

Table II.—Summary of Results Obtained in the Comparison of Efficiency of Methods of Aeration Measured in Terms of Turbidity and the Accumulation of Sludge
(Parts per Million)

Period. 1917.	Sew- age.	Turbidity				Per Cent Sludge			
		A	B	C	D	A	B	C	D
Mar. 27-Apr. 1	283	48	39	46	46	9	8	8	7
April 1-6	317	9	6	6	6	14	14	12	12
April 6-12	190	9	5	5	5	18	21	18	18
April 12-17	248	7	5	5	5	26	29	25	28
April 17-22	306	5	5	5	5	29	35	34	31
April 22-27	309	5	5	5	5	38	37	44	39
April 27-30	268	5	5	5	5	35	33	36	33
Average	274	13	10	11	11				
Reduction		95%	96%	96%	96%				
Results April 12 to 30	after Activated Sludge was formed.								
Average	283	5	5	5	5	38	37	44	39
Reduction		98%	98%	98%	98%				

with a comparatively heavy and not very fresh sludge did not give satisfactory results. The quick-opening door could not stand the pressure. Another trial will be given as soon as the door can be replaced.

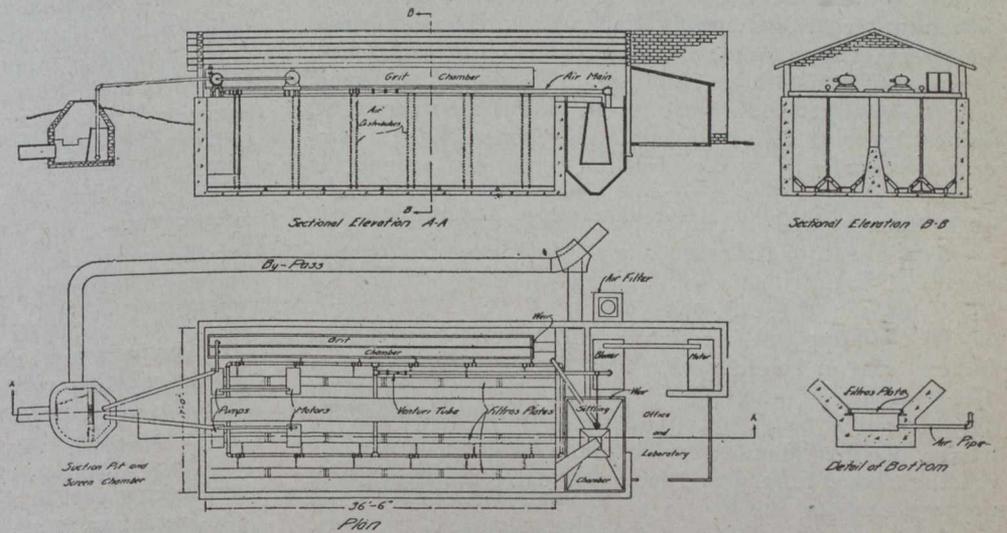
Mohlman reported experiments with two small centrifuges, one of the low-speed basket type and the other of the high-speed bottle type. The basket of the low-speed machine was 8 ins. in diameter and 6 ins. deep. The periphery was perforated with numerous holes 1/16 in. in diameter. When the holes were covered with a strip of muslin cloth, approximately 1 gallon 98 per cent. moisture sludge was put into the centrifuge and after 15 minutes, 700 grams of 91 per cent. moisture sludge were obtained. The high-speed bottle-type machine reduced the moisture from 98 per cent. to 92 per cent. in three minutes. Mohlman stated that in order to be economical there should be an automatic arrangement for removing the cake.

At Cleveland, Pratt and Gascoigne used a laundry centrifuge with a 26-in. basket, lined with a 1/4-in. wire mesh inside of which was a canvas bag. In the best run, when the basket revolved about 1,200 revolutions per minute, 60 gallons of 97 1/2 per cent. moisture sludge was added in about 25 minutes and in 2 hours the moisture content was reduced to 84 per cent. The time required would seem to make this process impracticable.

Working on the assumption that the principle used in drying of china clays or that used in the cream separator might be applicable, a modified basket-type centrifuge and a modified cream separator were tried. The holes of an 8-in. basket-type centrifuge were covered with a strip of rubber packing. The best results were obtained with 1,500 revolutions per minute, which was the limiting speed of the machine. This would seem to indicate that the process would give efficient results if carried on at an increased speed, but would yield an effluent that must be returned with the sewage to the aeration chamber. A

series of tests was made with a cream separator, the bowl of which was modified, by removing the inner disks and discharging the clarified liquid about an inch from the centre of the bowl at the top. The sludge added at the top dropped to the bottom of the bowl, and the liquid was thrown out over the rim. Sludge cakes containing from 85 to 86 per cent. of moisture were obtained by the cream separator in 6 to 8 minutes, which encouraged us to obtain a special machine for further experiments.

A specially designed centrifuge was purchased from the Tolhurst Machine Works, of Troy, N.Y. This machine is 12 ins. in diameter, 9 1/2 ins. high and at a speed of 1,800 exerts a centrifugal force of 550 lbs. According to its concentration from 10 to 25 gallons of the sludge are added and 10 lbs. of cake obtained. The sludge cake contains about 88 per cent. moisture. The space underneath the rim contains 0.158 cu. ft. Owing to the small size of the machine and to the fact that the material must be scraped out, the time of cleaning is longer than would be required for a larger machine with an opening in the bottom, so that a large machine could undoubtedly have been filled and emptied more rapidly than the small laboratory machine. It was found entirely



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possible to fill and empty the small machine four times in one hour. Calculating that the same rate could be used with a 40-in. machine having 46 times the capacity, it was possible to obtain in each filling 460 lbs. of sludge of 88 per cent. moisture, equivalent to 55 lbs. of dry material. One 40-in. machine would, therefore, deliver the equivalent of 2,200 lbs. of dry material in a working day of 10 hours. On the supposition that 1/2 ton of dry material will be obtained from 1,000,000 gallons of sewage, one machine would dewater the sludge from 2,000,000 gallons of sewage per day. The cost of the 40-in. machine at present is only \$750 and the power to run it is small enough to make the process appear practical for preparing sludge cake for a dryer.

The actual cost of dewatering will depend upon the amount of water that can be removed by the centrifuge, the size of dryer and the amount of coal required for removing the residual water. A drying test using 220 lbs. of 88 per cent. sludge cake made by the John P. Devine Co. indicates that the dewatering process can be made practical.