points from the usual forms of bacteria. First of all they do not reproduce bacterial growth while the bacteria grow profusely in our media. They are extremely pleomorphic, very fragile, and remain unstained by crystal violet. In the halo the larger elements are only sparsely present and as the transplants give rise to thousands of tiny colonies the growth must originate from very small forms. It seems probable that the elements of the halo originate from the bacteria as from a heated spore emulsion all spores reproduce the halo. None of the filamentous structures in the halo correspond closely to the filaments which were described in the bacterium cultures.[2]

It is interesting to note that the elements of the halo which are so different from the bacteria resemble closely the elements from which the cultures of the virus of pleuropneumonia bovis are built up.

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Hereditary Variations in Litter-Size of Rabbits.

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An analysis of 569 pregnancies occurring in our breeding colony during the 5-year period from 1929 to 1933 has indicated the presence of wide variations in the mean gestation periods of different breeds.[1] These differences were attributed to hereditary factors. The present report is concerned with an analysis* of the size of the litters resulting from these 569 pregnancies, the particular purpose being to ascertain whether breed had any influence on litter-size.

The pregnancies were the result of matings made in all months with the exception of July and August. Eleven breeds consisting of 10 standard bred strains and one intensely inbred line of albinos

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[2] Dienes, L., PROC. SOC. EXP. BIOL. AND MED., 1933, **31**, 388.

[1] Rosahn, P. D., Greene, H. S. N., and Hu, C. K., *Science*, 1934, **79**, 526.

* The symbols employed below are defined as follows; Var. = Variance; F = the ratio of the larger to the smaller variance; n = number of observations; M_n = mean of n observations; D = difference between two means; t = the ratio of the difference to its standard error; P = probability. For a description of the methods of analysis, see Fischer, R. A., Statistical Methods for Research Workers, Oliver and Boyd, London, 1930, and Snedecor, G. W., Calculation and Interpretation of Analysis of Variance and Covariance, Collegiate Press, Inc., Ames, Iowa, 1934.

which may be considered as a breed or family are represented. The mean litter-size ranged from 3.92 for Polish rabbits to 7.14 for the Beveren and Flemish breeds.

It was found that the variance between breeds was significantly greater than the variance within breeds (Var. between means of breeds = 40.43; Var. within breeds = 4.67; $F = 8.65$; $P = 0.01$—, significant). The demonstration of heterogeneity between breeds is interpreted as indicating that with respect to litter-size, each breed represented a homogeneous, normally distributed population. Certain environmental factors which might account for the breed differences were considered.

All animals received the same diet and were housed indoors under uniform conditions. Seasonal factors at the time of mating did not influence the litter-size, since a significant difference was not noted between the mean values calculated from all matings in the 2 intervals from March to October, and from November to February (March to October: $n = 295$, $M_n = 5.18 \pm 0.14$; November to February: $n = 274$, $M_n = 5.47 \pm 0.14$, $D = 0.29 \pm 0.19$, $t = 1.5$, not significant). Moreover, the variance within 2 months intervals was larger than the variance between 2 months intervals, although the difference was not significant (Var. between means of 2 months classes = 11.53; Var. within 2 months classes = 5.30; $F = 2.18$, not significant). With respect to season therefore, the population appeared to be homogeneous.

The mean age of the doe at the time of mating ranged from 9.96 months for the American Blue to 14.75 months for the Chinchilla. The method of analysis of variance gave significant evidence that so far as age of the doe at the time of mating was concerned, the whole set of values represented a homogeneous population. (Var. between means of breeds = 5.91, Var. within breeds = 45.64, $F = 7.72$, $P = 0.01$—, significant). There was no correlation between the breed mean litter-size and age of the doe at the time of mating ($r_{xy} = -0.185$, not significant).

Body weight appeared to have some influence on the litter-size. In general the lighter breeds such as the Polish and Himalayan had small litters, and the heavier breeds such as the Flemish and Beveren had large litters. When the breeds were divided into 2 classes according to weight, the litter-size of the heavier group was significantly greater than that for the lighter group ($D = 0.96 \pm 0.25$, $t = 3.9$, $P = 0.01$—, significant).

The environmental factors of housing, feeding, season and age did not appear to account for the observed heterogeneity between breeds. It was concluded that unless some unknown environmental condition or conditions were operative, the differences in litter-size of the different breeds were largely dependent on hereditary factors.

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Changes in Caudal Bones of the Rat as an Index of Ossification.*

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The conventional method of determining the rachitic condition of a rat by either the X-ray or the "line test" method has been restricted primarily to an examination of the longer bones of the rat's body, especially the proximal end of the tibia or distal end of the femur. While a study of the structural changes in such bones furnishes a reliable index of the degree of rickets manifested by the animal in question, a comparison of X-ray photographs of the whole body of such animals indicated that other bones of the skeletal framework might offer some advantages over the tibia and the femur in this respect. This appeared to be especially true of the bones of the tail. This particular body structure appeared to offer a series of provisional zones of calcification which could be studied by either the X-ray or the "line test" method. In fact the tail of the rat had been found to be both more easily and more effectively X-rayed than was the leg and, in addition, it afforded possibilities of removing portions of the bony segments for "line test" during the course of the experimental period, without serious consequence to the health and well-being of the experimental animal.

In connection with another investigation being carried out in this laboratory in which a large number of rachitic animals were being involved, a comparison was made of the X-ray and the "line test" findings, where both the tibia and the caudal bones were considered. A general idea of the comparative results obtained may be had by observing Plates 1 and 2, which were obtained from X-rays and "line test" photographs of the bones of 6 typical animals that represented various stages of ossification.

Animals 0 to 4 inclusive were placed on a rickets-producing diet when 21 days of age. At this time their weights ranged between 40

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