I N T R O D U C T I O N .

The soil as a medium of growth influences theextent and character of the root system. This, combined with the atmospheric environment and the inherrent characteristic of the plant species, determines the state of growth of the plant.

A vigorously growing plant as a rule develops a good root system. In the case of a backward plant, its condition may be attributed to the diseased condition of the above-ground parts as well as to a poor root system. More precise information on the state of the root system is obtained from root studies.

Plant root systems have been studied for a number of reasons. With tree crops, such studies revealed abnormal soil conditions such as subsoil pans and waterlogging which physically limited root penetration into lower layers of the soil. Certain plant species and crop varieties are naturally adapted to growing in soils totally unsuitable to others, and root studies have revealed anatomical or physiological peculiarities which fit them for such specialized habitats. It is therefore possible to select and breed crop and forage plants for particular habitats on the basis of their root systems. Workers in Java, Mauritius, and Barbados have used vigour of root systems as selection character in sugar cane breeding.

Exact knowledge of root distribution permits making certain suggestions concerning fertiliser placements, irrigation and cultivation practices. Obviously plants will make maximum use of fertilisers if the latter are placed in the soil horizon in which roots are concentrated. Similarly deep cultivation will break subsoil hardpans, and permit roots to penetrate deeper into lower strata of the soil.

Furthermore a study of the root system of forage crops in relation to grazing and cutting management will reveal any detrimental practices and suggest optimum grazing and cutting frequency necessary for maintaining a vigorous sward and actively growing root systems. Harrison and Hodgson (1945) have all separately reported the adverse effect of ill-deviced cutting or grazing management on grass root systems.

Although the soil influences the degree of root development, it is equally true that roots themselves also modify soil physical conditions making them more condusive for the growth of subsequent generations of plants.

Grasses, on account of their extensive fibrous roots are more effective than any otherplant species in this respect as well as in protecting the soil from erosion.

Joachim and Kandiah (1944) reported that a three year st nd of Pennisetum Purpureum (elephant grass) increased organic matter and nitrogen content of the soil, and in general improved porosity, percolation rate and other physical properties of the soil in Ceylon.
Theron and Haylett (1953) working in South Africa recorded that Chloris gayana (Rhodes grass) left for three years and generously dressed with nitrogenous fertilisers restored structure and humus content in a soil where both structure and fertility had deteriorated.

Several workers in U.S.A. and U.S.S.R. have noted marked differences between grasses and other plants as regards improvement of soil structural conditions and in addition of organic matter. Martin (1944) has evaluated several tropical grasses on the basis of the improvement they effected on soil crumb structure.

These beneficial effects of grass roots already noted in the temperate zone and the evidences of which arenow begining to accumulate in the tropics are attributable largely, if not entirely, to grass root systems. It is therefore incumbent that studies should be made with tropical grasses with a view to discovering their root production capacities and under what ecological conditions they are likely to attain maximum or optimum root development.

This paper is an account of the studies made on root systems of selected tropical grasses with regard to the nature of their distribution in the soil and their total quantity in the cultivable top 9 ins of the soil. Soil conditions were also examined in order to find out how one or all soil factors influence root behaviour in the soil of the New College farm where the studies were carried out.