

22nd. November 1913.

Dear Ashby,

I obstinately refused to write out what I had to say at Brighton, but did supply them with the enclosed abstract, which gives it pretty fairly in outline.

Oliver & Boyd have at the moment the material for a book on the Theory of Inbreeding, but it is a pretty incoherent bundle of the researches I have carried out for some years on special genetic problems contributing to such a theory. It seems to me

to be a long way from being a well-rounded treatise on the subject. I do not know when it will come out.

Yours sincerely,

SECTIONS M, D AND K

INBREEDING AND HYBRID VIGOUR IN LIVESTOCK AND
CROP IMPROVEMENT

ABSTRACTS of Papers read on FRIDAY, 10th SEPTEMBER.

THEORY OF INBREEDING

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From the point of view of pure genetics inbreeding should be regarded as a means of manipulating the germ plasm so as to control its structure and composition, particularly in respect to the numerous invisible factors which cannot be recognised individually. In practical plant improvement this tool has proved to be enormously successful, and its success makes it certain that it will be extensively used both in animal and plant improvement in the future. A theoretical understanding of its *modus operandi* seems, however, to be lacking, and even in the field of maize genetics, where the greatest amount of work has been done, very diverse opinions are held as to the reason for its success.

Elementary considerations show that the manifest effect of inbreeding must be due to dominance, and the genetical theory of the origin of dominance throws some light on the phenomena observed in inbreeding. Selection is exercised in three distinguishable phases of the process of producing desirable hybrids. The relative importance of selection at these stages is, however, obscure and disputed. It is submitted on quantitative grounds that the essential advantage of an inbreeding programme consists in the production in great variety of material which is reliable in its breeding properties, and that it is the facility offered for increasingly accurate selection by this reliability that constitutes the essential advantage conferred by inbreeding. In the work of maize improvement a very important contribution to the accuracy of selection at this stage has been the rapid improvement in the accuracy of varietal trials supplied by replicated randomised experimentation.