During the alterations the water level in aeration tank was dropped about 12 ft. and the sludge kept active by daily aeration. This alteration was completed May 28th, and after treating 200,000 gallons (32,000 cubic feet) of sewage on the 29th while treating 250,000 gallons (40,000 cubic feet) on the 30th an analysis of the effluent gave the following:—

Table No. 2.

		Result in Parts per 100,000		
Date, 1916	Character of liquid	Free and saline ammonia	Albuminoid ammonia	Oxygen absorption 4 hours
May 30	Average raw 24 hrs. sewage ..... Opalescent; brown solids strong smell	2.48	.46	4.8
May 30	Effluent ..... Clear, bright, and smell; very few light solids.	1.38	.009	.58
	Percentage of purification	44%	98%	88%

The volume treated was gradually increased to 800,000 gallons (128,000 cubic feet) per day, when a sample was analyzed with the following results:—

June 9	Effluent	.6	.13	.4

Nitrogen in nitrates and nitrites, 1.3.

Dissolved atmospheric oxygen absorbed in five days, 0.8 parts.

On the 5th July, when treating 830,000 gallons (133,000 cubic feet) per day, the analysis of a sample yielded the following result:—

Table No. 3.

		Parts per 100,000		
Date, 1916	Character of liquid	Free and saline ammonia	Albuminoid ammonia	Oxygen absorption 4 hours
5 July	Screened sewage ... Opalescent; some sludge; strong smell; no solids.	3.2	.60	5.7
5 July	*Partially treated sewage at end of first bay ..... Very slightly opalescent; some sludge; no solids; faint smell.	2.00	.19	1.98
5 July	†Effluent after first settlement ..... Clear, bright; some sludge; no solids; no smell.	—	—	.68

Proportion of sludge in aeration tank = 16 per cent.

*Percentage of purification: Albuminoid ammonia, 68%; oxygen absorption, 66%.

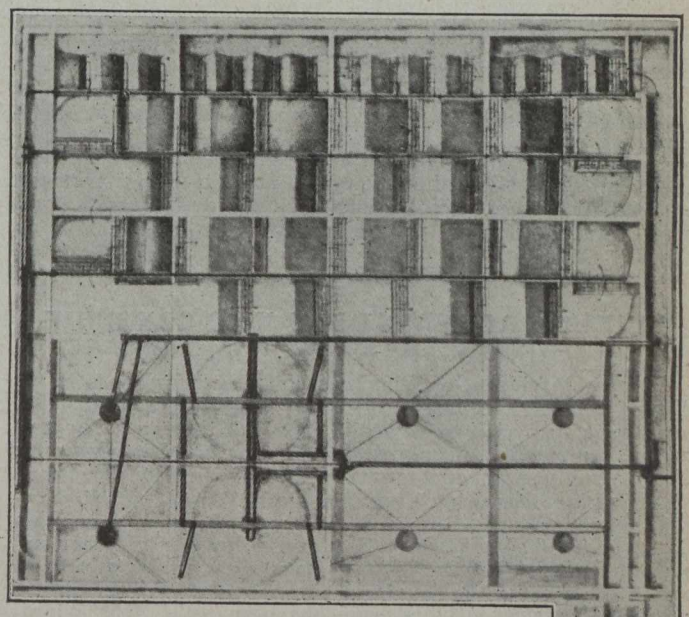
†Percentage of purification: Oxygen absorption, 88%.

Treatment was continued with slight interruptions (for enlarging the air lifts from 3 ins. to 6 ins., and fixing effluent collecting troughs) until December, 1916, at rates varying from 600,000 to 1,000,000 gallons (96,000 to 160,000 cubic feet) per day, but the first set of settling tanks in which all the settling was done was not able to pass continuously and successfully more than 750,000 gallons (120,000 cubic feet) per day of sewage, or including returned sludge, 1,000,000 gallons (160,000 cubic feet). Their capacity being 30,000 gallons (4,800 cubic feet), they afforded 57 minutes flow calculated on the 750,000 gallons (120,000 cubic feet) daily flow, or 43 minutes calculated on the total of 1,000,000 gallons (160,000 cubic feet).

The 6-in. air lifts together were set to raise 250,000 gallons (40,000 cubic feet) per day of sludge, but are capable of raising up to 400,000 gallons by further opening of the compressed air valves.

During a week's test from 20th to 27th October with a fairly constant flow of 750,000 gallons (120,000 cubic feet) per day of sewage, the average of suspended solids in the effluent was 3.4 parts and the oxygen absorbed in 4 hours test 1.13 parts per 100,000, results well within the requirements of the city. The proportion of activated sludge in a sample of sewage taken from the aeration tank and settled for one hour in a glass cylinder amounted to 11 per cent. at beginning, and 15 per cent. at end of the week's test, all sludge during the week being returned to aeration tank.

As the aeration tank appeared capable of treating much larger quantities, and that not more than 750,000



Plan of Aeration and Settlement Tanks.

gallons (120,000 cubic feet) of sewage per day could be settled in the first set of settling tanks if the suspended solids in effluent were to be kept down below 4 parts per 100,000, it was decided to alter the slopes of the second set of tanks and utilize them in the same way. This has now been done, affording an extra capacity of 40,000 gallons (6,400 cubic feet) for settling purposes.

It is interesting to note that no trouble had or has been experienced in connection with the aeration tank, which from the start has given excellent results, so that almost all alterations have been in connection with the settlement tanks to make them capable of dealing with the flow from the aeration tanks.

Purification Obtained.

The average of nine samples of screened sewage being all those taken and analyzed by the Worcester city analyst between July, 1916, and 19th May, 1917, gave the following results in parts per 100,000:—

Solids in suspension	14.3
Solids in solution	128.8
Albuminoid ammonia	.76
Oxygen absorbed in 4 hours	3.7

Since November, however, the more dilute sewage from the St. John's district has been omitted and a snap