

GENETICAL SOCIETY OF GREAT BRITAIN

ABSTRACTS of Papers read at the HUNDRED AND THIRTEENTH MEETING of the Society, held on 7th NOVEMBER 1953, at the GALTON LABORATORY, University College, London, W.C. 1

BIOMETRICAL ANALYSIS IN QUANTITATIVE INHERITANCE

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In his book *Biometrical Genetics* and several papers, Professor Mather has subjected the second degree statistics (variances and covariances) of quantitative characters in breeding experiments carried out over several generations to an arithmetical analysis which professes to provide estimates of the variance fractions ascribable to environment, the fixable and unfixable genetic variance, linkage, and gene interaction (departure from simple additivity), together with tests of significance. It will be shown that these computational methods can be simplified and made more direct. Each of the parameters to be estimated can be expressed as a linear function of the observations, the multipliers being usually quite small integers. Several different types of significance test are available and their applicability will be discussed. The question will then be raised how far and under what conditions the linear functions do in fact provide a valid measure of the genetic quantities with which they are labelled, and an indication will be given of some of the confirmatory information and tests that are desirable.

THE ASSESSMENT OF DIFFERENCES IN MUTATION RATES PRODUCED BY TWO TREATMENTS TESTED IN A NUMBER OF EXPERIMENTS

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Experiments were carried out to test the existence of possible differences in frequency of lethals in the paternal X-chromosomes from irradiated spermatozoa of *Drosophila melanogaster* when the irradiation was given to spermatozoa which were harboured (*a*) in the females' receptacles and (*b*) in the males' testicles. It was desired to test the significance of the difference between the two methods of irradiation, allowing for the fact that in addition to changes in irradiation rate between the experiments there were liable to be other sources of variation in mutation rate from experiment to experiment. The test proposed was a combination of the significance levels of the separate experiments. The statistical problems arising in this test are discussed and an alternative approach based on estimation theory is given.

SELECTION FOR LARGE AND SMALL SIZE IN MICE

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After 20 generations of selection with minimum inbreeding the rate of response remains undiminished in both large and small strains. Selection is three times more effective in reducing size than in increasing it. Several correlated characters showed correlated responses only during the first few generations.

THE MEIOSIS OF A MALE SPECIES HYBRID BETWEEN *TRITURUS VULGARIS*
MERIDIONALIS FEMALE × *TRITURUS HELVETICUS*

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This hybrid newt shows the now familiar pattern of reduced chiasma frequency and heterozygosity for translocations. It is heterozygous for at least three independent reciprocal translocations. The parental species belong to a taxonomic group distinct from that including the various races of *Triturus cristatus* and *Triturus marmoratus*, in which translocations are already known to differentiate the races and species from one another. It thus appears probable that translocation heterozygosity is a systematic feature of newt hybrids.

A SUGGESTION CONCERNING THE INHERITANCE OF
" ACQUIRED CHARACTERISTICS "

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The view is put forward that there might sometimes be a selective advantage in a mechanism which allows an adaptive response to unusual environmental conditions to be carried over in a hereditary manner to the succeeding generation. A possible mechanism, in accord with orthodox genetical knowledge and theory, is suggested ; it would, however, be limited to certain kinds of adaptive response.