

was then isolated by neutralizing with sodium carbonate, acidifying with hydrochloric acid, evaporating to dryness on the water bath, extracting with absolute alcohol and evaporating the alcoholic extract to dryness; the residue was then dissolved in a little water and filtered. The solution so obtained was acidified with dilute sulphuric acid, and decinormal permanganate was added, in every case the color was discharged, a reaction characteristic of phthalonic acid and serving to distinguish it from phthalic, homophthalic and phthalid-carbonic acids.

Phthalonic acid is thus an isolable product of the oxidation of all six substances studied; similar experiments showed that it is formed by the oxidation of α -naphthoquinone; hitherto it has been known as a product of oxidation of naphthalene¹ and of α -naphthol² only.

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β -Naphthoquinone

A glance at Table I shows that the number entered under k opposite β -naphthoquinone is the smallest in the column. In other words, 0.0001 gram of the quinone is oxidized to phthalonic acid in less time than it would take to oxidize any of the hypothetical intermediate oxidation products of Series B (page 121), even if they had been present in full concentration and had the chromic acid all to themselves.

This shows conclusively that neither orthocarboxy-cinnamic, ortho-carboxy-phenylglyceric, phthalyl-lactic, homophthalic, nor phthalid-carbonic acid can be formed in the course of the oxidation of β -naphthoquinone to phthalic acid, and, as has been pointed out in the introduction, positive evidence of this nature can be obtained in no other way. That phthalonic acid is an intermediate product is shown by the permanganate test described above.

The measurements with α -carboxy-phenylglyceric acid

¹ *Ischniae*, Ber. chem. Ges., Berlin, 31, 130 (1898) Gräbe and Franke. *Ibid.*, 31, 360 (1898).

² *Henrique*, *Ibid.*, 21, 767 (1888).