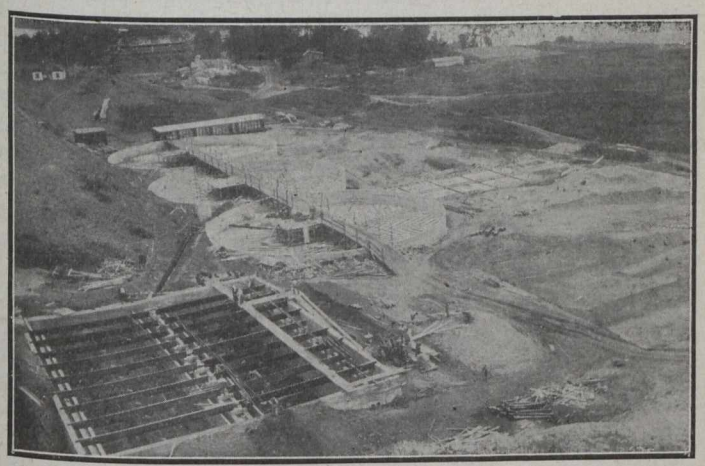
tend through the glass apron to the roof and are exposed for use by removing small cast iron covers set in the concrete roof. One-inch water services direct from the city force main are connected to the end of each line of sludge pipes for the purpose of flushing, if desired.

The collecting channel between the sedimentation tanks discharges into a cast iron pipe with a bellmouth on a level with the bottom of the channel. The sewage in entering this bellmouth is subjected to a natural vortex motion for the purpose of giving the liquid a chance to draw down and absorb all the oxygen possible. This pipe,



General View, While Under Construction.

which is 21 inches in diameter, discharges into a distributing chamber in which are located the three controlling valves for each of the three filter units. The liquid passes through to either of the filters by means of 12-inch cast iron pipes laid along the bottom of the filter floors to the riser pipes at the centres of the filters. The sprinkling arms cover a circle, having a diameter of 108 feet, and are probably the largest yet installed in this country.

There are three filters, with concrete floors and walls and with open tops. They have a total area of .62 acres, and an average depth of 7 ft. of medium, the minimum capacity of the sprinklers being 133,300 gallons to each distributer, the maximum capacity being five times the amount. The medium consists of a mixture of broken brick, hard furnace slag and gravel, sizing from 2½ to 3 inches on the average. The slope of the floor is 6 inches in 54 feet of radius.

The humus tanks, into which the sewage flows after filtration, are also constructed in duplicate and adjacent to the filters. Their purpose is to collect further settling of the partially purified liquid. The tanks have a capacity of 4,120 ft. Each is drained through one central sludge valve. Floor, walls and roof are of concrete. The liquid is drawn off over weirs 12 inches wide into a bafflerace leading to the float chamber and the chlorinating house. Measurements of each humus tank are as follows:—Capacity, 4,120 cu. ft.; liquid surface area, 1,200 sq. ft.; length of influent and effluent weirs, 80 ft.; distance apart of influent and effluent weirs, 15 ft.; difference in elevation of influent and effluent weirs, .1 ft.

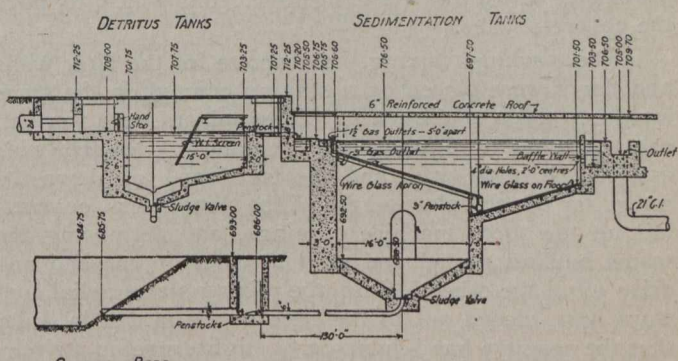
In the chlorinating house there is an automatic regulation of the chlorine solution, effected by a lever regulating the supply and operated by the float in the float chamber.

The sludge beds, each with an area of 480 sq. ft., are simply rectangular excavations in the soil.

For further details respecting the design of the entire plant the reader is referred to the article mentioned above.

Construction.—According to Mr. Blanchard's paper, construction work began with the excavation for the sedimentation tank, about 6,000 cu. yds. being removed. This excavation, with the exception of two or three feet of surface soil, was hard clay, requiring no shoring or timbering.

The concrete was first started by running the footing for the walls and erecting on them sectional forms of dressed boarding. The forms were placed the required distance away from the face of the shale wall and braced from the parallel wall 16 ft. distant, the same bracing thus serving for two walls. The concrete was poured in layers of from two to three feet, a complete circuit being made each day. No reinforcement or joints of any description were introduced, the 18-ft. walls being 3 ft. and 4 ft. thick at the bottom and tapering to 18 in. at the top. The 5-ft. walls were a uniform thickness of 18 in. For a small portion of some of the walls near the top 2-ft. square metal forms were used. These were found easily and quickly handled, left a good face, but were awkward when the length of the wall was not a multiple of the size of the form, or when the intersecting floors were not square with the surface. In laying the hopper floors a runner was laid down each angle, and after laying the concrete side, these were extracted and the spaces were filled in a week or so later. This was found satisfactory where the foundation was hard shale. The floors were 12 in. thick of 1:2:4 concrete laid in one layer, screeded and finished with a steel float. The aggregate used for all concrete was river gravel obtained close to the site; occasionally sand was screened out, but usually the natural gradings with slight adjustment were found to be sufficiently accurate. The 6-inch concrete roof was reinforced with No. 3 mesh 10-gauge expanded metal. The concrete was 1:2:4 laid in one layer, and finished with light tamper and wooden float, the cribbing being partly sup-



Sections of Detritus and Sedimentation Tanks and Sludge Beds.

ported from underneath and partly hung from the 24-inch beams carrying the roof. The foreslope was composed of a 9-inch concrete base with ¼-inch wire rolled glass 2 feet square laid on the surface, and embedded in a rich mortar of cement; no clips were found necessary. The glass apron was carried on 4-inch I-beams at 8.5 lbs., with 5-ft. centres let into the wall at the upper end and supported on concrete piers 18 inches high at the lower. On the top flange of the beam creosoted wood strips were fixed with small iron cleats sunk flush with the wood. The ¼-inch wired glass in sheets 5 ft. x 3 ft. were laid on these strips, embedded with a mixture of litharge and white lead. Each sheet was secured along the lower edge