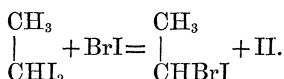


first used for the preparation of chlor-iodide of ethylidene. The iodide was agitated in the cold for some time with a weak solution of bromide of iodine,\* the excess of bromide was separated, and the product was washed with dilute potash. On subjecting this to distillation almost the entire quantity passed over between 130 and 165° C. On fractioning I obtained a large quantity of fluid distilling between 140 and 148°, most between 142 and 144°. The following equation explains the formation of this compound:



On analysing this body I obtained the following results:

	Theory $\text{C}_2\text{H}_4\text{BrI}$ .	Experiment.
Carbon .....	10·21 .....	10·24
Hydrogen.....	1·70 .....	1·82

Brom-iodide of ethylidene is nearly colourless when freshly prepared. It has a sweet taste, and distils without decomposition between 142 and 144° C. This is about 20 degrees lower than the boiling point of its isomer, the brom-iodide of ethylene (163° C.). It refuses to become solid even when surrounded with a mixture of ice and salt, differing in this respect also from its isomer. Heated with alcoholic potash it yielded a volatile vapour containing bromine, probably bromide of vinyl, and iodide of potassium.

This body is probably identical with those obtained by Pfaundler† and by Reboul‡ by exposing bromide of vinyl to the action of hydriodic acid. The boiling points of their compounds agree pretty well with each other and also with mine.

I am at present engaged in studying the behaviour of these compounds towards several reagents.

I have to thank my young pupil, Mr. Harrington, for his valuable assistance during the progress of this research.

VII. "Note on the Specific Gravity of the Vapours of the Chlorides of Thallium and Lead." By HENRY E. ROSCOE, F.R.S., Professor of Chemistry in Owens College, Manchester. Received May 8, 1878.

Experimental difficulties of so serious a nature surround the attempt

\* For the preparation of the bromide of iodine, see Proc. Roy. Soc., No. 149, 1874. It was made a little weaker for this process.

† "Jahresbericht," 1865, p. 483.

‡ *Ibid.*, 1870, p. 439.

to ascertain the specific gravity of vapours at a high temperature that, in spite of the interest which attaches to this subject, but few additions have been made in our knowledge in this direction since the researches of Deville and Troost.

The present experiments, of which this notice contains the first results, have been made with the object of so simplifying the process as to render it easy to determine the specific gravity of the vapours of bodies possessing high boiling-points with a degree of accuracy sufficient for the purpose of controlling their molecular weights.

The method consists in vaporizing the substance under examination in long-necked glazed porcelain globes of known capacity placed in a muffle raised to bright redness. The temperature of the globe is ascertained by a calorimetric determination made with heavy platinum weights placed in the muffle, this determination being checked by the simultaneous insertion in the muffle of a second globe containing mercury.

The porcelain globes having a capacity of about 300 cub. centims., and containing from 3 to 9 grams of substance, are closed by loosely fitting stoppers of baked clay, and then gradually introduced in the muffle. After remaining there until no further escape of vapour is observed, and until the temperature has become constant, the globes are quickly withdrawn from the muffle and their contents removed and analysed, the temperature being in each case ascertained by the calorimetric method at the time of withdrawal of the globe. The following determinations of the specific gravity of mercury vapour serve to show the reliability of the method:

	Temperature determined calorimetrically.	Specific gravity of mercury vapour.
Experiment I. ....	1019°	6·92
„ II. ....	894°	6·75
„ III. ....	815°	6·91
„ IV. ....	972°	5·77
„ V. ....	1047°	7·05

the calculated specific gravity (Hg=198·8) being 6·728.

Before determining the specific gravity of the vapour of thallium chloride it was ascertained that this compound does not give off free chlorine when volatilized at a red-heat, and that the sublimate contains thallium and chlorine in the atomic ratio of equality.

In each experiment the total amount of thallium and of chlorine remaining in the globe was determined by analysis, and the specific gravity calculated from their sum.

	Temperature determined calorimetrically.	Specific gravity of the vapour of thallium chloride.
Experiment I.....	859° .....	8·15
„ II.....	828° .....	8·28
„ III.....	1015° .....	8·06
„ IV.....	859° .....	7·43
„ V.....	1026° .....	8·75
„ VI.....	852° .....	8·60
„ VII.....	837° .....	7·84

The specific gravity of thallium chloride vapour calculated upon the supposition that the molecular weight of the compound is 238·07, and its formula  $TlCl$ , is 8·49.

Four determinations of the specific gravity of mercury vapour made simultaneously with four of the above experiments gave as a mean the number 6·0 instead of 6·728.

The specific gravity of the vapour of lead chloride was made in a similar way, but the temperature required for complete volatilization is much higher than that needed in the case of the last compound. The residue left in the globes was completely soluble in hot water, and contained lead and chlorine in the proportion of one atom of the former to 2·08 of the latter.

	Temperature determined calorimetrically.	Specific gravity of the vapour of lead chloride.
Experiment I.....	1046° .....	9·12
„ II.....	1089° .....	9·72
„ III.....	1077° .....	9·51
„ IV.....	1070° .....	9·64

The specific gravity calculated from the formula  $PbCl_2=277·14$  is 9·62.

I hope before long to be able to lay before the Society the results of specific gravity determinations of the vapours of other compound and elementary bodies, together with the whole of the experimental details.

VIII. “Extract from Report to Professor Sir Wyville Thomson, F.R.S., Director of the Civilian Scientific Staff, on the Brachiopoda dredged by H.M.S. ‘Challenger.’” By THOMAS DAVIDSON, F.R.S. Received May 8, 1878.

At the request of Professor Sir Wyville Thomson, I have undertaken the examination, description, and illustration of the Brachiopoda dredged by the ‘Challenger’ Expedition.

Very little seems to have been known with respect to recent Brachi-