the existence of a strong sphincteric mechanism at the lower end of the choledochus, wholly apart from the gastro-intestinal tract.

This is a preliminary report.

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The Application of Certain Statistical Criteria to the Problem of Seedling Mortality.

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The practically important problem of obtaining an adequate crop stand on the agricultural field must depend for its solution on the detailed investigation of a number of factors, physical, chemical, physiological and pathological. While the end purpose of such investigations may be in part practical, they have their bearing upon a number of general biological questions, for example that of the existence of a selective death rate.[1] In suggesting the applicability of certain statistical methods, which, as far as I am aware, have not heretofore been applied to these problems, I have in mind the probability that they will be useful in other investigations involving the problem of mortality.

Problem 1. A criterion of the deviation from a random distribution of an observed distribution of number of seedlings produced.

Let s be the number of seeds planted, g be the number of seeds germinating or surviving to a given stage, f the number of seeds failing to germinate or dying at an early stage, in a large number, N, of small experiments. Then if p be the probability of development of the seed into a seedling, and q be the probability of its failing to develop or of its dying before any given period

$$p = \frac{\Sigma(g)}{sN} = \frac{\overline{g}}{s}, \quad q = \frac{\Sigma(f)}{sN} = \frac{\overline{f}}{s} = 1-p,$$

where Σ denotes summation throughout the number, N, of experimental plantings and the bars denote means of g and f.

If the frequency distribution of the number of germinations per experiment (*c. g.*, per hill) were determined solely by chance it should should be given by $N(p+q)^s$. The agreement of the theoretical and empirical distributions may be tested by Pearson's χ^2 criterion,[2] using Elderton's[3] table for testing goodness of fit.

Application of this criterion to large series of germination records

for Sea Island, Egyptian and Upland cotton[4] has shown by the large values of χ^2 that in this specific case the chances of the deviations of the observed from the theoretical distributions being due to random sampling are, practically speaking, infinitesimal. These results indicate clearly the influence of some factor or factors which tends to bring about greater differences in the number of seedlings germinating per experimental unit than would be expected on the basis of chance alone. These factors may be most logically sought in the influence of substratum heterogeneity, which has been considered in a number of earlier investigations on soil properties and plant characteristics.[5]

It is here suggested that this χ^2 test furnishes a valuable criterion for the selection of the most suitable planting technique for experimental work.

Problem 2. The correlation between the mortality of associated seedlings.

In dealing with the problem of the influence of localized conditions on seed germination the method of intra-class or inter-class correlation[6] may be utilized by employing the number of seedlings per unit as variates when more than one unit can be considered to be associated. In cases in which it is desired to express the relationship between the fate of the seedlings of the same unit on a correlation scale, the frequency distribution may be reduced to a four fold table of alternative variables as follows:

Let n be the number of seeds germinating, m the number failing to germinate per experimental unit of $n + m = s$ seeds per unit. The contributions of any such unit to the four fold table will be $gg = n(n\text{-}1)$, $gf = nm$, $fg = mn$, $ff = m(m\text{-}1)$. The summation of these values for all the experimental units gives all frequencies required for the four fold table. Such tables permit the application of Pearson's equal probability r.[7]

An application of this criterion to large series of data for the germination of cotton on highly saline soils of the Gila River Valley at Sacaton, Arizona,[8] results in correlations ranging from .3635 to .7463.

Problem 3. A criterion of the differentiation of varieties with respect to germination rate, or of environmental conditions with respect to their capacity for influencing germination rate. A determination of the significance of the differentiation of two varieties with respect to germination rate or of two sets of conditions with respect to their capacity for influencing germination rate may be made by means of Pearson's[9] double χ^2 test.

Unpublished studies on cotton germination rates indicate wide

variations in the extent of differentiation with respect to capacity for the production of seedling stand.

Such a method of comparison as that here suggested is desirable since it is possible that criteria of differentiation based on means and standard deviations alone may be inadequate in view of the fact that the form of the distribution may differ in the two varieties or environmental conditions compared.

This is a preliminary report.

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Decorticate Rigidity.

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On section of the brain stem at the level of the colliculi, Sherrington[1] in 1897 observed that the animals (cats) passed into a condition of increased extensor tonus. This condition he called "decerebrate rigidity". The rigidity was "confined to those muscles which maintain the animal in erect attitude".

Goltz,[2] Holmes,[3] Rothman[4] and de Barenne[5] studied dogs in which the frontal portion of the brain was removed, and in which most of the thalamus and midbrain were left intact, but reported no rigidity. Thiele[6] and Magnus[7] have stated that it is necessary to section the brain in the mesencephalic region to obtain rigidity. Hence it has been generally accepted that the condition results, not