

The rate of filtration for the year was 3.27 million Imperial gallons per acre per day, this being slightly lower than in the previous year. The total amount of water filtered was 11,470 million Imperial gallons. In the yearly report for 1916 special reference was made to the quality of the sand, particularly as regards the effective size and the uni-

TABLE C

Excremental bacteria growing on Bile-Salt Agar (Rebipelagar) at 37-39 deg. C., 24 hours incubation, showing monthly maximum, minimum and average number per c.c. in raw and filtered water; yearly average number per c.c. in raw and filtered water, and the total percentage reduction in filtered water for the year.

Month.	Raw Water			Filtered Water		
	Maximum	Minimum	Average	Maximum	Minimum	Average
Jan.	188	0	11.1	2	0	.2
Feb.	80	0	4.4	2	0	.125
Mar.	164	0	13.3	4	0	.32
Apr.	300	0	40.8	1	0	.16
May	57	0	8.6	6	0	.44
June	170	0	29.58	8	0	.5
July	27	0	2.65	2	0	.08
Aug.	270	0	16.73	1	0	.08
Sept.	86	0	12.8	10	0	.5
Oct.	1,250	0	91.62	1	0	.12
Nov.	29	0	6.12	1	0	.08
Dec.	440	0	73.2	3	0	.58
Average for year.			26.5			0.25

Total reduction for the year, 99.0 per cent.

formity coefficient. At that time the portable sand washer was being used in the summer months. This practice was discontinued and the washer is now used only during the winter months. The quality of the sand greatly improved during 1918 and is now in good condition.

Summary

(1) Over 10,000 samples were examined from the slow sand system during the year.

(2) The average number of bacteria growing on agar at blood temperature was 356.3 per c.c. in the raw water and 2.2 per c.c. in the filtered water. Total reduction, 99.1%.

(3) The average number of excremental bacteria growing on bile-salt agar at blood temperature was 26.5 per c.c. in the raw water and 0.25 per c.c. in the filtered water. Reduction, 99.0%.

TABLE D

Monthly Percentage of Samples Showing B. Coli in Raw and Filtered Water

Month	Raw Water						Filtered Water					
	100cc	10cc	1cc	.1cc	.01cc	.001cc	100cc	10cc	1cc	.1cc	.01cc	.001cc
Jan.	76.0	40.0	32.0	12.0	0.0	0.0	19.0	4.0	0.0	0.0	0.0	0.0
Feb.	100	66.6	16.6	0.0	0.0	0.0	75.0	20.8	0.0	0.0	0.0	0.0
Mar.	96.0	52.0	28.0	8.0	0.0	0.0	88.0	24.0	4.0	0.0	0.0	0.0
Apr.	96.0	80.0	48.0	20.0	0.0	0.0	88.0	24.0	0.0	0.0	0.0	0.0
May	96.1	57.7	30.8	7.7	0.0	0.0	53.8	11.5	0.0	0.0	0.0	0.0
June	95.8	50.0	41.6	8.3	0.0	0.0	29.1	0.0	0.0	0.0	0.0	0.0
July	92.3	61.5	23.0	7.7	0.0	0.0	30.8	3.8	0.0	0.0	0.0	0.0
Aug.	100	96.1	65.4	26.9	7.7	0.0	50.0	11.5	0.0	0.0	0.0	0.0
Sept.	100	75.0	50.0	20.8	4.2	0.0	45.8	8.3	0.0	0.0	0.0	0.0
Oct.	96.1	76.9	53.8	30.8	7.7	0.0	61.5	15.3	0.0	0.0	0.0	0.0
Nov.	96.1	50.0	23.0	7.7	0.0	0.0	38.4	11.5	0.0	0.0	0.0	0.0
Dec.	92.0	88.0	68.0	36.0	28.0	8.0	92.0	60.0	4.0	0.0	0.0	0.0

Efficiency as Judged by B. Coli Test, Showing Percentage Reduction in Filtered Water.

100cc., 36.0%; 10cc., 74.0%; 1cc., 98.3%; 0.1cc., 100%; 0.01cc., 100%; 0.001cc., 100%.

Indicated Number of B. Coli per 100cc., and 1cc.

Average of 302 samples: Raw water, per 100cc., 1,136; per 1cc., 11.36.

Filtered water, per 100cc., 2.7; per 1cc., .027.

Total reduction of B. Coli in Filtered Water, 99.7%.

Total Percentage of Samples Showing B. Coli in Raw and Filtered Water During Past Six Years

Year	Raw Water						Filtered Water					
	100cc	10cc	1cc	.1cc	.01cc	.001cc	100cc	10cc	1cc	.1cc	.01cc	.001cc
1913	81.2	54.6	24.6	4.9	0.0	0.0	33.2	7.5	0.3	0.0	0.0	0.0
1914	87.4	61.0	30.7	8.6	0.99	0.0	35.2	8.9	1.3	0.0	0.0	0.0
1915	91.4	60.2	31.9	8.2	1.6	0.3	46.4	11.1	1.7	0.0	0.0	0.0
1916	96.4	68.7	35.8	10.5	0.98	0.0	56.9	11.5	0.65	0.0	0.0	0.0
1917	92.7	67.1	32.2	8.5	2.6	0.0	59.8	14.4	0.32	0.0	0.0	0.0
1918	94.7	66.2	40.0	15.5	3.9	0.66	60.6	17.2	0.66	0.0	0.0	0.0

(4) The total percentage of samples showing B. Coli in one c.c. was 39.9 in the raw water and 0.66 in the filtered water.

(5) The average indicated number of B. Coli present per 100 c.c. of water examined was 1,136 in the raw water and 2.7 in the filtered water, showing a total reduction of 99.7%.

(6) Pollution of the raw water as judged by the B. Coli test has increased by 61.9% since 1913.

(7) The highest temperature recorded in the water was 64 degs. F. and the lowest 33.9 degs. F.

(8) The highest degree of turbidity occurring in the raw water was 160 p.p.m., whilst the lowest was 1. The filtered water was free from turbidity throughout the year.

(9) The chlorides in the raw water were 8.2 p.p.m. in 1913, whilst in 1918, the figures had increased to 9.89 p.p.m.

(10) The total number of filters cleaned during the year was 181.

(11) The average rate of filtration was 3.27 million Imperial gallons per acre per day.

TABLE E

Average Monthly Turbidities, Showing Maximum and Minimum Figures

Month	Raw Water			Filtered Water		
	Maximum	Minimum	Average	Maximum	Minimum	Average
January	24	1	4.0	0.5	0.5	0.5
February	39	1	4.0	0.5	0.5	0.5
March	51	1	8.3	0.5	0.5	0.5
April	160	1	26.5	0.5	0.5	0.5
May	7	1	2.0	0.5	0.5	0.5
June	7	1	1.7	0.5	0.5	0.5
July	3	1	1.6	0.5	0.5	0.5
August	8	1	1.8	0.5	0.5	0.5
September	14	1	2.9	0.5	0.5	0.5
October	7	1	1.6	0.5	0.5	0.5
November	12	1	1.9	0.5	0.5	0.5
December	65	1	18.7	0.5	0.5	0.5

(12) The average amount of water filtered was 31.42 million Imperial gallons, or 50% of the average amount of water daily consumed.

(13) *The maximum and minimum consumption daily during the year was 77.49 and 45.61 million Imperial gallons, respectively, whilst the average daily consumption was 62.72 million Imperial gallons.

(14) *The average daily consumption per capita was 128 Imperial gallons.

Conclusions

For several years past attention has been directed to the continual deterioration in the quality of the raw water. Observations were based upon the percentage number of days in the year that the raw water contained the typical colon bacillus in one cubic centimetre of water examined. The figures for the past six years which read as follows: 1913, 24.6%; 1914, 30.7%; 1915, 31.9%; 1916, 35.8%; 1917, 32.2%; 1918, 39.9%, show conclusively that the raw water is becoming impurer. The slight reduction in 1917 was due

TABLE F

Temperatures of Air and Water in Degrees Fahrenheit at 9.30 a.m.

Month	Water			Air		
	Maximum	Minimum	Average	Maximum	Minimum	Average
January	37.0	32.0	34.7	33	-8	12.29
February	36.0	33.0	34.8	39	-15	21.7
March	35.9	32.9	33.9	46	14	32.6
April	39.2	33.8	36.6	49	28	40.3
May	44.6	37.4	40.6	68	40	50.42
June	50.0	41.0	44.3	70	52	60.1
July	46.4	41.0	43.9	78	51	66.5
August	64.0	41.0	56.9	76	56	67.0
September	60.8	41.0	47.0	66	42	54.8
October	50.0	41.0	45.1	58	41	48.9
November	50.0	42.0	45.4	55	24	42.3
December	42.0	36.0	38.6	44	18	33.2

to the more favorable weather rather than to any improvement in the quality of the water.

In 1913 the colon bacillus was present on seventy-five days (24.6%) of the total number of days upon which examination of the raw water was made. This figure had increased in 1918 to 121 days (39.9%). From the figures submitted it will be seen that the pollution in the raw water was progressive in character, and that the actual percentage increase in the number of days upon which the water was seriously polluted had increased 61.9% in six years. The normal increase in population and the consequent discharge of sewage into the lake may have been the principal rea-

*Figures kindly supplied by Department of Works.