INTRODUCTION

In the course of his studies on the effects of different cultivation methods on the growth of maize on certain soils of the College New Farm, Lamrock (1953) opened up a number of lines of inquiry into the mechanism of crust formation on the soil surface.

He attempted to make an artificial rainfall simulator in order that the effects of different rates of rainfall on the stability of the soil structure produced by different cultivation patterns might be studied under controlled conditions on a small scale.

However, it soon became apparent that a knowledge of the actual characteristics of the rain in the area, was desirable before it could be truly simulated.

From the appearance of the heavy showers which occur frequently in the wet season, it was thought that the maximum intensities might be considerably above those recorded by the 24 hour Intensity Meter which is part of the normal equipment of the College Meteorological Station. This meter would not show up changes in intensity in a period of five minutes or less, and during heavy downpours the line on the graph is too steep to allow of anything better than an approximate reading of intensity.

Also, a knowledge of the range of drop sizes, and their distribution, in these tropical downpours, was desirable.

Some information was available on drop-size characteristics from temperate regions, but little or no work has been done on their distribution in the tropics,

where maximum intensity rates are often greater than those in temperate regions.

The importance of the impactive force of raindrops upon the soil is a factor which has only recently begun to be realised and studied intensively, with all its further implications of soil erosion and water loss by runoff.

Bennett, Bell & Robinson (1951) have described the effect of raindrops beating on the soil, with the resulting breakup of larger crumbs and splashing up of fine soil particles to form a muddy suspension, which quickly clogs the spaces between soil particles and reduces infiltration with the resulting runoff and erosion. Also, on drying, the muddy surface layer forms a hard crust which lowers aeration and permeability to further rains.

Ellison (1952) pointed out that the impactive force of the raindrop of a heavy storm on the soil may reach 288 Horsepower per acre. Therefore, any information on the nature and amount of this force, is valuable for the protection of the soil from it.

Therefore, apparatus was developed and some information was obtained on the intensity variations and maxima in tropical storms in short periods of the order of a half minute to five minutes. Raindrop numbers and size distributions were also investigated, and an attempt was made to relate their Kinetic Energies to rainfall intensity.

An apparatus was constructed as the initial stage in an effort to measure raindrop force directly, and this field of study awaits further attention.