

devices. The standard that the writer set for himself in the beginning was an accuracy of 1 in 1,000.

The length of the weir crest was obtained by the use of two $\frac{1}{4}$ in. square rods which were arranged to slide upon each other in the manner of inside calipers. They were placed in the canal and adjusted until the points were in contact with the sides of the canal and then removed and the distance between points ascertained with a brass scale graduated to .01 ft. It was necessary to estimate .001 ft., but this can be done with a fair degree of accuracy, and an error of even .002 would mean only 1 in 1,000, inasmuch as the crest was something over 2.00 ft. long.

The zero readings of the float gauges were determined in the following manner: A hook gauge was clamped to the bulkhead, to which the weir plate was attached, by means of an ordinary carpenter's clamp. The point of the hook was carefully brought to the level of the crest by means of a small pocket level and the hook gauge slow-motion screw; one end of the level, which was about 6 ins. long, resting upon the crest and the other end upon the point of the hook. The distance below the crest of the surface of the water in the approach channel was determined by lowering the hook and adjusting the point to coincide with the surface in the usual manner. Simultaneously the readings of the float gauges were observed. By adding the distance (from the surface of the water to the crest level) to the float gauge readings, the zero reading was obtained. In this operation care was exercised to have the surface of the water in the approach channel not more than 0.2 ft. below the level of the crest, and to maintain the surface at a fairly constant level. Because of leakage from the flume it was necessary to keep a small stream of water running into it to equalize the loss. These precautions were necessary to obviate error. In the first case, if the distance moved through by the hook gauge

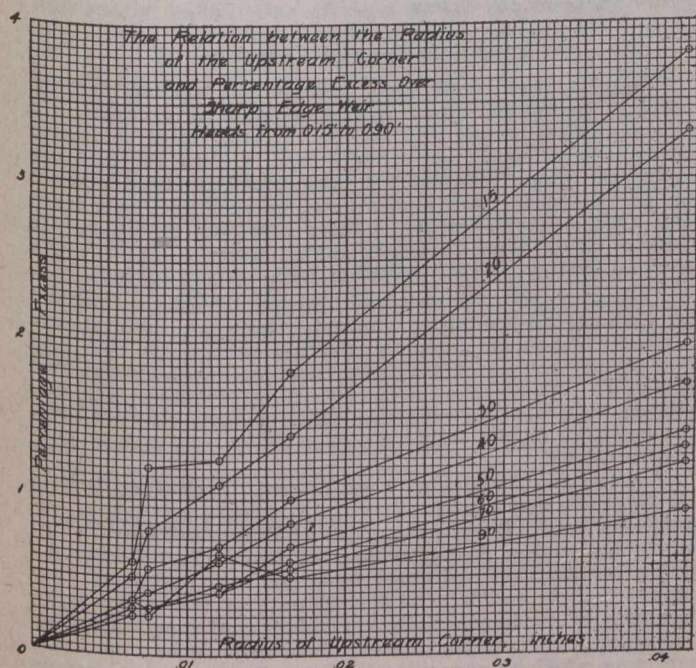


Fig. No. 2.—Relation Between Radius of Upstream Corner and Percentage Excess Over Sharp Edge Weir

from the crest level to the water surface were great, some error might be introduced due to a failure to make the hook gauge plumb. In the second case, if the surface of the water should be falling rapidly, unless the readings of the hook gauge and the float gauge were simultaneous an error would be introduced.

The weir discharge measurements were made with iron tank No. 2, and with the 400 cu. ft. concrete tank. In either case the discharge measurements are believed to be accurate to well within 1 in 1,000.

The head observations for the weir experiments were made with the float gauges.

The operating conditions were for the most part very steady. For the weir experiments the flow was steady up

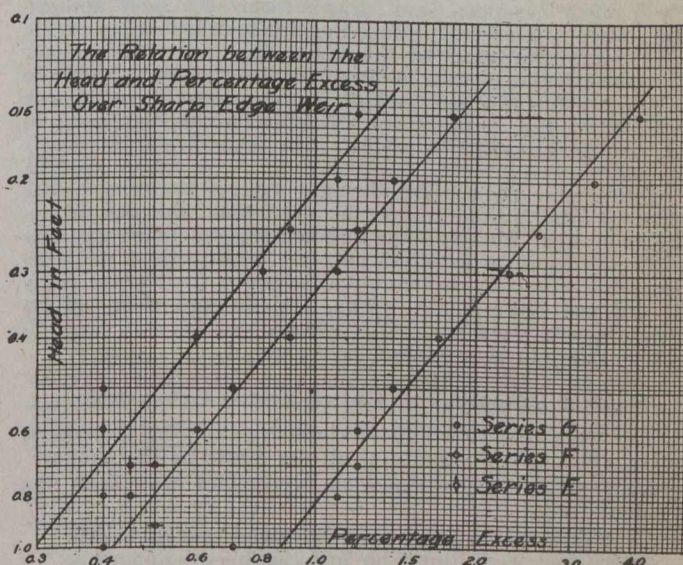


Fig. No. 3.—Relation Between the Head and Percentage Excess Over Sharp Edge Weir

to a head of 0.5 ft. Above this head the following range of gauge readings are representative:—

Mean observed head, in feet.	Range of readings, in feet	
	From	To
0.6015	0.6005	0.6035
0.6981	0.6965	0.7005
0.8003	0.7980	0.8030
0.8979	0.8955	0.9025
1.0010	0.9975	1.0055
1.0985	1.0955	1.1045
1.3542	1.3515	1.3590

A raft of 2-in. x 10-in. plank 5.0 ft. long was placed in the approach channel just below the fence. This served to still the surface and eliminate standing waves. The head gauge was under constant observation during a run in both the orifice and weir experiments, and the mean observed head is the average of a large number of readings.

In the weir experiments the discharge measurements were reduced to cubic feet per second per foot of weir length.

The weir was rounded without removing it from the channel. For series B the edge was rubbed once across, with a piece of fine emery paper tacked on a board, under pressure of two or three pounds. For series C it was gone over twice more. The rounding for series D and E was accomplished in much the same manner except that a pad of felt was tacked on the board and covered with fine emery cloth, the result being that when the weir was rubbed with this, it being somewhat yielding, produced more of a real rounding, rather than an octagonal effect. For series F and G the edge was rubbed across twice with a fine file and then smoothed with the emery pad. For each series care was exercised to rub all parts of the edge

(Concluded on page 42, Construction News Section)