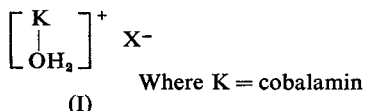


LETTER TO THE EDITOR

Some Observations on Vitamins B_{12a}, B_{12b} and Chlorocobalamin

SIR,—The material obtained by catalytic reduction of vitamin B₁₂ followed by aerial oxidation of the product has been designated vitamin B_{12a} by Kaczka *et al.*¹ Whatever may be the structure of this compound in the solid state (see Cooley *et al.*²) it is evident that in aqueous solution it undergoes changes leading to the formation of aquocobalamin hydroxide (I; X = OH).^{3,4}



The basic aquocobalamin cation present in such solutions is characterised by the truly remarkable facility with which it undergoes combination with suitable anions. The products formed, however, fall into two main groups. The first of these, to which such compounds as cyanocobalamin (vitamin B₁₂), nitritocobalamin (vitamin B_{12c}) and thiocyanatocobalamin belong, do not dissociate appreciably in aqueous solution. The second group of complexes are clearly ionic in character and give the normal reactions of the entrant anion. Thus treatment of an aqueous solution of "sulphatocobalamin" with barium acetate leads to the formation of a precipitate of barium sulphate.⁵ Such complexes, in our view, are more accurately formulated as aquocobalamin salts, e.g., aquocobalamin sulphate (I; X = $\frac{1}{2}\text{SO}_4$) rather than "sulphatocobalamin." Similarly, the substance termed "chlorocobalamin" by Kaczka *et al.*⁵ is best regarded as aquocobalamin chloride (I; X = Cl). The latter compound, moreover, is necessarily identical with the substance obtained by Veer *et al.*⁶ by photolysis of vitamin B₁₂ in dilute hydrochloric acid, and termed by them and subsequently by Cooley *et al.*³ vitamin B_{12b}. The exact nature of the product isolated by Pierce *et al.*⁷ from cultures of *Streptomyces aureofaciens* and from liver and originally assigned the designation vitamin B_{12b}, however, has not yet been revealed. In these circumstances, we should like to propose that, pending elucidation of the nature of the vitamin B_{12b} isolated from natural sources, reactions in aqueous solution effected with this compound, as well as with B_{12a} and "chlorocobalamin," be regarded as taking place between the aquocobalamin cation and the reagent involved.

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REFERENCES

1. Kaczka, Wolf and Folkers, *J. Amer. chem. Soc.*, 1949, **71**, 1514.
2. Cooley, Ellis, Petrow, Beaven, Holiday and Johnson, *J. Pharm. Pharmacol.*, 1951, **3**, 607.
3. Cooley, Ellis, Petrow, Beaven, Holiday and Johnson, *ibid.*, 1951, **3**, 271.
4. Buhs, Newstead and Trenner, *Science*, 1951, **113**, 625.
5. Kaczka, Wolf, Kuehl and Folkers, *J. Amer. chem. Soc.*, 1951, **73**, 3569.
6. Veer, Edelhauser, Wijmenga and Lens, *Biochim. Biophys. Acta*, 1950, **6**, 225.
7. Pierce, Page, Stokstad and Jukes, *J. Amer. chem. Soc.*, 1949, **71**, 2952.