

THE ACCURACY OF THE PLATE COUNT OF SUSPENSIONS
OF PURE CULTURES OF BACTERIA IN STERILE SOIL.

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INTRODUCTION AND HISTORICAL.

In Soil Microbiology some practical method of obtaining estimates of the individual populations in soils of various types is needed. The accurate estimation of numbers of microorganisms may be of value in the measurement of soil potentialities or the effect of soil treatment. Present available methods are used with little knowledge of their accuracy. There is not general agreement on a test to determine how much of the variation among replicates prepared from a single sample is due to random sampling and how much is due to characters inherent in the population.

The plate method has been the most popular means of counting organisms in soil or elsewhere since Koch's development of the liquefiable solid medium in 1881. Certain limitations of the method are recognized. The result obtained does not represent a count of the actual numbers in the original sample but only such organisms or clumps of organisms as grow to form colonies under the conditions provided. Many investigators have found numerous sources of error in the plating technique. In spite of the shortcomings of the method, a large part of the advance made in Bacteriology is based upon plate counts. Working with milk and cultures of the colon organism, Breed and Stocking (1) found that skilled analysts using proper technique usually make reasonably accurate estimates of the number of living bacteria in milk. More experience and improved practices result in more regular and supposedly more accurate counts.

One of the more recent approaches in testing the value of Bacteriological data is based upon statistical methods. Fisher, Thornton and MacKenzie (4) suggested the X^2 (Chi square) test for use on large numbers of counts of series of parallel plates. The object of this test is