8 hours the air was turned off, settlement permitted, the supernatant liquor removed, fresh sewage added and the aeration repeated. The process was continued until the tank contained about 30% of its capacity of good activated sludge, *i.e.*, for about 33 days. Then the seeded tank was started upon the continuous flow method.

Mr. Hatton reports remarkable results. With a rough screened sewage containing from 1,000,000 to 7,000,000 bacteria per c.c., 250 p.p.m. of suspended matter, 30 p.p.m. of organic nitrogen and 120 p.p.m. of oxygen consumed, an effluent was produced containing a 99 per cent. removal of suspended matter and bacteria, 12 to 14 p.p.m. of nitrates, stable after 5 days and clear as lake water, leaving a sludge containing 5.45% ammonia, 1.34% available phosphoric acid, 0.23% potash, worth $9 a ton, dry weight, as fertilizer. Only 1.77 cu.

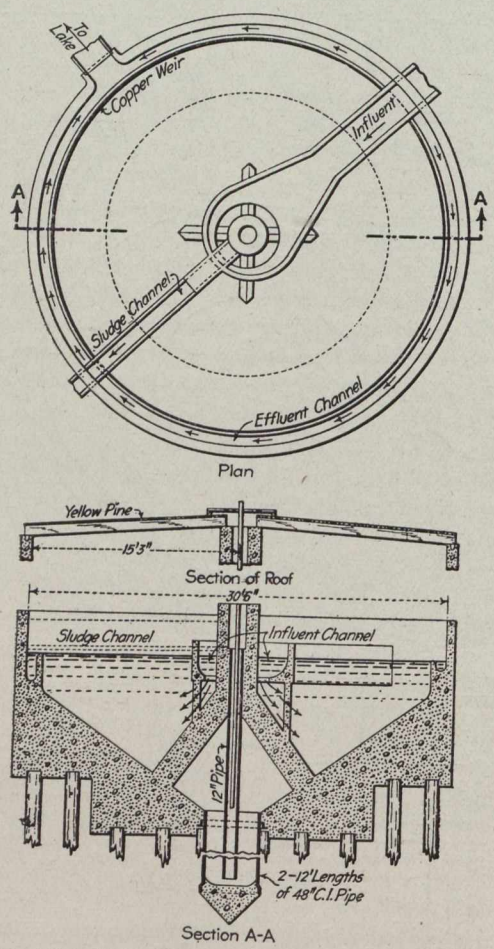

Fig. 2.—Details of Sedimentation Tank.

ft. of air was used per gallon of sewage treated, the process costing $4.43 per million gallons.

It is upon these excellent results that the commission based the decision to spend $65,000 on a large sized plant, the following description of which is abstracted from Mr. Hatton's paper.

The plant consists of eleven circular reinforced concrete tanks 30 ft. inside diameter by 13 ft. maximum depth, supported upon a pile foundation due to the instability of the soil. Tanks 1 to 6, inclusive, are the aerating tanks in which the sewage mixed with the activated sludge is aerated by means of air forced in under 5 lb. pressure. Tank 9 is the sedimentation tank, and tanks 10 and 11 are the activated sludge tanks. The drawings show details of the aerating tanks with their curved baffles, the manner of sloping the bottom of the running through channels so as to avoid the deposition of sludge, and the manner of placing the air diffusers. The sedimentation tank is the only tank to be roofed over. The roof is necessary to prevent ice forming about the edges of the circular weir, which would set up uneven currents. This tank has a radial flow, and is designed for a 25-minute sedimentation period at a 2,000,000-gallon rate.

The two sludge tanks are similar to the aerating tanks except that they are each made into two separate compartments by stop planks connecting the two ends of the baffle walls. Their pipes and diffusers are placed in the same number and manner as in the aerating tanks.

Wooden rectangular troughs are built part way around each tank to control the direction of the flow of liquor, and stop planks are arranged so that any one or series of tanks can be cut out. The sewage from 250,000 people, to which is added the sewage from the packing house district, passes out to the lake through a 20-ft. wide open channel alongside of the proposed plant.

In this channel a weir is constructed 20.35 ft. long, which maintains a depth of about 3 ft. of liquor for 40 ft. back of the weir. This is the grit chamber in which the heavier solids from the street washings are deposited, as the sewers connected with this large intercepting sewer are of the combined type. The weirs have been so arranged as to provide a flow through the plant to correspond with the fluctuations of flow through the main sewer, and the air applied to the sewage will be automatically regulated to correspond with this flow. Self-recording air meters will be installed to determine the volume and pressure of air used.

The sewage, after passing the plant weir, enters tank 1, where it comes into immediate contact with the air and the activated sludge, with which the tank has been originally seeded. It is designed to use 25 per cent. of this activated sludge at first and to increase or diminish it as the operation shows necessary to get the most economical results.

Passing through tank 1 the liquor, mixed with the sludge, enters tank 2, when it is again aerated and further mixed with the sludge contained in that tank, and so continues until it passes, with the sludge mixed with it, into the centre channel of tank 9. Here the sludge settles out to the bottom of the tank, the clear liquor passing over the circumferential weir to the lake.

The sludge settles to a deep well built in the bottom of the settling tank, and is discharged by gravity into sludge tanks 10 or 11, where it is aerated for such a period as may be necessary to maintain the nitrogen cycle. From these sludge tanks the sludge passes to an 18-in. cast-iron pipe sunk vertically in the ground with its base about 28 ft. below the height of the liquid in the sludge tank, and from this pipe it is pumped by air into the fresh liquor trough, entering tank 1 with the raw sewage and again passing through the process.

That portion of the activated sludge in excess of what is necessary to maintain the proper percentage in the aerating tanks is pumped out of the sludge tanks from time to time and dewatered and will be used as a fertilizer. The method of dewatering has not yet been decided upon, but will probably be by means of the sludge press or vacuum wheel. The deep chambers connected with the settling tank and sludge tanks are for the purpose of dewatering the sludge as much as possible by weight, and thus avoiding the pumping of unnecessary liquor through the process.