

## INTRODUCTION.

The technique of pot testing has often yielded reliable information about the nutritional requirements of crops and the fertility status of the soil.

In using the technique the worker assumes that the test plant, under greenhouse conditions, has the same requirements as the crop plant growing in the field. It is also assumed that the plant under test will react in a similar way to the crop plant to any given combination of nutritional factors. A further criticism is that the technique fails to give any measure of the integrated effect of the physical properties of the soil, its previous management together with the climatic environment. The great advantage of the method is however the elimination of soil fertility variations, particularly important where mineral requirements alone are being studied. The technique may be used in preliminary investigations with advantage to save time and expense in designing field experiments, which would, in the case of cacao, occupy large areas of ground and cover many years.

The indicator, or test plant, used in the technique may vary with the method employed. Mitscherlich (v. Stewart 1932), who introduced the technique, used a variety of oats in his experiments. A series of investigations <sup>BASED</sup> on this method were carried out at the college to find a suitable indicator for use in the tropics. This work was summarised by Innis (1936), and the conclusion reached was that Hill Rice and Sudan Grass would be suitable. Jenny (1948), working in America, found that lettuce was a suitable plant to employ in a pot test after certain modifications to the original method had been introduced. Recent work in Turrialba (Alvim 1954) has also shown the suitability of certain varieties of lettuce. Stephenson and Schuster (1941) working in America, successfully used sunflower in another modification of the technique. Schroo (1953), investigating the application of various pot tests to the study of the fertility status of sugar cane soils, used sugar cane itself as an indicator throughout his experiments.

The method originally proposed by Mitscherlich and afterwards modified by various investigators is of limited value, as the assumption that all plants will react in the same way under all conditions and to the same extent to a given nutritional factor or set of factors, is inaccurate. Consequently there is no simple method of translating the responses of the indicator plant into the nutritional needs of the field crop. In spite of this, the method has proved extremely useful in temperate regions, and has been widely used (v. Stewart 1932).

The present study is concerned with the application of pot tests in the investigation of the fertility status of soils on which cacao may be grown.

It is difficult to find a suitable quick growing indicator plant in the case of cacao as the root volume occupied by an orchard crop bears little relation to that occupied by a vegetable or grain plant. There was no previous work to guide in the choice of a suitable plant. It was decided to use cacao itself in a series of experiments, and, because Stephenson and Schuster had used an annual, sunflower, for investigating the fertility status of orchard soils, lettuce was chosen for another series of experiments. The success of Alvim's work also influenced this choice.