

per cent. sulphuric acid and a few drops of manganese sulphate solution were added, and after two minutes, by which time the oxidation to phthalic acid was complete, the solution of potassium iodide and sulphuric acid was added and the iodine determined. Since the oxidizing power of the permanganate is 1.66 times greater in acid solution than in alkaline solution, the permanganate used in oxidizing the solution to phthalic acid was multiplied by 1.66 so that the amounts of permanganate would be in proportion to their oxidizing value.

	I	II
Permanganate reduced in alkaline solution		
Permanganate reduced in acid solution	4.65	4.75

This shows conclusively that the oxidation is as represented above in B and that the reaction in alkaline solution proceeds to phthalonic acid, but it is still possible that there is a rapid oxidation to the diketo acid and then a slower oxidation to phthalonic acid.

Some experiments were made to determine the constituents of the solution at various stages of the oxidation by adding small amounts of permanganate to the quinone solution, allowing the reaction to proceed till all the permanganate was reduced, acidifying the solution and ethering out. As the residual quinone is so much more insoluble in water than the products of the reaction, the residue obtained by the evaporation of the ether contained little else than quinone.

A = initial weight of quinone in the solution.

B = cc. permanganate used to 50 cc. quinone solution

C = weight of residue from ether.

D = weight of quinone which would be left if oxidation were direct to phthalonic acid.

E = weight of quinone which would be left if oxidation were to diketo acid.

A Gram.	B cc.	C, Gram.	D Gram	E, Gram
0.0226	1	0.0209	0.0210	0.0206
0.0226	6	0.0126	0.0131	0.0108
0.0226	8	0.0110	0.0100	0.0068
0.0226	10	0.0087	0.0069	0.0023

The results given in this table are not very good because the method was inaccurate but they confirm the conclusion arrived at from the previous experiments that there is no intermediate stage in the oxidation of β -naphthoquinone to phthalonic acid in alkaline solution. A series of experiments, in which the rate of oxidation of the quinone in alkaline solution was determined, also gave no indication of the existence of an intermediate product.

Further experiments to prepare the diketo acid by the saponification of phthalyl cyanide are now being carried out.

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