

1. INTRODUCTION.

Theobroma cacao L.. shows two different phases in its branches. The young, actively growing branches bear the leaves and are solely concerned with the metabolism of the plant. The mature wood of the older branches bears the flowers and subsequent fruits. Because of this habit of cauliflory, the fruits are not borne within the region of active photosynthesis as in many other plants, but at some distance from it..

From the physiological point of view, it could be possible that the position of the pods upon the trunk and branches may affect the size of the pods depicted by its dimensions, wet weight and bean count. Humphries (1939) showed that the degree of cherelle wilt was greater on thinner branches than on the thicker ones, so it is quite conceivable that the surviving pods may be smaller on the thinner branches. Should a correlation be established between a particular region or type of stem of the tree, and the size of the pod, it may be possible to encourage the more productive types of branches by suitable pruning.

Up to the outbreak of World war II., most of the cacao in Trinidad was grown from seedlings derived from open pollinated parent trees. In the early 1930s selections were made of the more productive trees throughout the Island, and it is the clonal trees derived from these by vegetative propagation replacing the less productive seedling trees. Although much is known of the productivity of these individual trees, little is known of the productivity within the tree, i.e. on which parts of the tree the cacao is produced. The little work that has been done was on seedling trees.

Pound (1931, 1932,) showed that as a general rule, the

dimensions of the pod on the main trunk of seedling trees were greater than those on the finer branches. Measurements were based on three regions of the tree - the main trunk, the main branches and the finer branches. These regions were not compared with the actual quantity of cacao obtained, and one of the regions - the main trunk - seldom exists on trees derived from fan cuttings. Pound also studied the relationship between length, diameter and external volume of the pods of these seedling trees, expressing their relationship in the formula:-

$$\text{Volume} = 0.45 \times \text{Length} \times (\text{Diameter}^2).$$

The present investigation was concerned with a more detailed study of the effect of the pod position, not only on the weight of actual cacao per pod, but also upon the bean number. Pound's work concerned seedling cacao which is gradually being replaced by clonal cacao, so the present work was carried out on two common clones, a plantation of each presumably being less variable than a plantation of seedling trees. The internal volume of the pod is a more useful quantity, so it is hoped to derive a formula which is applicable to any particular clone. If, as Pound found, the ratio of the pod length and diameter are constant, such a formula could express the internal volume solely in terms of a constant and the pod diameter.

The Cacao crop varies markedly from season to season, and for that reason, investigations on yield must over several years. The present investigations cover a period of only 8 months of one year, so that the results obtained permit the drawing of only tentative conclusions.