or 18,500 Imperial gallons. There are 50 filtros plates, each 1 sq. ft. in area. The area of the tank is 336 sq. ft. and filtros plates 50 sq. ft. or a ratio of 1 to 6.7. The air was measured by a venturi meter and controlled by a hand valve. The cycle of operation was, roughly, as follows:— Filling, 1 hour; aeration, 3½ hours; settling, ½ hour; decanting, 1 hour. Samples were collected before and after treatment and the average monthly results of the analyses were as follows:—

	Crude Sewage	Effluent from Tank	Percentage Removed
Settleable solids in two hours, cu. yds. per million gallons	17.5	0.8	95.4
Suspended matter, in p.p.m.	250	12	95.3
Total solids, in p.p.m.	1,067	777	27.1
Nitrogen as free ammonia, p.p.m.	14.61	9.70	32.4
Nitrogen as alb. ammonia, p.p.m.	8.79	2.84	72.3
Nitrogen as organic nitrogen, p.p.m.	30.3	13.5	55.5
Nitrogen as nitrite, p.p.m.	0.24	0.81	
Nitrogen as nitrate, p.p.m.	0.42	2.51	
Oxygen consumed, p.p.m.	116	23	80.0
Alkalinity, p.p.m.	255	240	
Chlorine, p.p.m.	185	183	
Dissolved oxygen, p.p.m.	1.1	5.2	
Temperature, degrees Fahr.	62°	63°	
No. bacteria per c.c. at 20° C. in millions	2.100	0.115	95.3

This tank treated sewage at the following average daily rates:—

June 52,911 gallons, 1.76 cu. ft. of air per gallon
July 56,308 gallons, 1.91 cu. ft. of air per gallon
August 72,539 gallons, 2.05 cu. ft. of air per gallon
September 76,950 gallons, 2.00 cu. ft. of air per gallon
October 57,097 gallons, 1.36 cu. ft. of air per gallon
November 60,824 gallons, 2.14 cu. ft. of air per gallon

Average amount of sewage treated daily, 62,771 gallons.
Average amount of air used per gallon, 1.87 cubic feet.

The figures for May and December are not given.

It is interesting to note that whereas Messrs. Adern and Lockett, in their experiments in 1914, found the amount of free air used did not exceed 15 cu. ft. per square foot of tank area per hour with a sewage depth of about 5 ft., whereas the average at Milwaukee for sewage 9 ft. deep was about 25 cu. ft., Mr. Adern thought 12 cu. ft. would suffice, and Dr. Bartow is reported to have succeeded in using still less quantity of air.

Turning now to the continuous flow method. Another of the former chemical precipitation tanks was remodelled for this purpose. This tank is 32 ft. 0 in. x 10 ft. 6 ins. x 10 ft. 0 in. deep, divided longitudinally into three compartments. The sewage is admitted into and flows through the left-hand into the right-hand and out by the central compartment, and in doing so it travels 81 ft. and is aerated. The sludge, being very flocculent, is carried forward and settles in the sedimentation chambers whence it is pumped back to the point of sewage inlet. The air is distributed and diffused in the same way as in the fill and draw tank.

The continuous flow tank was operated by filling it with sewage on June 28th, 1915, running in 1,200 gallons of sludge from the Imhoff tank and from the secondary sedimentation tanks of the sprinkling filters. More sludge was run in on July 13th and 16th, and by the 19th July the black sludge had by aeration turned brown. The tank was put into working commission on August 5th. Samples were taken and analyzed and the following figures show what were the average results during four months, August to November inclusive.

	Crude Sewage	Effluent from Tank	Percentage Removed
Settleable solids in two hours, cu. yds. per million gallons	20.77	2.4	87.7
Suspended matter, p.p.m.	310	15	95.2
Total solids, p.p.m.	1,165	834	28.3
Nitrogen as free ammonia, p.p.m.	15.7	7.16	55.0
Nitrogen as alb. ammonia, p.p.m.	9.53	4.77	50.0
Nitrogen as organic nitrogen, p.p.m.	34.6	11.1	67.7
Nitrogen as nitrite, p.p.m.	0.20	0.41	
Nitrogen as nitrate, p.p.m.	0.17	5.94	
Oxygen consumed, p.p.m.	123.0	22.0	82.3
Alkalinity, p.p.m.		192	
Chlorine, p.p.m.		196	
Dissolved oxygen, p.p.m.	1.09	4.3	
Temperature, deg. Fahr.	64	64	
No. of bacteria at 20° C., mil.	1.620	0.086	95.0

The continuous flow tank treated sewage at the following average daily rates:—

August 19,745 gallons, 4.52 cu. ft. of air per gallon
September 47,755 gallons, 2.01 cu. ft. of air per gallon
October 59,137 gallons, 1.62 cu. ft. of air per gallon
November 60,393 gallons, 2.09 cu. ft. of air per gallon

Average amount of sewage treated daily, 46,760 gallons.
Average quantity of air used per gallon, 2.56 cubic feet.

Omitting August, the averages are: Amount of sewage treated, 55,762 gallons; quantity of air used, 1.91 cu. ft. per gallon.

It is instructive to compare the results obtained by the two methods.

	Fill and Draw Method	Continuous Method
Reduction in settleable solids	95.4%	87.7%
Reduction in suspended matter	95.3%	95.2%
Reduction in total solids	27.1%	28.3%
Reduction in free ammonia	32.4%	55.0%
Reduction in alb. ammonia	72.3%	50.0%
Reduction in organic nitrogen	55.5%	67.7%
Reduction in oxygen consumed	80.0%	82.3%
Reduction in bacteria	95.3%	95.0%
Average number of tank volumes treated daily	2.8	2.5
Average quantity of air per gallon in cubic feet	1.87	1.91

There would appear to be but little difference in the results obtained by the fill and draw or the continuous flow methods. A number of experiments, however, were made apart from the general tests and the results point to possibilities of great interest.

The cost of furnishing compressed air at five pounds pressure is estimated by Mr. Halton at $2.50 per million cubic feet of free air and on this basis the cost of treating sewage on the fill and draw method, using 1.87 cu. ft. per gallon, would be about $4.67 per million U.S. gallons, and by the continuous method, using 1.91 cu. ft. per gallon, $4.78 per million U.S. gallons, but Mr. Copeland states that 1,000,000 (U.S.) gallons can be clarified, freed from 95 per cent. of its bacteria and rendered stable for five days by the application of 1.75 cu. ft. of air per gallon at a cost of $4.38, which includes overhead charges upon that portion of the plant devoted exclusively to treatment of sewage but excludes plant and engine room labor and cost of disposing of the sludge.