

- IV. "On the General Forms of the Symmetrical Properties of Plane Triangles." By THOMAS DOBSON, Esq., B.A., Head Master of the School-Frigate 'Conway,' Liverpool. Communicated by Capt. E. A. INGLEFIELD. Received December 3, 1861.

(Abstract.)

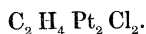
The symmetrical properties of plane triangles have been fully expounded in a series of six papers dated 1835, 1836, 1842, 1843, 1845, and 1848 respectively, in the 'Lady's and Gentleman's Diary,' published annually by the Stationers' Company of London. Either from being the work of different hands, or from the earlier papers having been written before the importance of symmetry in mathematical formulæ was duly appreciated, the series of papers leaves much to be desired as to uniformity of method.

By assuming the usual expressions for the area of a triangle, as in the present paper, with a few other expressions of an equally elementary nature, all the well-known symmetrical properties of plane triangles may be readily deduced, by a little skill in the combination of algebraical symbols, without leaving the plane of the triangle.

But the author has preferred to use a method which is at once general, simple, and uniform. This consists in referring the symmetrical points connected with a triangle to an indefinite plane, and establishing by an elementary process certain general formulæ, each of which can be made to yield several cognate plane properties when different definite positions are assigned to the plane of reference.

- V. "Note on Ethylene-Dichloride of Platinum." By P. GRIESS, Esq., and C. A. MARTINS, Ph.D. Communicated by Dr. HOFMANN. Received December 16, 1861.

About thirty years ago, Zeise obtained, by the action of dichloride of platinum upon alcohol, a compound which he found to have the following composition,

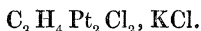


This formula was corroborated by the analysis of a series of compounds which this body forms with the chlorides of some of the

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metals. The chloride-of-potassium compound, according to Zeise's researches, contains



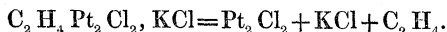
The chloride-of-ammonium compound has an analogous composition. Zeise further observed that his platinum compound unites directly with ammonia, producing a substance of the formula



The correctness of these formulæ Liebig, relying on certain theoretical conceptions, has called in question. The discussion which followed his remarks has, however, in no way decided the constitution of these compounds.

We have undertaken to prepare and analyse some new double compounds of this series, in order if possible to elucidate the constitution of Zeise's bodies.

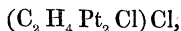
We first endeavoured to establish the nature of the gas which under various conditions is evolved from Zeise's compounds. For this purpose we exposed the potassium-salts above mentioned to a temperature of  $200^\circ$ , and collected the gas which was evolved, over bromine water. In this manner an oily liquid was obtained, which was easily proved to be identical with dibromide of ethylene. The formation of the gas seems to ensue according to the following equation,



The formation of ethylene-gas, as well as the analysis of several salts which we prepared, seems to indicate that the original formulæ given by Zeise are correct, and that the existence of the group  $(\text{C}_2\text{H}_5)_2\text{O}$  assumed by Liebig in these substances is not supported by experimental evidence.

We have succeeded in combining ethylene-dichloride of platinum (this is the name which we propose for Zeise's compounds) with mono- and diatomic bases. We have also combined this substance with the chlorides of the bases.

The bodies thus obtained may be arranged in two series, comparable in many respects with certain classes of compounds which protochloride of platinum forms with organic bases. If ethylene-dichloride of platinum be viewed as the chloride of a monoatomic radical thus,

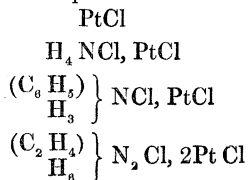


a very simple relation between the derivatives of this substance and

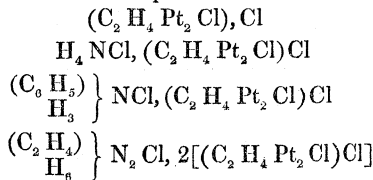
some of the compounds of protochloride of platinum becomes perceptible.

*First Series.*

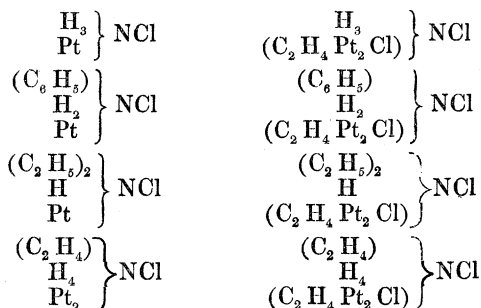
Compounds of protochloride of platinum.



Compounds of ethylene-dichloride of platinum.

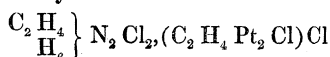


*Second Series.*

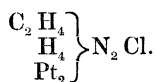


The compounds of ethylene-dichloride of platinum with ammonia and chloride of ammonium here mentioned have already been described by Zeise; the remainder, as well as the greater number of the protochloride-of-platinum bodies, are new.

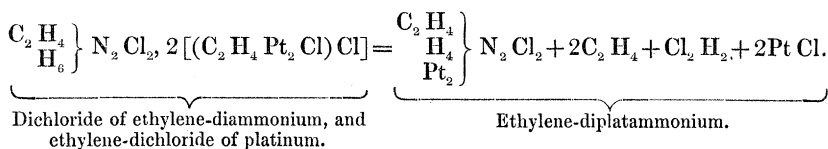
The detailed examination of these compounds, which are for the most part beautifully crystallized, is not yet completed; but we take this opportunity of mentioning an observation which seems to give a more decided support to the view we have expressed regarding the relation of the series of ethylene-dichloride-of-platinum and that of the protochloride-of-platinum compounds. If the aqueous solution of the easily soluble body



be boiled, a considerable quantity of gas is immediately cooled, and at the same time beautiful yellow, difficultly soluble needles are deposited containing



This reaction may be explained by the following equation :—



In conclusion it deserves to be noticed that the compounds of acetylene with subchloride of copper and other salts, which have been observed by Boettcher, Berthelot and others, may probably be classed with the group of the ethylene-dichloride of platinum. It is with the intention of testing this view that we are now engaged in an investigation of the deportment of protochloride of platinum with olefiant gas.

The observations described in this Note were made in Professor Hofmann's laboratory.