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James Apjohn M.A.

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[NEW SERIES.]

JUNE 1831.

LIX. *On a Combination of Bicyanide of Mercury and Iodide of Potassium.* By JAMES APJOHN, M.D. *Professor of Chemistry to the Royal College of Surgeons in Ireland.*

To the Editors of the Philosophical Magazine and Annals.
Gentlemen,

HAVING recently, in the course of some experiments upon the salts of mercury, fallen upon a new, and, in some respects, a rather remarkable compound, I beg leave to communicate to chemists, through your Journal, the following brief notice of it.

When liquid hydriodate of potash is added to a solution of corrosive sublimate, the well-known biniodide of mercury immediately falls down. This is a decomposition familiar to every chemist. But if for corrosive sublimate we substitute the bicyanide of mercury,—notwithstanding the analogy in composition between these two salts, no such double exchange of principles takes place. A precipitate however in this case also slowly forms, possessing the following properties. It occurs in very thin four-sided prisms, of a beautiful pearly aspect. These are very soluble in hot water, but this fluid scarcely acts upon them at the temperature of 60°. Digested with ammonia and potash they appear to experience no change; and the same may be said of them when brought into contact with the alkaline carbonates. When touched however with a drop of muriatic acid, their colour is immediately changed to a bright scarlet, and the odour of prussic acid is evolved. A portion of them ignited in a platinum crucible left a residuum which, when dissolved in water, gave a copious crystalline precipitate with tartaric acid added in excess.

From these experiments, and several others which it is
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unnecessary to detail, it became obvious that the crystals were composed of the two salts presented to each other. The next object therefore, was to determine the relative proportions in which these were united. To effect this, 40 grains of the compound were dissolved in hot water, and a stream of sulphuretted hydrogen passed through the solution as long as it threw down any precipitate. This, (which by a previous experiment was known to be bisulphuret of mercury,) when perfectly dry, weighed 22·25 grains. Hence as 232 (atomic weight of cinnabar) : 252 (atomic weight of bicyanide of mercury) :: 22·25 : 24·16 = the bicyanide in the 40 grains.

The solution from which the cinnabar was thrown down was now evaporated to dryness, in order to expel the whole of the prussic acid formed; and to the residue, which by a previous trial was found to be iodide of potassium, after being dissolved in water, nitrate of silver was added as long as it caused any precipitate. This (the iodide of silver) collected upon a double filter, dried and weighed, amounted to 22·08 grains. Hence as 234 (atomic weight of iodide of silver) : 164 (atomic weight of iodide of potassium) :: 22·08 : 15·47 = the iodide of potassium in the compound. The 40 grains were therefore constituted as follows:

Bicyanide of mercury	24·16
Iodide of potassium	15·47

39·63

Now, as 24·16 : 15·47 are very nearly in the ratio of 252 : 164, it is obvious that the compound consists of an atom of each of its constituent salts. And as, by viewing these as destitute of oxygen and hydrogen, we account for the entire 40 grains, it is clear that they are present as bicyanide and iodide, not as biperprussiate and hydriodate. This latter conclusion also is confirmed by the salt yielding no water upon being heated strongly in a glass tube.

This compound, as far as my knowledge extends, is without any perfect parallel in chemistry. It is a double salt, but it is distinguished from all those with which we have been long acquainted by the circumstance of the proximate constituents of its component salts, both the electro-negative and the electro-positive, being all different. Berzelius says (*Traité de Chimie*, tom. troisième p. 331): “On ne connaît pas d'exemple bien constaté de sels qui renferment plus de trois constituans.” The hiatus here alluded to is obviously filled up by the salt just described, and which, from its composition, may be denominated the iodo-bicyanide of potassium and mercury.

It

It is almost unnecessary to observe, that the change of colour already noticed as being produced in our compound by the action of muriatic acid, is due to the development of hydriodic acid, which passing to the bicianide, produces at the same time, biniodide of mercury and prussic acid. A similar effect is produced by any other acid capable of liberating hydriodic acid from the iodide of potassium. In such experiments it is clear that but one half of the mercurial salt can be converted into biniodide; for one atom of the bicianide of mercury would require for perfect decomposition two atoms of hydriodic acid, whereas but one can be developed from the iodide of potassium.

The iodo-bicianide of potassium and mercury is probably but one of a class of double salts which the bicianide of mercury forms with haloid compounds. This conjecture, however, I have not as yet had time to put to the test of experiment.

Dublin, May 14, 1831.

LX. *On Mr. Lindley's Statement respecting the Investigation of the Structure of the Orchideæ.* By J. E. B.

To the Editors of the Philosophical Magazine and Annals.

Gentlemen,

I REGRET exceedingly to be compelled, by the high estimation I entertain for the character of Mr. Brown the botanist, to be obliged to notice, thus publicly, a statement by Mr. Lindley in his "Introduction to the Natural System of Botany," from which an inference has been drawn, by an anonymous writer in a Northern Journal, prejudicial to the reputation of that gentleman. Those who are acquainted with Mr. Brown will at once acquit him of all desire to deck himself in borrowed plumes; but as there are many persons, whose good opinion is worth preserving, and to whom he may be a stranger, I deem it but justice to state what appears upon the face of the proceeding; yet I should not have interposed, if Mr. Lindley had not contented himself with only privately disavowing his intention to convey to his readers the meaning imputed to him.

The Dedication to the "Introduction" bears the date of August last. Under the head of "*Orchideæ*," p. 262, after remarking that it is not necessary to enter upon an historical view of the gradual alteration which has taken place in the opinion of botanists with regard to the sexual apparatus of