mutant in our stock has now been definitely located on chromosome 7 by use of E. G. Anderson's a-b translocation tester for that chromosome. Although we have grown families from about 30 Pn ears, we have only obtained one cross-over between Pn and bd.

The Pn mutant is characterized by prominent but defective glumes which consist largely of undifferentiated parenchyma cells. When the Pn glumes dry down during final maturation of the ear, they shrink to a thin, almost transparent, layer with the vascular bundles becoming prominent ridges. The glumes do not contract much in length and continue to partially cover the grains. At maturity they are papery and brittle, and are distinctly different from the glumes of tunicate maize or the normal glumes which serve to protect the caryopses of other grasses.

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11. Half-tunicate teosinte, a possible "synthetic" prototype of maize and Tripsacum.

The structure of half-tunicate teosinte fits the theoretical requirements for a common ancestor of maize and Tripsacum. Also the general structure of this synthetic derivative approximates a typical condition for the Andropogoneae. The resemblance is closest to Elyonurus tripsacoides. The slender rachis segments of half-tunicate teosinte differ from those of Elyonurus by the presence of a shallow cupule in the former and its absence in the latter. This cupule (or adnate-prophyll part of a cupule) is a definitive character separating the Andropogoneae from the American Maydeae.

If maize and Tripsacum had such a common ancestor, then evolution toward these species could have followed certain general tendencies which are prevalent in the grasses. The evolution toward primitive maize from our synthetic common ancestor would have involved longitudinal compaction and reduction to unisexual flowers. The factors for a polystichous thickened and continuous rachis in modern maize appear to represent acquisitions made chiefly during domestication as is suggested by recent studies on primitive archaeological maize. In the evolution of Tripsacum, reduction would have proceeded toward solitary instead of paired spikelets in the pistillate region. Also there would have been specialization of the cupule and outer pistillate glume as integral parts of a new protective device, the cupulate fruit case.

12. The effect of weak tunicate alleles on the expression of the Vg gene.

A collection of weak alleles at the tunicate locus has been assembled in isogenic stocks (Mangelsdorf, MNL, 1953) and these are now