



## LXIII. On the action of oxalic acid upon chloride of sodium

Mr. Arthur Thorold Wood

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belong to the inductive action of currents of electricity described in the first section of the first series of my Experimental Researches. I have investigated them to a considerable extent, and find they lead to some exceedingly remarkable and novel consequences. I have still some points to verify, and shall then think it my duty to lay them (in continuation of my first paper) before the Royal Society.

I am, my dear Sir, very truly yours,

Royal Institution, Nov. 20, 1834.

MICHAEL FARADAY.

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LXIII. *On the Action of Oxalic Acid upon Chloride of Sodium.* By Mr. ARTHUR THOROLD WOOD.\*

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IT is not generally known that the decomposition of chloride of sodium may be readily effected by the action of oxalic acid; indeed, it is presumed that the fact is altogether new, as our best chemical authors make no mention of it.

That such decomposition does take place may be proved by several simple experiments: for example, if chloride of sodium and oxalic acid be distilled with water in a retort, muriatic acid will pass over; and when its production ceases, upon allowing the contents of the retort to cool, a salt having the characters of oxalate of soda will crystallize, mixed to a certain extent with chloride of sodium according to the proportions of the materials employed.

As the muriatic acid in this experiment is very dilute, and as oxalic acid cannot exist in the free state without a certain proportion of water, the fact of the decomposition of chloride of sodium may be more satisfactorily proved by taking oxalic acid in crystals, and fused chloride of sodium, reducing them to fine powder, and heating them in a glass tube containing a slip of litmus paper, when muriatic acid will be instantly and copiously evolved, and the litmus paper, of course, reddened. When the evolution of the muriatic acid gas ceases, the dry contents of the tube may be transferred to a piece of platinum foil, and intensely heated before the blow-pipe flame; the oxalate of soda will decompose, and carbonate of soda will remain in sufficient quantity to restore the blue of the reddened litmus paper when wetted with water, or to change the yellow of turmeric paper to brown.

If it be merely required to show that alkali is evolved from chloride of sodium by the oxalic acid, it may be done simply by heating the two, folded in a bit of platinum, for a minute or so before the blow-pipe flame, then adding a drop of water and applying the usual test papers.

\* Communicated by the Author.

These experiments have not as yet been performed with minute attention as to the proportions of the acting bodies, although such investigation is contemplated; but it is concluded, that the chlorine of the chloride of sodium obtains hydrogen from the water of the oxalic acid to evolve muriatic acid gas, and that the sodium, obtaining its oxygen from the oxygen of the water, forms soda, which combines with the oxalic acid, forming oxalate of soda, decomposable at a red heat into carbonate of soda.

The chloride of calcium also undergoes decomposition when heated with oxalic acid, evolving muriatic acid gas, and forming oxalate of lime, which upon the further continuance of the heat leaves lime.

These researches will be extended to the other chlorides, with the view of getting new results; in the mean time it is hoped that the facts now stated possess some claim to originality.

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LXIV. *On Subterranean Temperature, as observed at a Depth of Five Hundred Yards below the Level of the Sea, in Latitude 54° 55' North, November 15, 1834. By JOHN PHILLIPS, F.R.S., F.G.S., Professor of Geology in King's College, London.\**

1. **THOUGH**, upon a review of the facts and reasonings concerning the interior temperature of the globe, we may freely admit that below a certain depth from the surface the thermometric heat becomes continually greater as we descend, so many sources of embarrassment occur in the prosecution of experiments, that it is by no means an unreasonable scepticism to doubt, whether the law of the augmentation of heat in proportion to the depth is even approximately known. Those who, from local and practical experience, are the best enabled to judge of the corrections required for the effects of respiration, light, friction, and chemical action, on the one hand, and of the ventilating air on the other, must allow that the interference of these causes of error, though less considerable than is sometimes imagined, is of serious consequence in so delicate an inquiry.

2. Immediately after leaving Edinburgh, in October, I was at Newcastle for a week, and was informed by Mr. Hutton, of

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\* Communicated by the Author: in the Phil. Mag. first series, for 1823, vol. lxi. p. 347, 436, and vol. lxii. p. 38, 94, will be found a review, drawn up by Mr. Brayley, Jun., of the experiments on Subterranean Temperature which had then recently been made in the Mines of Cornwall and the North of England, exhibited in a tabular form. See also vol. lxvii. p. 302, and Phil. Mag. and Annals, N.S. vol. ix. p. 94.