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FRIEDEL AND CRAFTS' REACTION—NITRO-PHTHALIC ANHY-DRIDES AND ACETYLAMINO-PHTHALIC ANHYDRIDES WITH BENZENE AND ALUMINUM CHLORIDE.

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In Freidel and Crafts'¹ synthesis of *o*-benzoylbenzoic acid, phthalic inhydride is heated with benzene and aluminum chloride. This reaction has been studied quantitatively by Rubidge and Qua,² who state the conditions under which a 97% yield may be obtained and also the conditions which give a good yield of diplienyl-phthalide.

The object of the present research was to study this reaction when the 2 nitro-phthalic anhydrides and the 2 acetylamino-phthalic anhydrides were used. When a substituted phthalic anhydride is treated with benzene and aluminum chloride 2 acids and 2 derivatives of diphenyl-phthalide are possible. For example,



In most of the reactions studied the yields of the acids were poor, and in only one case was any attempt made to alter the conditions of the experiment in order to obtain the derivatives of diphenyl-phthalide.

The literature on this subject is confined to 2 papers by Rainer.⁴ From t-nitro-phthalic anhydride, this investigator obtained 2-benzoyl-4-nitrobenzoic acid identical with that obtained by Kliegl⁴ from phenyl-nitroluoren and 6-benzoyl-3-nitrobenzoic acid, m. p. 212°. Rainer also decribes the reduction of the latter acid to 6-benzoyl-3-aminobenzoic acid, n. p. 193-4°. The products obtained separately by Rainer and Kliegl are identical with those obtained by the author from 4-acetylaminobhthalic anhydride.

In this work, the acetylamino-phthalic anhydrides were used instead

- ¹ Ann. chim. phys., [6] 14, 446 (1888).
- ² Rubidge and Qua, THIS JOURNAL, 36, 732 (1914).
- ⁸ Rainer, Monatsh., 29, 178; 29, 431 (1908).
- 4 Kliegl, Ber., 38, 294 (1905).