

FREDERICTON MECHANICAL FILTER PLANT.*

Fredericton is situated on the St. John River and has a population of about 8,000.

The water supply is drawn from the river through a 15-inch riveted steel suction this taking the water from a crib pier 150 yards from the shore conveys it by gravity to a pump well located adjacent to the waterworks station. From the pump well the water is raised by two six-inch centrifugal pumps direct connected to reciprocating engines with capacity of 1,400 gallons per minute. These pumps raise the water to the coagulating basin (54 feet by 22 feet 3 inches), capacity 90,000 gallons, divided completely into two chambers to allow for the alteration of the period of coagulation to suit the varying conditions of the river. From the coagulating basin the water flows by gravity through the filter beds (10 feet by 15 feet) at the rate of 125 million gallons per acre per day to the clear water reservoir situated below the filter building. The clear water basin has a storage of 470,000 gallons.

The coagulating basin, filter tanks and clear water basin are constructed of concrete. The supply and effluent are controlled by hydraulic gates as are also the connections for cleaning the filter beds.

The water supply for the city is lifted from the clear water basin and supplied directly to the city by a cross compound Corliss Engine, manufactured by Allis-Chalmers-

Table Showing Colour Reduction by Months.

Month	Parts per Million				Remarks.
	Average color of raw water.	Platinum standard	Average turbidity of raw water	Grains alumina sulphate per gallon	
May	80.5	21	1.46	41.8	Note. — That where the table shows no turbidity for any month the intention is on certain days there was slight turbidity but it was not considered advisable to make the average of these to represent the month.
April	62.7	15	1.56	35.0	
June	78.2	10	2.02	30.9	
March	55.4	5	1.66	29.9	
December	56.	2	2.43	27.3	
August	52.7	0	2.16	27.3	
July	48.6	0	2.22	27.0	
November	51.0	2	2.11	26.5	
January	55.6	0	2.22	26.1	
February	44.0	0	2.32	26.9	
October	48.6	3	2.27	25.4	
September	48.6	0	2.71	24.1	

These facts having been noted in the daily operation experiments were made in the laboratory for the purpose of checking these results, and determining if possible the

The following table shows in detail the monthly operation of the filter plant:—

Record of Filter Plant Operation, 1908:

MONTH	Total water filtered per month in gallons	Daily average in gallons	Per cent. wash water used on filter beds	Total per cent. wash water	Air application in mins.	Turbidity (raw)	PARTS PER MILLION				Alumina Sulphate in grains per gallon	Per cent. re- duction of colour
							Colour		Alkalinity			
							Platinum Raw	Standard Eff.	Erythrosine Raw	Method Eff.		
January	16,801,600	553,385	.87	.92	7.0	0	55.6	23.3	41.8	22.8	2.22	50.
February ...	16,244,490	560,155	.82	.89	7.3	0	44.0	11.5	42.5	21.5	2.32	60.
March	15,781,800	509,020	.75	.80	8.1	5	55.4	28.8	37.2	23.3	1.66	48.0
April	16,448,510	548,284	.69	.76	8.5	15	62.7	28.5	35.1	22.0	1.56	54.5
May	16,960,650	547,118	1.05	1.12	6.5	21	80.5	31.1	23.3	10.5	1.46	61.1
June	16,357,450	545,248	.78	.82	7.8	10	78.2	29.3	31.2	14.3	2.02	62.5
July	16,525,080	635,580	.75	.79	8.3	0	48.6	20.5	39.5	20.2	2.22	59.9
August	19,806,550	703,437	.68	.75	8.4	0	52.7	21.6	40.5	22.4	2.16	59.0
September ..	17,211,200	573,706	.72	.77	8.0	0	48.6	16.8	44.4	23.7	2.71	65.4
October	16,174,190	521,747	.69	.73	8.0	3	48.0	20.5	48.0	24.8	2.27	57.8
November ..	15,977,650	532,588	.74	.77	7.4	2	51.0	22.5	42.0	24.5	2.11	56.0
December ..	16,486,600	531,822	.78	.83	7.5	3	56.0	20.	39.5	19.1	2.43	65.4
1908	200,775,770	563,513	.77	.83	7.7	..	56.8	23.3	38.7	21.1	2.09	58.7
1907 .....	.....	544,000	...	.63	...	..	84.2	32.8	34.9	17.9	2.17	61.

Bullock, Limited, which has a capacity of 3,000 gallons per minute. There is also a Gaskill Engine connected to the reservoir for emergencies. Both of these engines are also arranged to pump directly from the river.

From the above record the following Table is deduced showing the percentage of reduction in color due to the application of one grain of alumina sulphate per gallon:—

By an examination of the above table the following the deductions seem justified:

1. The color of the St. John River water is reduced a larger per cent. per grain of alumina sulphate used when the water carries from five to twenty parts per million of turbidity.

2. That when the color of the same water is fifty parts or more per million (platinum standard), a larger percentage of color is removed per grain of chemical than when the color falls below this point.

* From the report of A. K. Grimmer, B.A.I., City Engineer, of Fredericton, N.B.

saving in chemical which could be made by the mechanical application of a specified quantity of turbidity. The following table shows the summary of experiments and results:—

Table Showing Experiments on Color Reduction.

No. of experiments from which average was deduced	Turbidity added.	Parts per 1,000,000	PARTS PER MILLION				Alumina sulphate in grains per gallon	Percentage of colour moved per grain per gallon
			Colour		Alkalinity			
			Raw	Eff.	Raw	Eff.		
4	0	59	17.5	40	19.3	2.35	30.	
2	5	59	15.0	38	19.0	2.40	30.8	
4	10	59	13.5	40	20.0	2.35	32.0	
2	12	58	12.0	38	19.5	2.40	33.0	
4	15	59	11.0	40	20.0	2.35	34.4	
2	18	58	10.0	38	19.5	2.40	35.0	
5	20	68	20.0	38	20.0	2.40	28.0	
4	25	75	21.0	38	20.0	2.40	36.0	
4	30	68	18.0	38	20.5	2.40	37.0	