action of the third order; Noyes[17] showed by a recalculation based on method three, that under some circumstances, at least, it is of the first. Mr. Forster,[18] who subjected the reaction to a "systematic exploration," showed it had no "order" at all; that the effect of increasing the concentration of the potash was first to increase and then to decrease the rate. The relations found by Forster had not been guessed by his predecessors, and, consequently, were not revealed by their method of working.

The last reactions of which I shall speak, are the reactions grouped under the common name "induction." Here, two reactions take place in the solution at once, and the rates of each are affected by the concentrations of four or more chemicals.[19] The experimental study of complicated cases like these is, to put it shortly, absolutely impossible by any method other than that which I have called "systematic exploration." Guess and Try is no good; not that one can't guess—some people, I don't know whether any chemists among them, are able to guess the result of a horse race, or of a flurry in stocks—but the "trying" needs the systematic procedure.

Manchot,[20] Schilow, and Luther[21] guessed at the mechanism of the induction by iron of the reaction between chromic acid and hydrogen iodide. Miss Benson's experiments[22] showed that they guessed wrong; and a long series of experiments by Mr. DeLury[23] on the induction of the same reaction by arsenious acid, furnish the first proven case of induction according to the peroxide formula. No other cases of induction have been studied from this point of view; and no others can be, except by this method.

Working with this tool of Harcourt's, we have been able to sharpen it a little, and extend its usefulness. Without going into details, it was obviously only a short step to pass to the "method of constant rates,"[24] in which all the concentrations, and rates as well, are kept constant during the experiments.

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[17] Zeit. phys. Chem., *18*, 129 (1895).
[18] Jour. Phys. Chem., 7, 640 (1903).
[19] Jour. Phys. Chem., *11*, 9 (1907).
[20] Liebig's Annalen, 325, 95 (1902).
[21] Zeit. phys. Chem., *46*, 777 (1903).
[22] Jour. Phys. Chem., 7, 356 (1903).
[23] Jour. Phys. Chem., *11*, 54 (1907).
[24] Jour. Phys. Chem., 7, 92 (1903).