

PART I.

INTRODUCTION.

The problem of the selection and breeding of improved strains of maize has been studied sporadically at the Imperial College since 1928, and has now assumed the aspect of a breeding programme rather than an experimental investigation. This does not mean that the study of maize improvement has been concluded in all but practical detail; however, so much is known of the methods and theoretical questions involved, that the subject has become almost a matter of routine.

In the circumstances therefore, it is felt that the investigation offers little scope for the activities of future Post-graduate workers; and one of the main purposes of the present paper will be to build up the experience of the past ten years into a breeding policy, capable of forming part of the normal farm routine.

Welch (13 p. 32) pointed out that a programme could be mapped out involving production and testing of pure lines, and gave a daily diary (13 p. lxxviii) which, subject to slight modification, has proved very satisfactory this season. It will be seen from this that an automatic system can be adopted, involving initiating, breeding and testing pure lines, and culminating in a hybridisation policy.

In the past two years, methods have been tried and experience gained in the handling of such an undertaking, and it is now possible to formulate rules of procedure. These are, of course, not rigid, and it is to be expected that modifications will occur, but as they have been of value in the past, they will at least form a guide for the future.

Theoretical considerations have been dealt with so adequately by previous workers (7, 13 ) that it seems redundant to include much beyond a review of current literature and more

recent experimental work in the present paper. Theoretical points upon which the author holds a different view are discussed; but for a complete account of this aspect of maize breeding the reader is referred to the excellent and complete account in Welch (13) and in U.S.D.A. Yearbook, 1936 (5).

From a practical point of view, the problem offers little in the way of original work since there is so limited an amount of material. Neither Mass Selections nor Pure Lines, except Harland's strains, have been subject to more than two seasons' work and it is early to think even of testing their value. Such small tests as were carried out must therefore be taken with caution, and considered only as an indication rather than a proof.

There is, of course, but one test of the value of any variety or hybrid - the performance of its progeny. This will form a regular part of the routine if the proposals outlined below are adopted.

Much of the present paper is concerned with details of procedure and of proposed plans for a regular breeding programme - in fact, it hopes to achieve the position of a practical text-book for the College Maize Breeding, based on the theories of all previous contributions in this series, and the methods they found satisfactory.

The present author considers that, on purely economic grounds, there is no future for hybrid corn in Trinidad. American work, cited below, (12) shows quite definitely that hybrid corn is better than the best mass selected types; but that it is more expensive to produce, can hardly be doubted. Now maize in Trinidad is almost entirely a peasant crop, grown on small holdings as a rule, and with seed saved from last season or bought for food, from a grower like the I.C.T.A. farm.