

15 October 1931.

Dr Hubert D. Goodale,  
Mount Hope Farm,  
Williamstown,  
Massachusetts,  
U.S.A.

Dear Dr. Goodale:

Please excuse the delay in answering your letter of 24 August. I have, in the meanwhile, had to put up with an operation and have been for some weeks in a nursing home. The worst of it is, that I find I have mislaid the correspondence with you, prior to your last letter but I hope you will be able to put me right if I stray from the point.

The question of the genetical explanation of the normal curve of variation has been a good deal confused in the literature. Some writers have assumed that because the  $(1 + 1)^n$  binomial expansion alone is symmetrical that therefore this gene ratio must be postulated together with a complete lack of dominance. As a matter of fact any binomial with a sufficiently high exponent, that is, any genetical situation with contributions from a sufficient number of cumulative factors will tend to normality, the asymmetry tending steadily to disappear as the number of factors is increased and indeed being more liable to distortion from physiological causes of more importance than that due to the asymmetry of the binomial.

In respect of the rating of the bulls from the productivity of daughters and dams, I think I wrote to you a suggestion, by which the best rating formula can be derived entirely from the evidence of the record. I have never been properly clear as to on what data your 70 or 75 per cent. point is based, nor on how it was derived, but I can see no escape from the view that the best rating must be the one which gives the closest agreement between different ratings of the same bull in compari-

son with the variation between the average ratings given to different bulls.

I agree with you entirely as to the neglect in the text books of the theory of cumulative dominant genes, which I believe to be of enormous importance in all practical applications. You may be interested to know that before coming to the States, I had put together a paper, with the help of Dr. Immer of Minnesota and Dr. Tedin of Sweden, who are both interested in the subject and which I hope, may lead to experiments adequate to clear up the very interesting situation already known in maize.

I am rather glad that I did not draw the cheque you offered before leaving the States, as I have a bill outstanding to discharge in dollars, and should have lost on the exchange had I received your money before.

Yours sincerely,