

A PRELIMINARY NOTE ON THE
STUDY OF COMPLEX FORMATION
BETWEEN STANNIC CHLORIDE AND
DIBASIC CARBOXYLIC ACIDS

F. W. CLARKE¹ has observed that the precipitation of stannic sulphide, from solutions of stannic chloride, is hindered by the presence of oxalic acid. Rössing² has utilised this fact in separating tin and antimony, by adding oxalic acid to a solution containing a mixture of salts of these, and then passing hydrogen sulphide, when tin remains in solution, and antimony alone is precipitated as sulphide. No definite information is, however, on record as to the cause of the inhibition. The present study has been taken up to investigate the real mechanism and the extent of the inhibition brought about by oxalic acid and other di-basic acids of the group, viz., carbonic, malonic and succinic acids.

Carbonic acid $\begin{array}{c} \text{C}\cdot\text{OOH} \\ | \\ \text{OH} \end{array}$, the first member of

the series and its salt were both unable to act as inhibitors.

It was found that oxalic acid when present in small quantities, had no effect on the precipitation of tin sulphide and it was not until 7 c.c. of N/2 oxalic acid were added to 5 c.c. of M/20 stannic chloride solution that inhibition seemed to commence. With greater amounts of oxalic acid, the precipitate grew gelatinous in nature and became a deep brown gel. Finally when 5 c.c. of M/20 stannic chloride solution, 10 c.c. of N/2 oxalic acid were added, it became colloidal in nature and exhibited a green fluorescence. There was no point of total inhibition, because on passing sulphuretted hydrogen for a long time or on leaving overnight the colloid jellified and finally settled completely.

Potassium oxalate was found to be a more efficient inhibitor; 7 c.c. of N/2 potassium oxalate were required for 5 c.c. of M/20 stannic chloride as compared to 10 c.c. of oxalic acid.

Malonic acid $\begin{array}{c} \text{COOH} \\ / \\ \text{CH}_2 \\ \backslash \\ \text{COOH} \end{array}$, the next higher acid was tried, and a far larger quantity was needed for 5 c.c. of M/20 stannic chloride; sodium malonate was a bit more efficient than the acid.

Succinic acid $\begin{array}{c} \text{CH}_2\cdot\text{COOH} \\ | \\ \text{CH}_2\cdot\text{COOH} \end{array}$ was unable to inhibit, though sodium salt was found to have a slight effect.

It is suggested that the inhibition is due to a complex formation between stannic chloride and the acid or salt. Electrical conductivity measurements and absorption spectra studies were also found to support complex formation.

Further work, to elucidate the composition and structure of the complexes, is in progress.

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December 20, 1944. A. K. BHATTACHARYA.

1. Clarke, *Chem. News*, 21, 124, 2, Rössing, *Zeit. anal. chem.*, 41, 1.

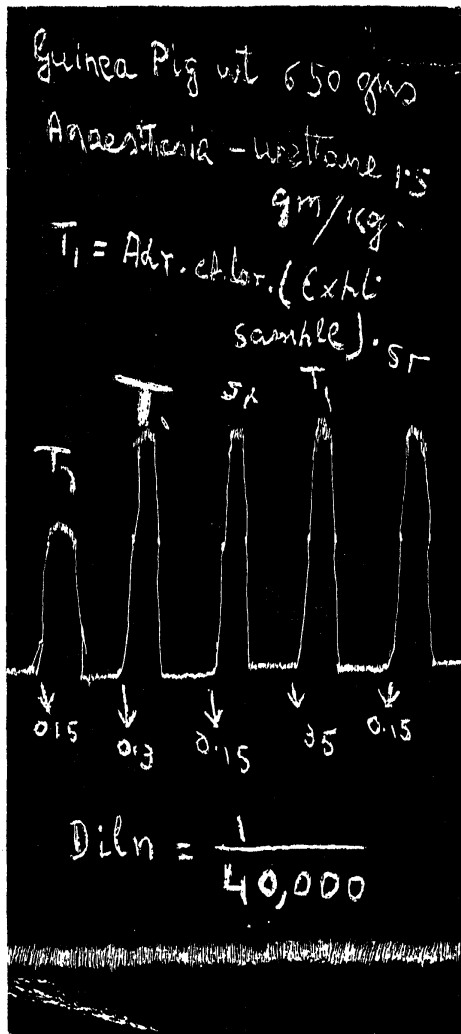
BIOLOGICAL ESTIMATION OF
ADRENALINE IN GUINEAPIGS

Biological assay of Adrenalin solutions is generally carried out on spinal cats according to the method of Elliot. The method is reasonably accurate, and more convenient than the rabbits' intestine method which, though more sensitive, is not adaptable for routine assays. Great difficulty is being experienced in procuring suitable cats; assay trials have revealed that guineapigs could conveniently be used for standardising adrenaline solutions, easily available and the method reasonably accurate.

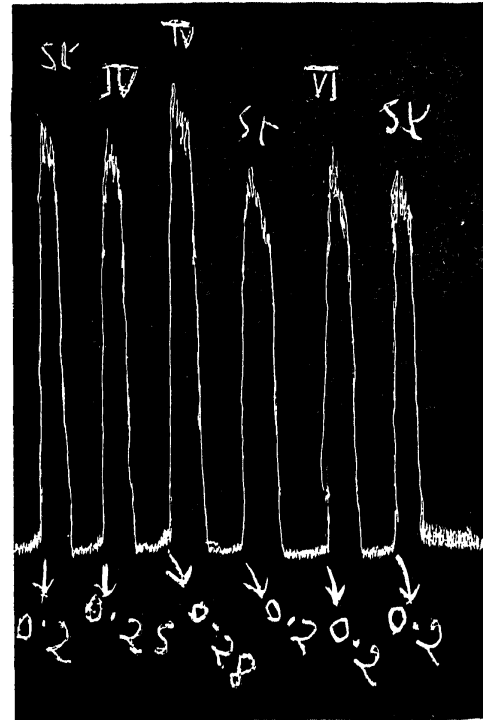
Healthy male or female guineapigs, fasting 24 hours and weighing between 500-700 gms. were anaesthetised by intra-peritoneal injection of urethane (1.5 gm. per kg.). Prior to the administration of the anaesthetic the animals were injected subcutaneously with 0.75 mg. per kg. of atropine. The animals were generally ready in 1 to 1.5 hour for dissection. If necessary, small quantities of ether were carefully administered. Tracheotomy was done, a fine glass tracheal cannula (prepared in the laboratory) was inserted, tied, and then connected to the artificial respiration pump. Both the external jugular veins were then dissected out, and a venous cannula inserted into one of them. Thereafter the internal carotid artery on both sides was separated very carefully from the vein and the vagus nerve, and ligated at the cerebral end. A fine arterial cannula (prepared and suitably graded in the laboratory) was then inserted into one of the arteries and connected to the mercury manometer. This part of the operation requires to be done very carefully but provides sufficient ease in the selection of the cannula and attaining steadiness of the hands, is not difficult. Occlusion of the artery should be done by traction with a fine thread instead of an artery clip, however small it may be. Rise of blood pressure in guineapig is fairly high at the outset but gradually falls to a level of 25-40 mm. of Hg in about half an hour, when the animal is ready for assay.

Certain precautions should be taken during the preparation of the animal. The operating table should be so raised as to be on a fairly same level with the mercury manometer; otherwise sodium citrate may be sucked into the heart owing to a great difference of pressure and cause the heart to fail. Excursion of the lungs should be carefully regulated by controlling previously the volume of air in the respiration pump. A complete fast of 24 hours is essential for proper anaesthesia; otherwise the animals frequently become resistant.

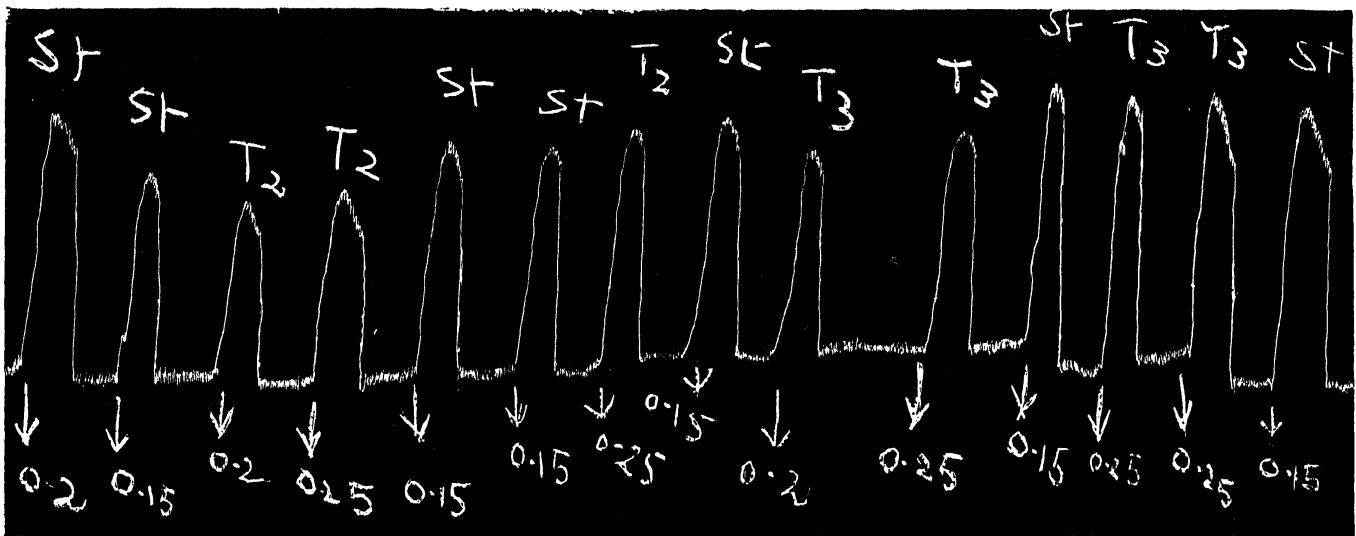
0.1 c.c. of a 1/40,000 dilution gives a fair and rapid rise in blood pressure (30-40 mm. of Hg). The time of rise and fall is almost the same as in spinal cats. We generally assay the test solution in strength of 1/40,000 and the doses are varied from 0.1-0.3 c.c. Infusion of saline given with each test solution is 0.5 c.c. Tachy-phylaxis sometimes occurs, specially if the intervals between the injections are shortened, or a very large number of injections are given.



CURVE I



CURVE II



CURVE III

Curves I, II & III show the response to 1 in 40,000 dilution of Adrenaline

Adult guineapigs are found to be somewhat resistant to anaesthesia. Quick-acting anaesthetics, single or in combination, such as chloroform + urethane, though producing rapid action, are often found to kill the animal during operation,

or the period of testing. Chloroform and ether anaesthesia was found to be unsuitable for the purpose.

Preliminary atropinisation of the animal is very helpful in preventing vagal inhibitions during rise in blood pressure, and tended to maintain a fairly constant level.

Accuracy of the method.—Solutions of adrenaline could be standardised by this method with an accuracy of $\pm 4-10$ per cent. The

results compared well with the results on spinal cats.

Bengal Immunity Research Lab.,
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 December 23, 1944.

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