was 2/3 (H + u^2 2g) where H is the head at crest and u is velocity of approach, and the velocity at the edge is $g^{1/2}$ $y^{1/2}$. The energy generated with increase in velocity over the weir was not entirely lost if water rose in smooth curve downstream of the weir to the water level upstream. Loss of energy however, was considerable with formation of a standing wave. Gradual expansion below the exit ends of siphons, culverts and bridges can be very helpful in recovery of head.

The experiments on broad crested weir led to folloing conclusions :

(i) when the standing wave forms clear of downsteam edge of crest the depth of flow at the edge is given by relation 2/3(H + U^2/2g) and the discharge over the crest is maximum for a given upstream water level.

(ii) with depth of flow equal to 2/3 (H + U^2/2g) at the downstream edge of crest, the water surface after depression over the crest rises in smooth curve to the upstream water level.

(iii) there will be no afflux if the depth at the downstream edge of the crest is slightly more than 2/3 (H + U^2/2g).

When conditions of no afflux begin the critical depth at downstream edge of crest is given by equation :

$$y = c \times 2/3\,(H + U^2/2g) \qquad (1)$$

the value of c is 1.06 and remains constant except for very low velocity at crest such as 1.5 ft./sec for which value of x approaches 1.20. The maximum height x of weir which causes no afflux for given depth and velocity in a stream can be determined from the equation:

$$x = D\,(U^2 / 2g) = k.\,q^{2/3} \qquad (2)$$

where D is natural depth for given discharge in a stream perior to construction of weir, x is the maximum height of weir over the bed, u is velocity of approach and k is a coefficient. For c equal to 1.06, 1.10. 1.20 the corresponding values of k are 0.473, 0.476, and 0.495.

If height of a weir is more than that given by eq. 2, height of afflux above the weir crest is obtained by equation :

$$H^3 + H^2\,(2x\text{-}3/2.q1^2\,/g^{1/3}\,\} + Hx\{x\text{-}3q1^2/g^{1/3}\,\}\text{-}2/3.x^2.q1^2/g^{1/3} + q^2/2g = 0 \qquad (3)$$