INTRODUCTION

In 1901, Duggor remarked "Notwithstanding the excellent
cultural methods for the fungi, a study of germination in re-
lation to stimuli involved has largely been a matter of
incidental consideration". This is still true today, and it
is hoped that this work will do a little to elucidate the
position in relation to the fungi considered.

This work was undertaken with a twofold object in view.
Firstly, to study the effect of various environmental factors
on the germination of the spores of Marasmius perniciosus
(Stahel), Phytophthora palmivora (Butler), and Colletotrichum
spp.; all pathogens on cacao. Secondly, to establish the
regularity of germination of the spores. It was hoped that at
the end of the investigation, some correlation would be esta-
blished between the standardized environmental factors, and the
percentage germination.

To examine all the environmental factors in their various
combinations would be impossible, necessitating about 900,000
experiments for each fungus. This being the case, the following
method was adopted. A single experiment was carried out to
determine the effect of medium, culture age or in the case of
Marasmius perniciosus sporophore age, time of deposition of the
spores, stimulants, and method of germination (hanging drop or slides).
The effect of each of these factors can be shown singly in the
statistical analysis. The best of these results was taken, as
the standard, and then the other experiments were carried out,
using the results of the first experiment to determine the ini-
tial conditions. Each additional factor elucidated was then
added to those of the first experiment for testing the next set
of conditions.

The practical importance of this work lies in its
applicability to fungicide testing. If standard environmental
factors could be fixed, and a given percentage germination
guaranteed (within statistical limits) under these conditions,

then any deviation would be attributable to the toxic effects of the fungicide applied.

The desire to apply this work to fungicide testing decided that the experiments had to be simple, not involving a great deal of apparatus or expensive chemicals.

The optimum figure for any factor was determined in one of two ways: where a figure showed a significantly better germination, it was automatically chosen; but if there was no significant difference between the readings, then the figure decided on was the average of the groups of results showing the least deviation. For example, if two sets of results were 4, 5, 6 4; and 1, 9, 8, 2, the first would be selected; their means (4.75, and 5) are not significantly different, but the first only has a deviation of 2, while the second has a deviation of 8. In making the selection, however, the deviation was expressed as a percentage of the treatment means. This meant the higher the treatment mean, the greater the actual deviation that would be allowed. This slightly biased the selection in favour of the higher readings, but as there was not a statistically significant difference between the readings, this weighting was not great, and the inaccuracy was well compensated for by having the use of a standard of comparison, given by the method.

For the purpose of this work, germination can be defined as the production of a germ tube or zoospore. The length of the germ tube was not taken into consideration, as this is an expression of growth rather than of germination.