

LXXX.—*Interaction of Acetylene and Mercuric Chloride. Part II.*

By WILLIAM JOB JENKINS.

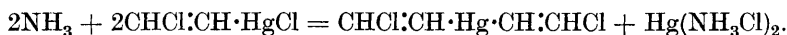
IN a former communication by Chapman and Jenkins (T., 1919, **115**, 847) an account was given of a new method of preparing Biginelli's additive compound of mercuric chloride and acetylene (Biginelli, *Ann. Farm. Chem.*, 1898, 16; Brame, T., 1905, **87**, 427), to which the constitutional formula  $\text{ClHg}\cdot\text{HC}:\text{CHCl}$  has been assigned. It has since been found that the yield of this compound obtained by the method therein described can be considerably improved if purified acetylene \* is used in the preparation. Further-

\* The purification of acetylene from those contaminating gases, which would interact with mercuric chloride or its additive compound with acetylene, was found to be most conveniently effected by passing the impure gas through a heated glass tube packed loosely with slaked lime. The acetylene purified in this way had entirely lost its unpleasant odour.

more, the compound made from purified acetylene is much more stable than that obtained from the impure gas, and does not exhibit signs of melting, when quickly heated, until its temperature has been raised to 129°.

From the constitution assigned to Biginelli's compound, it seemed reasonable to conclude that other additive compounds of mercuric chloride and acetylene should be capable of existence. Thus two molecules of acetylene might unite with one molecule of mercuric chloride to form a compound having the formula  $\text{CHCl}:\text{CH}\cdot\text{Hg}\cdot\text{CH}:\text{CHCl}$  (I), or one molecule of acetylene might unite with two molecules of mercuric chloride to form a saturated compound with the constitutional formula  $(\text{ClHg})_2\text{CH}\cdot\text{CHCl}_2$  (II).

My efforts to obtain either of these two compounds by direct combination of acetylene and mercuric chloride have been futile. I have, however, succeeded in preparing compound (I) by an indirect method, namely, the removal of one molecule of mercuric chloride from Biginelli's compound. Up to the present I have been able to discover only one reagent—ammonia—by means of which this removal of mercuric chloride could be effected, the action being represented by the equation



I have not, as yet, succeeded in preparing the saturated compound.

When dry ammonia was bubbled through a solution of the compound  $\text{HgCl}_2\cdot\text{C}_2\text{H}_2$  in dry chloroform, a white precipitate was formed immediately, but more than an hour was required to complete the precipitation. There was no evidence that acetylene was liberated during the reaction. On heating, the white precipitate fused, with evolution of ammonia, and sublimed as mercuric chloride.

The analysis of the substance (Found: C = 1.09; H = 2.05; Cl = 20.57;  $\text{NH}_3$  = 10.60; Hg = 64.80 per cent.), and its properties, prove that it is rather impure fusible white precipitate.

From the filtrate, after concentration, white crystals separated (Found: C = 13.99, 14.30; H = 1.27, 1.23; Cl = 21.11; Hg = 62.02.  $\text{HgCl}_2\cdot 2\text{C}_2\text{H}_2$  requires C = 14.84; H = 1.24; Cl = 21.98; Hg = 61.94 per cent.).

This new additive compound is a well-defined, crystalline substance, m. p. 60°, very soluble in ether, chloroform, or benzene. It can also be prepared together with fusible white precipitate by passing ammonia into a solution of the compound  $\text{HgCl}_2\cdot\text{C}_2\text{H}_2$  in benzene. When a concentrated solution of the new compound in chloroform or benzene was heated for some time, acetylene was slowly evolved and crystals of Biginelli's compound separated.

Formula (I) appears to represent satisfactorily the properties of the new additive compound, so far as these are at present known.

It will be observed that the formulæ assigned to Biginelli's compound and the new compound represent them as being similarly constituted to the mercury alkyl haloids and the mercury dialkyls respectively, and, accordingly, account for the circumstance that the melting point of the new compound is  $70^{\circ}$  lower than that of Biginelli's compound.

The above work was carried out at the Sir Leoline Jenkins Laboratories, Jesus College, Oxford, and I wish to record my thanks to Mr. Chapman, F.R.S., for his advice and help.

THE CHEMICAL DEPARTMENT,  
UNIVERSITY OF BRISTOL.

[Received, April 9th, 1921.]

---