failed to detect any difference in the rates in the two cases, and the subsequent measurements were carried out in air.

Effect of the Concentrations of Bromate, Iodide and Acid on the Rate

By comparing Table I with II, III and IV respectively it is readily seen that the velocity of the reaction is proportional to the first power of the concentrations of the bromate and iodide and to the second power of that of the acid, as represented by the equation:

$$\frac{1}{V}\cdot\frac{dx}{dt} = \frac{(A-x)}{V}\,\frac{(B-x)}{V}\,\frac{(C-x)^2}{V^2} \qquad (1)$$

This conclusion is confirmed by the constancy of K in the tables as calculated from the integrated form of the above equation:—

$$\frac{KABC^2t}{V^3} = x' = x + \frac{1}{2}\left(\frac{1}{A} + \frac{1}{B} + \frac{2}{C}\right)x^2 + \frac{1}{3}\left(\frac{1}{A} + \frac{1}{B} + \frac{3}{C} + \frac{1}{AB} + \frac{2}{AC} + \frac{2}{BC}\right)x^3 \qquad (2)$$

In the tables I have used the symbol x' for the quotient $KABC^2t/V^3$, because it gives the amount of iodine that would be liberated in t minutes if the solution retained its original composition throughout the experiment. The amount of iodine actually liberated, x, is naturally less than x', because of the decrease in concentration of the reagents as the reaction proceeds.

In calculating K the values of A, B and C denoting respectively the initial quantities of $KBrO_3$, KI and HCl have been expressed in the same units as x (see p. 683); thus $A = 6KBrO_3$, $B = 2/3KI$, $C = HCl$, according to the equation:

$$KBrO_3 + 9KI + 6HCl = 3KI_3 + KBr + 6KCl + 3H_2O.$$

For instance in the experiments of Table I, A = 123, B = 65.78, C = 95.15.

In each table the constant increases slightly as the reaction proceeds; no importance can be attached to this fact, however, as a change of from 0.05 to 0.1 cc of the hundredth-normal arsenite used in the analysis would account for the increase.