

Reductive Cyclisation of Nitro-compounds by Triethyl Phosphite: New Syntheses of Phenothiazines and Anthranils

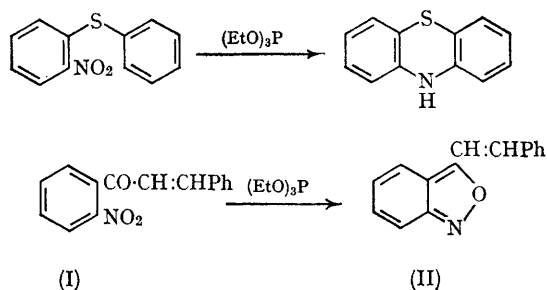
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EARLIER Papers¹ have indicated the wide synthetic possibilities inherent in the reduction of nitro-compounds by triethyl phosphite. Thus, 2-nitro-biaryls, -azobenzenes, -benzylideneanilines, and -stilbene give good yields of the corresponding carbazoles, benzotriazoles, indazoles, and indole, this syntheses of indoles being recently extended by Sundberg.²

Extension of this cyclisation reaction to give the phenothiazine and anthranil ring systems is now reported. Thus, 2-nitrophenyl phenyl sulphide (1 mol.) and triethyl phosphite (4 mol.) after 12 hr. under nitrogen at the boiling point gave phenothiazine (m.p. and mixed m.p. 183—185°; 54%) and *N*-ethylphenothiazine (m.p. and mixed m.p. 103°; 2%), formed by ethylation of the initially-formed phenothiazine. Similar cyclisations occurred with 4-*t*-butylphenyl 2-nitrophenyl sulphide, 4-*t*-butylphenyl 4-ethoxycarbonyl-2-nitrophenyl sulphide, and 4-methyl-2-nitrophenyl phenyl sulphide.

Synthesis of anthranils is exemplified by conversion of 2'-nitrochalcone (I) into 3-styryl-anthranil (II) (54%) and of 2-nitrobenzophenone into 3-phenylanthranil (58%).*



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* Dr. A. J. Boulton (East Anglia) has informed us that he, also, has synthesised anthranils by this route.

¹ J. I. G. Cadogan, M. Cameron-Wood, R. K. Mackie, and R. J. G. Searle, *J. Chem. Soc.*, 1965, 4831.

² R. J. Sundberg, *J. Org. Chem.*, 1965, **30**, 3604.