SOME OBSERVATIONS AND EXPERIENCES IN THE OPERATION OF COAGULATING BASINS*

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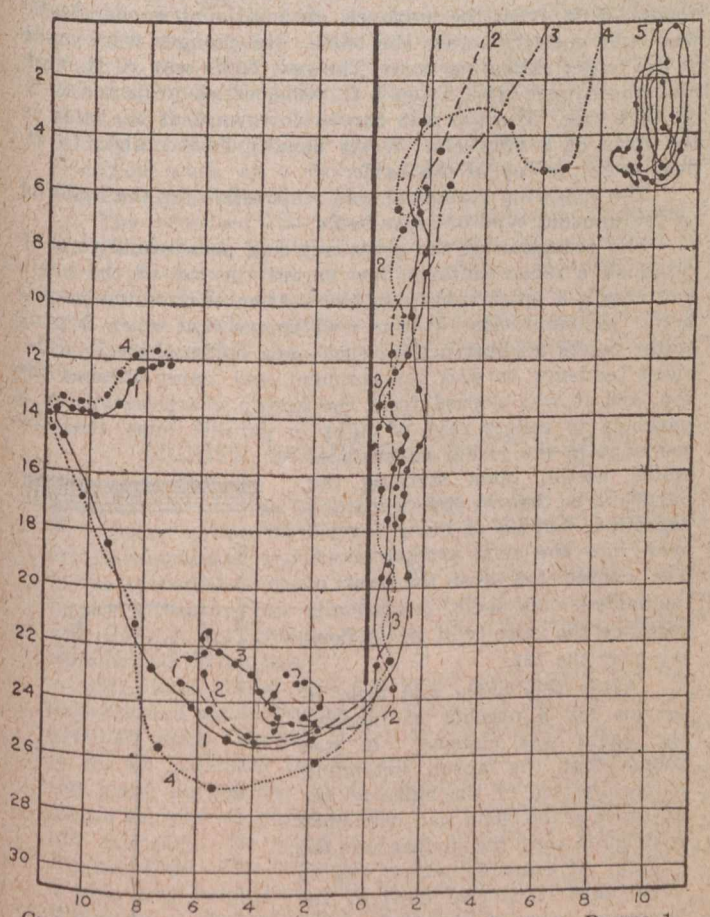
THE two coagulating basins of the Montebello filters of the Baltimore water works are each 317 feet long, 232 feet wide and have an average depth of water of about 15 feet. A central baffle wall extends about three-quarters of the length of each basin. Water is admitted through five sluice gates, spaced at equal intervals, and, after passing around the baffle, is withdrawn through a similar number of gates. The water passes over a baffle at the entrance and over a skimming weir at the exit. It was the hope of the designer that the water would move with reasonable uniformity through the basins, but this has not been realized.

In the course of operation it was noticed that the movement of water through each of the two coagulating basins was different, although they were operated in parallel and apparently under the same conditions. It was also noticed that the water, while following characteristic lines in each basin, seemed to vary from time to time.

In order to learn something more definite regarding the exact movement of the water and its effect on the efficiency of the basins, a series of sixteen different current measurements was made. For making the observation, six identical

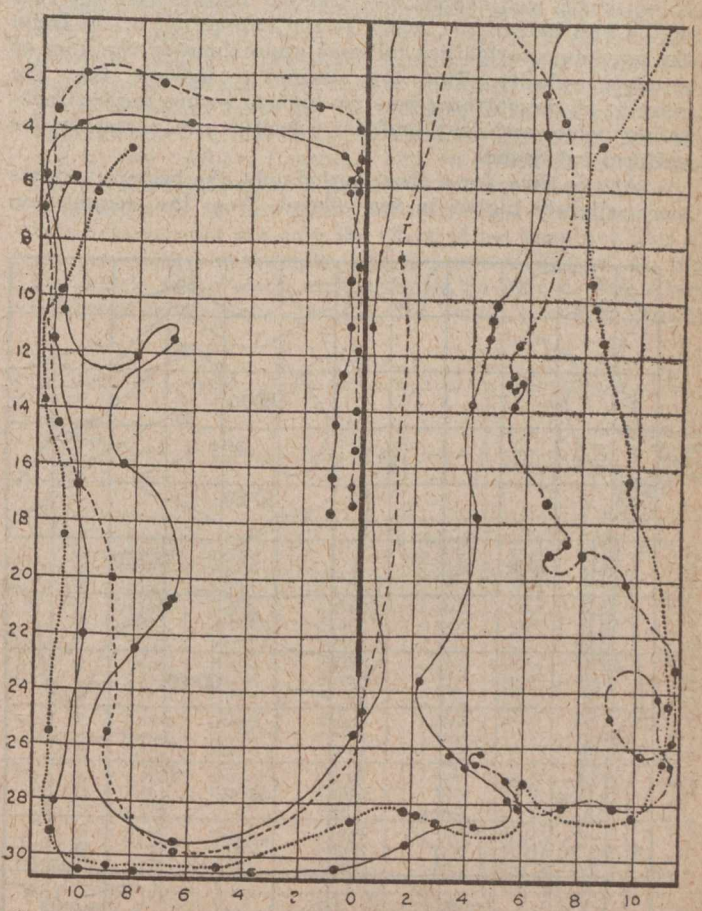


Current Measurements with Surface Floats, Basin 1

Readings of floats taken every five minutes; Venturi rate of flow, 123 m.g.d.; August 21st, 1917.

aluminum floats were used. Each float was cross-shaped in plan, and was composed of four sheets of aluminum, each 6 by 12 ins., inserted in a pine strip. The floats were just heavy enough to half submerge a large cork, to which a number was pinned. The portions of the floats exposed to the wind were very small, and, as the observations were not made on windy days, it is believed that their movements indicate the currents through the basin with reasonable accuracy. Most of the observations were made with the floats submerged just below the surface or 4 ft. below.

The floats were started at the entrance of the basin, and readings were taken, locating their position, every six minutes. The floats in the main channel, both surface and at the 4-ft. depth, generally moved forward at relatively high velocities, while those along the outer edges of the basin



Current Measurements with Surface Floats, Basin 2

Readings of floats taken every five minutes except first reading on each float, which had six minutes interval; Venturi rate of flow, 128 m.g.d.; August 14, 1917

moved in very erratic ways, sometimes getting caught in eddies in the corners and staying there for hours. Basin 1 usually showed an eddy at the entrance in the north-west corner, probably due in part to a slight difference in the alignment of the baffle. Basin 2 showed no eddies at the entrance, but both basins showed eddies in the far corners and usually along the outlet side of the baffle wall.

On August 14th, 1917, surface floats were used for making current measurements in Basin 1. The velocity of the floats varied considerably. Some of them moved *forward* at rates as high as 32 ft. per minute. On the outlet side of the baffle, two of them were carried *backward*, adjacent to the baffle, for three-quarters of its length. On August 18th, 1917, the basin was cleaned, and on August 21st other surface float measurements were made. On this occasion the floats moved along entirely different lines. One of them circled around in the north-west corner, the other four moved slowly along the baffle wall at velocities of from 2 to 12 ft. per minute, and on the outlet side of the baffle showed no decided forward movement.

The greater velocity and more uniform movement of floats on August 14th was due to the fact that mud had filled the lower part of the basin, necessitating higher surface velocities. Most of the float measurements showed that higher velocities were obtained near the baffle wall on the incoming side and the outer wall on the outgoing side. A survey of the mud surface just before cleaning showed that the heaviest

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