NORMAL SELF-FERTILIZATION IN CORN.¹

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INTRODUCTION.

Methods of breeding self-fertilized plants have been standardized so that at the present time the same general plan is used by nearly all scientific investigators. Many minor points are not yet entirely settled, but these are of relatively little importance. With corn, however, there is little uniformity of opinion among plant breeders as to the actual value of different methods of work. With regard to the correlation of various ear and plant characters and resultant yield of the progeny a large amount of data shows that there is no significant relation. This lack of correlation between ear and plant characters and yield of progeny in corn is partially explained by the fact that environmental effects modify various ear and plant characters to a marked degree. The mode of pollination of the corn plant may be given as a second cause of this lack of relation.

Studies by East (1908, 1909), Shull (1908, 1910), Collins (1910), and others, together with further data, have been reviewed by East and Hayes (1912). One of the conclusions reached as a result of these investigations was that self-fertilization in plants that naturally cross-pollinate reduces vigor and cross-pollination in self-fertilized plants tends to increase vigor. It was believed that this phenomenon of increased vigor in first-generation crosses, which has been called heterosis by Shull, was a physiological stimulus due to heterozygosis, although it was recognized that some factors in the heterozygous condition gave a greater stimulus to development than others. A recent hypothesis of Jones (1917) is very attractive and places the matter on a strictly inheritance basis. He attributes the increased vigor which is often obtained in the heterozygous condition to growth factors. This seems logical, as nearly all experiments show that the heterozygous condition for each particular growth factor gives more than half as great a result as the homozygous condition. While dominance is not complete, there is almost always a tendency to

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² References are to "Literature cited," p. 126.