under its charter, and could furnish with the proper equipment, it was decided that the company should install a mechanical filtration plant. Owing to the arrangement of the water system and the limited space available at the pumping station, some rather unusual conditions had to be met. The contract was made in May with the Pittsburg Filter Manufacturing Company, of Pittsburg, and the plant was designed by it, in conjunction with the engineers of the water company, and is now under construction. The plant is designed for an ultimate capacity of 20,000,000 gallons per day. The filter beds at present being installed, when fully equipped, will give a capacity of 12,500,000 gallons; only a 10,000,000 gallon equipment is being placed, however, at the present time.

The company has a reservoir at present holding about 16,000,000 gallons, from which the distribution to the system is made. This reservoir is some 450 feet above the pumping station. Owing to the fact that it is undesired to lose any of the available head, it became necessary to design the plant so as to utilize the present reservoir as a clear-water receiving basin; this necessitated the building of the filter plant practically all above ground. In general, the plant consists of two reinforced concrete sedimentation basins, each 150 feet long, 65 feet in width and 22½ feet in depth, each holding something in excess of 1,500,000 gallons. These reservoirs are uncovered and surrounded by vertical walls of heavily reinforced concrete 15 inches in width at the top and 30 inches at the bottom and 17 feet in width of base. As it is necessary for the flow of water to be at a sufficient elevation above the flow line of the present reservoir to provide for the filter operating head, the question of foundation would ordinarily have been one of considerable expense; fortunately, however, the top of the hill on which it is located is composed of shale, and after the surface removal of two or three feet of earth there was formed a most excellent and solid foundation.

The water is pumped direct from the pumping station into the end of each basin, being controlled by a valve to each, and a connection is made to the inlet to the present reservoir, so that the raw water from the pumping station may be supplied to either or both of the sedimentation basins or by-passed through the reservoir, and may also be by-passed directly to the system. Water is distributed across the end of the basin through vertical risers, and will flow horizontally to the opposite end of the basin, passing under a baffle located about in the centre of the basin, and being gathered at the opposite end into a concrete overflow conduit which discharges into a central chamber, from which point it is carried through a 36-inch cast-iron conduit into the filter house and distributed to the filters. The basins are provided with an open overflow 12 inches below the top of the wall, the bottom being sloped with about an 8 per cent. slope to a central sump, from which a valve discharges into a 20-inch washout pipe in the bottom of each basin. The floors of the basins are covered with 10 inches of concrete reinforced with triangular mesh reinforcement, and the walls on the outside are banked up to within three feet of the top all around.

The main filter building consists of a T-shape brick structure 140 feet long and 40 feet wide for the length covering the filters, which are partially covered with flat concrete covers, and 66 feet long over the portion covering the operating-room, machinery and laboratory. This building is one storey in height over the filters; the T-head is two stories above the filter, and has a basement floor on the level of the pipe gallery floor. The building is of buff-colored brick, covered with a Spanish tile roof, the interior finish being of natural wood. The office and laboratory will have metal ceiling and be lined with white glazed tile. The basement floor and all other floors are of concrete, and in this basement is installed the pumping machinery, heating plant and light apparatus. The first floor contains the concrete solution tanks, with concrete orifice tanks for operating them, the office, general reception-room and laboratory. The third floor is to be used as a storage-room for the coagulants, and dissolving tanks are also located here. Communication is had between the three floors by a circular iron stairway. The lower gallery floor is on the level of the ground on the outside of the building, a double door on one end, and the arrangement of the piping in the gallery gives a clear passage from this doorway through the gallery into the basement. The arrangement of the gallery is such that there is a clear space three or four feet wide and high enough for a man to walk through it without meeting obstructions.

The filter equipment is of the contractor's usual general standard type, using a separate water and air manifold system. The water manifold is entirely of cast-iron, with cast-iron laterals and bronze screens; the air manifold is of perforated brass tubing, above which are 8 inches of gravel and 36 inches of sand. The troughs are cast-iron, diamond-shape troughs, so arranged that the flow of water to them does not exceed a travel of 3½ feet, and are designed to carry away not less than ten gallons of water per square foot of area from the bed. The controllers are the closed type, arranged so that the rate of flow can be adjusted from the operating floor, similar to those in use at Lorain, Ohio, and McKeesport, Pa. The valves are all hydraulically operated, and furnished by the Rennselaer Manufacturing Company, and are controlled from marble operating tables, with polished brass trimmings. On the operating table will be located the loss of head gauges. The type of gauge used at this plant will be entirely new in design. It will be of the recording type, with a rectangular chart of convenient form for binding; it will be arranged with double recording pens, one of which will record the actual water level on the filters, the other one recording the loss of head in the effluent, thus giving at a glance the absolute loss of head in each filter, irrespective of any variation in the water level of the filter itself. The purified water is discharged through the controllers into a concrete conduit below the gallery floor, from which it flows to the present reservoir by gravity.

On account of the isolated position of the plant the power conditions were a matter of considerable study. It was not desired to build an independent power station at this point, as it would necessitate hauling all fuel for three miles up a very steep hill, and in winter time over exceedingly bad roads. The conditions at the filter plant require a maximum of power in use a few minutes at a time periodically. After considerable study, it was determined to place a generating plant in the pumping station, about a mile distant, and deliver current over a transmission line to the filters to operate the wash pump, blowers and other power requirements; and in order to secure the most economical electrical installation it was determined to distribute the use of power over a considerable period of time. To do this necessitated the storage of both water and air, and to do this economically required the storage to be at a pressure or elevation practically the same as that of the larger machinery used in direct application. It was finally determined to employ a storage tank of considerable area for water, so that the pumping head would be very little, if any, above that required in washing the filters by direct pumping.