

CHEMISTRY

Chairman: H. T. BRISCOE, Indiana University

The address of Chairman H. T. Briscoe on Two Decades in the History of Chemistry and the paper on The Preparation of Acetyl Bromide, by M. T. Bruton and Ed. F. Degering, are published by title only. Karl Means, Butler University, was elected chairman for 1940.

The Adsorption of Potassium Ferrocyanide and Ferric Sulfate by Prussian Blue

E. W. KANNING and A. W. CAMPBELL, Indiana University

Studies concerning the composition of Prussian blue precipitates formed by the interaction of the ferric and ferrocyanide ions have led to interesting and, in some instances, conflicting conclusions. It has been shown that, when the reactants are mixed, oxidation-reduction reactions and adsorption occur which prevent the formation of the stoichiometric compound, $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$. Bhattacharya and Dhar¹ report experiments that indicate that this compound is formed when a solution of ferric chloride is added to a solution of potassium ferrocyanide. They further point out that, when the precipitate is allowed to age in contact with the supernatant liquid, the composition of the precipitate changes to approach an equilibrium mixture as a result of either oxidation-reduction or adsorption processes or both. It is pointed out that Prussian blue is primarily susceptible to adsorption processes.

The simple compound, $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$, is formed, according to Müller,² only if the solutions of ferric iron and ferrocyanide are of definite concentrations. In most cases the precipitate consists of a complex mixture, the exact composition of which depends upon the conditions under which it is prepared. Woringer³ states that commercial iron blue is a complex compound, $\text{Fe}^{\text{III}}\text{Fe}^{\text{II}}_3[\text{Fe}_3(\text{CN})_6]_3$, which is formed as the result of the mutual oxidation and reduction of the ferric and ferrocyanide ions. Schmidt and Rassow⁴ are of the opinion that Prussian blue is a ferric ferrocyanide in which part of the iron is replaced by potassium and two molecules of water in intermolecular combination. Davidson and Welo⁵ state that the formulas for the "soluble" and "insoluble" blues are $\text{KFe}[\text{Fe}(\text{CN})_6]$ and $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$, respectively. Justin-Mueller⁶ suggests the formula, $\text{Fe}^{\text{III}}[\text{Fe}^{\text{II}} : (\text{CN})_6 : \text{Fe}^{\text{II}}]_3$

¹Bhattacharya, A., and Dhar, N. R., *Z. für anorg. und allgem. Chem.*, **213**:240-8 (1933).

²Müller, E., *Journ. prakt. Chem.*, **84**:353-69 (1911).

³Woringer, P., *Chem.-Ztg.*, **36**:78 (1912).

⁴Schmidt, P. F., and Rassow, B., *Z. Angew. Chem.*, **37**:333-4 (1924).

⁵Davidson, D., and Welo, L. A., *Journ. Phys. Chem.*, **32**:1285-9 (1931).

⁶Justin-Mueller, E., *Bull. Soc. Chim.*, **49**:1285-9 (1931).