursion.

J. L. Allan, A. J. Barnes and J. W. Rowland are the members of the committee on papers; L. H. Wheaton, P. A. Freeman and R. McColl are the entertainment committee; W. P. Morrison, F. H. MacKenzie and J. R. Freeman are the committee on transportation and hotels.

According to a statement by E. M. Dechene, deputy minister of the Department of Lands and Forests, Province of Quebec, an investigation of the water power development in that province has already revealed a total of 810,000 h.p. developed, not including hardly any of the plants under 1,000 h.p. capacity. Including the smaller plants, Mr. Dechene estimates that the grand total will reach 850,000 h.p. A detailed statement showing developments for each river will be given out by the department at a later date.

The National Research Council of the United States, acting as the Department of Science and Research of the Council of National Defense, has appointed a committee to investigate the fatigue phenomena of metals. Professor H. F. Moore, of the Engineering Experiment Station of the University of Illinois, is chairman. The committee is charged with the responsibility of developing a knowledge of the strength and durability of metals subjected to repeated stresses, such as ship structures, crank shafts of aircraft engines and heavy ordnance. It is expected that much of the experimentation required will be done in the laboratories of the University of Illinois at Urbana under the personal direction of Prof. Moore.