

performed many times in succession on the same specimen with the same results.

Professor Clerk-Maxwell informs me that similar results are to be obtained with gutta-percha, drawn out when *cooled*, after being boiled in water.

The subject is especially interesting as an exaggerated example of the *Elastische Nachwirkung*, which has recently been discussed at great length by Boltzmann and others.

The following Gentlemen were duly elected Fellows of the Society :—

J. B. BROWN MORRISON, of Finnerlie and Murie, Perthshire.

ANDREW WILSON, Ph.D., 118 Gilmore Place.

JAMES LAMBERT BAILEY, Ardrossan.

ROBERT COX, Gorgie, Murrayfield.

JOHN HISLOP, Sec. to the Dep. of Education, New Zealand.

JAMES COSSAR EWART, M.D., 12 Alva Street.

GEORGE WM. BALFOUR, M.D., 17 Walker Street.

Monday, 20th January 1879.

DAVID STEVENSON, Mem. In. C.E., Vice-President,
in the Chair.

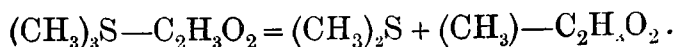
The following Communications were read :—

1. On the Action of Heat on the Salts of Trimethylsulphine. No. III. By Professor Crum Brown and J. Adrian Blaikie, B.Sc.

I. *Acetate of Trimethyl-Sulphine.*

The acetate is formed by treating the iodide of trimethylsulphine with acetate of silver. On leaving the strong solution over sulphuric acid *in vacuo* for three weeks no crystallisation took place. The syrup on being heated in a small retort gave off water, and, without solidifying, sulphide of methyl, mixed with acetate of methyl. On redistilling the two latter, they went over at a temperature between 45°

and 56° C. It was not possible to separate them by distillation, but on shaking the mixture with solution of chloride of mercury, the sulphide of methyl was removed, leaving a few drops of acetate of methyl, easily recognised by its fruity smell.



II. *Benzoate of Trimethyl-sulphine.*

The benzoate is formed by treating the iodide of trimethyl-sulphine with benzoate of silver. The solution of the salt can be evaporated on the water bath to a syrup. On leaving it for about two weeks over sulphuric acid a very few crystals were formed, which could not be separated from the very thick syrup in which they were suspended. By adding alcohol it was obtained more easily in small thin plates. After several days of very cold weather a crust formed over the surface of the aqueous solution.

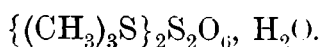
The thick aqueous solution on being heated to 100° C. with a current of dry air passing over it gave off some water, but the salt did not solidify. On continuing to heat at about 110° C., the clear liquid became milky, sulphide of methyl was given off, and a layer of a liquid formed above the heavy aqueous solution. This was collected apart, dried by means of chloride of calcium, and gave as its boiling point 198° C., that of benzoate of methyl. The decomposition is expressed by the following equation :—



III. *Dithionate of Trimethyl-sulphine.*

The dithionate is formed by neutralising an aqueous solution of free dithionic acid with the hydrate of trimethyl-sulphine. On evaporating a solution of the salt on the water bath it begins to crystallise out. On leaving the saturated solution to cool, a large quantity of clear cubical crystals was obtained, not hygroscopic, insoluble in hot alcohol, and, when dry, without any smell of sulphide of methyl.

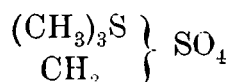
Analysis agrees with the formula



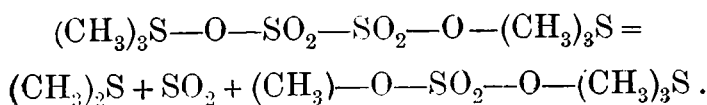
On heating the salt to about 120° C., it loses water, and on raising the temperature to 220° C. sulphurous acid is given off, but at first no sulphide of methyl. After some time, sulphide of methyl begins to come off also, and the substance melts. Heat was applied until the melted substance, which had been perfectly clear, turned slightly brown, and the evolution of gas almost ceased. 8·015 grammes were found to have lost 3·325 grammes = 41·4 per cent. The loss of one molecule of water, one of sulphurous acid, and one of sulphide of methyl, corresponds to 43·3 per cent.

On cooling, the liquid solidified. The crystalline mass was very hygroscopic, and dissolved in alcohol. On adding ether, the salt was precipitated as a strong aqueous solution, which, on standing over sulphuric acid, yielded beautiful long fine prismatic needles. These were separated as well as possible from the mother liquid, by pressing between filter paper, and left for several days over sulphuric acid.

Analysis agrees with the formula



and an examination of its properties proved it to be the methyl sulphate of trimethyl-sulphine.



2. Experimental Determination of the E. M. F. of the Gramme Magneto-Electric Machine at different Speeds. By Professor Tait.

3. On the Law of Cooling of Bars. By Professor Tait.

[Part of this paper appears in the *Transactions* for 1877–78, having been inserted (as § 11*) in Professor Tait's paper on *Thermal and Electric Conductivity*.]