id/id synthetic was finally derived. However, upon introducing the other two perennialism genes, pe and gt, into this ear-fertile synthetic background, it was found that only ear-barren plants were perennial, while those producing ears never were. The latter were often able to produce more than one successive vegetative generation, but each was successively less totipotent, and inexorably "ran out" in a manner described for the gt-pe phenotype (Shaver, Genetics 50:393-406, 1964). This work indicates that the differentiation of the ear as a floral, rather than as a vegetative, branch imposes difficulties or even precludes vegetative totipotency in maize. It may be that the addition of tassel seed genes to the perennial genotype would be the best way to regularly produce perennials from seed.

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5. id/id as a "macromutation" in maize.

Students of speciation have often turned up presumptive evidence for sudden origination of species or biotypes. "Cataclysm" was once a respectable word among taxonomists and paleobotanists. It has often occurred to me that the id gene in maize ought to qualify as a concrete example of how a sudden origination could occur. This one genetic step exerts a profound spectrum of changes in the maize plant: Vegetative development is drastically slowed, though many more plastochrons are eventually completed. An id/id plant is much like sorghum in its ability to tolerate long unfavorable periods and then respond vigorously to the restoration of good cultural factors. New leaf types appear in the form of beautifully regular decussate (opposite and rotated 90°) phyllotaxy. Other plants have regular and equal triphyllous nodes. At the ear-bearing node, either two or three equal ears are formed as axillary branches, depending upon the number of leaves at the node. id/id plants are aphid-susceptible before flowering, but become very aphid-resistant afterwards. The flowering period is made drastically later than in an equivalent non id/id population, and the plant would thus be immediately isolated reproductively from its ancestral form. It would not be difficult to conceive of conditions in nature which might favor a so-different

phenotype. Addition of complementary genes via the Baldwin Effect to reinforce the changes conveying selective advantages would stabilize the admittedly variable id/id phenotype in whatever form most "fitted" in the new niche.

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6. Non-Mendelian inheritance at the P locus.

In attempting to produce maize hybrids specifically tailored to the needs of human-consumption as milled products of corn, cob color is a criterion of desirability. In all of our standard lines, if the line has a red cob, we convert the line to white cob. On the other hand, if the line is originally white-cobbed, we convert it to red. Neither conversion is easy to make, and in neither case does the inheritance of cob color behave as a simply inherited trait. However, the latter conversion of a white condition to a red state is the more instructive. Several such lines, instead of giving a simple 1:1 segregation in the advanced backcross generations, have something like a 2:1:1 wherein about ½ of the progeny are white cobbed, as expected, but the other half segregate for deeper and lighter colors of red in about equal numbers. This seems to vary widely from line to line, though we have never used sufficient progeny sizes within a line to adduce comprehensive data. However, if one backcrosses the progeny from a lightly colored cob, all may be found to have white cobs. In such a case, one would have to assume that the red cob was present as a maternal effect, rather than from an autogenous gene, since the trait was thus not passed on in heredity. In other cases, even though one selects a progeny from a deeper red cob to further backcross, all the progeny may have white, or only very pale, cobs.

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7. Apparent parahereditary transmission of infectious viruses in maize.

In conducting the first winter breeding nurseries in Hawaii, outbreaks of Hawaiian Corn Mosaic (described by Brewbaker, Crop Sci. 5:412-415, 1965) were sometimes suffered because of infestations of