CLXVI. STUDIES ON THE ANTINEURITIC VITAMIN.

I. PRELIMINARY NOTE ON A POSSIBLE SECOND FACTOR.

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ATTENTION has been drawn by Plimmer and Rosedale [1926] and Plimmer [1926] to the difference in visible symptoms in pigeons on a total deficiency and a partial deficiency of vitamin B in the diet. While the typical paralysis of acute polyneuritis occurred in the former case, shortage in amount of vitamin B led to general debility, the time of appearance depending upon the amount of the vitamin in the ration. The visible effect of shortage is first observed by a falling off of the food consumption, the scattering of the food and the inability of the birds to fly up to the perches of the house. *Post mortem* examinations have shown conditions described by McCarrison [1921], one of the most noticeable being the presence of large masses of decomposing food material in the intestine.

During the course of the preparation of a strong extract of vitamin B from rice polishings a point of interest concerned with the difference between acute polyneuritis and the "shortage" of the vitamin has been observed.

1. Rice polishings have been extracted by 1 % acetic acid, 2 litres being used for each 500 g. of polishings. The extraction is carried on for 8 hours at 40° with constant stirring. After filtering, the extract is concentrated *in vacuo* at 40° to such volume that 1 cc. corresponds to 1 g. of the original polishings. 5 cc. of this extract suffice to cure acute polyneuritis within a few hours. 2 cc. daily, administered to pigeons receiving a diet composed solely of white polished rice, produce steady growth and secure complete maintenance of health and functions.

2. This first extract has been treated with lead acetate until no further precipitate could be obtained, when it has been filtered, the lead being removed by H₂S, which in turn has been expelled by boiling *in vacuo* at 40°. The filtrate and the precipitate after treatment with lead acetate have each separately been subjected to these operations, each being finally made to such volume that 1 cc. corresponds to 1 g. of polishings.

The filtrate portion behaves similarly to the first extract in that 5 cc. will cure acute polyneuritis and 2 cc. given daily will maintain the health of pigeons on a diet of white rice.

2 cc. of the precipitate portion, given daily, enable birds to maintain growth, health and natural functions. This portion, however, will not cure typical acute polyneuritis. The administration of this portion to birds suffering from polyneuritis causes rapid evacuation of the bowel, and, while death ultimately ensues, the usual "stoppage" symptoms are not found on *post mortem* examination. Birds which do not show the typical polyneuritis symptoms, but which have become enfeebled by white rice feeding, are sufficiently relieved by the administration of 5 cc. of this fraction to be able to feed and to remount the perches a few hours after the dose.

In view of this fact, and also on account of the observation that the health of pigeons could be maintained on small quantities, it was thought that small portions of vitamin B had been precipitated by the lead acetate. An amount of this extract corresponding to 2 kg. was concentrated *in vacuo* at 40° and administered in a dose of 20 cc. to a polyneuritic pigeon without cure being effected. This concentration and dosing has been carried out seven times with the same result.

It appears, therefore, that two factors are concerned in the ordinary rôle of vitamin B, one of which has to do with digestive processes, but is independent of the anti-paralysis factor, and is precipitated by lead acetate.

Further chemical and clinical investigations are in progress.

REFERENCES.

- McCarrison (1921). Studies in deficiency disease (Oxf. Med. Publ.).
Plimmer (1926). *Proc. Roy. Soc. Med.* **19**, 21.
Plimmer and Rosedale (1926). *J. State Med.* **34**, 117.