XL.—*On the Action of Nitrosyl Chloride on Organic Bodies.*—Part I.
On Phenol.

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NITROSYL chloride appears to act upon organic bodies in several different ways. In some instances it replaces hydrogen by NO, producing nitroso-compounds. At present indications of this mode of action have been obtained only in the case of one body, acetanilide, but probably other secondary derivatives of ammonia, containing either positive or negative radicles, would give a similar result, and I hope shortly to bring under the notice of the Society experiments in this direction.

In other cases nitrosyl chloride effects the substitution of chlorine

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for hydrogen, with liberation of nitric oxide, but its more general action is that of an oxidising agent.

The object of the present note is to record a somewhat remarkable reaction which occurs when this body acts upon phenol. In this case it appears to oxidise the phenol to quinone, which is then converted into chlorinated quinones, the nitrosyl chloride itself suffering reduction, not merely to nitric oxide or nitrogen, but being actually converted in great part into ammonium chloride.

When dry nitrosyl chloride, NOCl , is passed into pure phenol, much heat is developed, and the product is a semi-solid, black, pitchy substance. The phenol to be employed was therefore dissolved in about twice its weight of glacial acetic acid, which was not found to be appreciably affected, and the mixture was kept cool. The action of nitrosyl chloride gas produces a deep purple coloration, which afterwards changes to red, and ultimately to reddish-brown, whilst a considerable quantity of crystalline matter is deposited. Throughout the operation nitric oxide, hydrochloric acid, carbon dioxide, and probably nitrogen gases are abundantly evolved, and at different stages of the process, quinone, and a red substance having the properties of phenoquinone, can be detected by distilling the product with water. The crystalline deposit, filtered off and purified by recrystallisation and sublimation, turned out to be chloranil, probably containing a small quantity of one of the less chlorinated quinones. It was easily recognised by its crystalline form, and by estimation of chlorine. $\cdot 2876$ gave $\cdot 6572$ gram of silver chloride, corresponding with 56.5 per cent. of chlorine. Chloranil contains 57.7 per cent.

The liquid filtered from the chloranil gave, on addition of water, a copious, earthy, brown precipitate, which contained chloranil, together with a considerable quantity of a black amorphous substance. The latter is almost insoluble in benzene, but dissolves readily in alkalis, and is reprecipitated by acids. When heated it gives off a few drops of a brown oil, and leaves a bulky residue of carbon. It contains nitrogen. The aqueous liquid holds in solution ammonium chloride, which was identified by its crystalline form, and by all the usual qualitative tests. Probably in the later stages of the experiment much of it is destroyed by the nitrosyl chloride; but even when excess of that substance has been employed, a sufficient quantity remains to admit of its being collected and purified by recrystallisation and sublimation.