S_2 and S_3 components of this Synthetic are available as individual ears. (See note at end of announcement).

South African-American Synthetic

This Synthetic shows promise as a source of stalk strength as well as disease resistance. It is made up of American breeding material which survived the prolonged drought of 1955 and which remained erect following a subsequent hurricane, crossed with South African inbreds which were selected for their remarkable resistance to Helminthosporium turcicum, the causal agent of Northern leaf blight.

The South African-American Synthetic is somewhat later than the Sweepstakes, which in turn is later than Early Synthetic No. 2.

The stiff stalked selection consists of bulked seed of 94 plants still erect and sturdy Dec. 15, 1959.

Seed of individual ears of these stiff stalked plants is available.

Note regarding requests for disease resistant early generation inbreds

The corn disease nursery at this station consists of about 1000 10-foot rows of early generation inbreds. We seldom keep anything beyond the S_4 generation at which time, the choice selections are turned over to the Corn breeders in Agronomy for agronomic evaluation. (209 such cultures were given the Agronomists in 1958.) We expect an evaluation report on the combining ability of these cultures, when such information becomes available. In that way, disease resistant inbreds already produced can become available to improve germ plasm at some future date.

We expect and ask for this same type of cooperation from any individual outside this station. We are glad to share our material with you, but our program cannot be nurtured unless we in turn receive credit. We really believe we have something worth while sharing.

Furthermore, I am not interested in packeting small numbers of inbreds of specific maturity dates. Unless you want 50-100 items, why not develop your own from the Synthetics available.

-- C. C. Wernham

PIONEER HI-BRED CORN COMPANY
Johnston, Iowa
Department of Plant Breeding

1. Parthenogenesis in 2n x 4n crosses.

In crosses between diploid sugary maternal parents and non-sugary tetraploid males, occasional 2n sugary kernels develop. These have been observed in various cultures over the past four years. It was first assumed that such kernels probably arose as a result of fertilization by contaminating sugary pollen. However, in 1958 two ears containing a nearly full set of 2n homozygous sugary seeds were

found among approximately 150 crosses of 2n sugary x 4n non-sugary. The more than usual care exercised in making the pollinations would seem to render remote the possibility of all seeds on these two ears being contaminants. Plants grown from these seeds were markedly reduced in size when compared with their maternal parents. However, they exhibited considerable variation from plant to plant. Such variation would be expected if the kernels producing these plants arose from reduced eggs followed by subsequent chromosome doubling. Since chromosome doubling of a gamete derived as a product of normal meiosis would impose complete homozygosity, the progenies resulting from selfing such plants should be uniform within individual ear classes. A test for uniformity in this material will be made in 1960. In 1959 pollen from 4n starchy plants was placed on silks of 161 2n sugary ears. Pollinations were delayed approximately one week beyond the time one would normally pollinate for full seed sets. These pollinations resulted in 364 3n starchy kernels, 16 2n sugary kernels. The sixteen diploid sugary kernels were distributed among 10 ears. Additional care was taken in 1959 to reduce the possibility of contamination by stray sugary pollen, i.e. tassels of all sugary plants were removed prior to shedding and no sugary genotypes were grown in the vicinity of the plants being crossed. It would seem not unlikely, therefore, that the 16 diploid sugary kernels arose in the absence of fertilization. If parthenogenesis is involved, the variation between plants from homozygous sugary kernels obtained in 1958 would suggest that reduced eggs, followed by spontaneous chromosome doubling, are functioning as embryos. Although attempts at embryological studies have been made, the infrequent occurrence of possible parthenogenetic kernels renders this a very unattractive approach to this problem.

-- William L. Brown

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1. Resistance to Helminthosporium turcicum.

In the South African Journal of Agricultural Science 2:255-259, June 1959, T. van Schaik and P. M. le Roux published on the genetic nature of some sources of resistance to leaf blight in maize caused by Helminthosporium turcicum. A maize line, Mex 155 obtained from Dr. E. J. Wellhausen from Mexico with the original number Gto. 57-272-1-7, was found to carry a single dominant gene for almost complete resistance to leaf blight under South African epiphytotic conditions. This inbred line should be extremely useful for incorporation into susceptible maize inbreds which are otherwise desirable and economically important, because in a variety of crosses with other susceptible lines, it gave uniform highly resistant progenies.

The resistance of Mex. 155 was recovered in approximately half of the progeny of the backcross to the susceptible parent and to a large extent, therefore, can be attributed to the action of a single major dominant gene. The variation in grades of susceptibility among the non-resistant segregates may be explained by the influence of some minor modifying genes which are suppressed completely by the dominant resistance gene but show effects in its absence.

-- P. M. le Roux
Dept. of Plant Pathology