

a great variety of stocks. These in turn are exhibiting a number of characteristics which may be regarded as primitive and which may provide clues as to the nature of wild corn and to some of the changes which must have occurred in the course of corn's evolution under domestication. For example, practically all Tu Tu plants bear their ears high on the stalk, the uppermost ear sometimes occurring at the node below the tassel. Since the upper part of the stalk is slender, this means that only small ears can be borne in this region. If wild corn was of this nature, then one of the most important changes occurring during domestication has been a shift in the position of the ear to a lower, thicker region of the stalk which is capable of bearing larger ears.

Since the number of husks surrounding an ear is directly correlated with the number of internodes between the tassel and the ear these small ears borne on the uppermost nodes of Tu Tu plants have only a few husks and these sometimes open up at maturity. This explains a previously puzzling situation: why an ear of pod corn should be twice protected, once with glumes surrounding the seeds and a second time with husks surrounding the ear. It is now possible to imagine the husks as a protective device primarily for the tender young female inflorescence and the glumes a protective device for the ripening kernel.

Paul C. Mangelsdorf

15. The widespread distribution of Chapalote maize in prehistoric times.

The present-day Mexican race of maize called "Chapalote" was one of the basic races in North America in prehistoric times. A re-examination of the actual cobs, photographs or descriptive literature covering 14 sites in northwestern Mexico and southwestern United States suggests that the archaeological maize from this area was either pre-Chapalote, Chapalote or a more evolved and more tripsacoid derivative called "Basket-maker" corn. The Mexican states with prehistoric Chapalote are Michoacan (lava impressions), Sonora (Dark Cave) and Chihuahua (Swallow Cave, Slab Cave, Tau Cave, Olla Cave). In the region now the U.S., Chapalote occurred in Arizona (Richards Cave, Tonto Cave, Painted Cave), Colorado (Cottonwood Cave, Lo Dais Ka Cave) and New Mexico (Bat Cave, Tularosa Cave, Gebollita Cave).

16. Archaeological evidence of the effect of teosinte introgression on maize evolution.

A large stratified collection of archaeological cobs from Gebollita Cave, New Mexico is being studied. Identification of the original maize (level-5) as Chapalote is possible because the cobs and kernels from this level are perfectly preserved by carbonization. In the next level up (level-4), which was not carbonized, there was sudden teosinte

introgression. Some of these cobs from this level are exact counterparts of modern F<sub>1</sub> hybrids between maize and teosinte and many others resemble teosinte derivatives in being small with highly indurated glumes. A few cobs have soft-glumes and resemble the carbonized ones from the previous level. In level-3 there is some recovery, on the average, from the marked effects of teosinte introgression as well as a tremendous increase in variability. Finally, in levels-2 and -1, the variation initiated by teosinte hybridization, includes a type of maize that has larger cobs and was presumably more productive than the original Chapalote race. Some of the larger cobs resemble those of the present day flour corns of the semi-arid regions in the Southwest. The introgression from teosinte which may initially have been detrimental proved to be beneficial in the long run, after new balanced polygene systems had become established.

17. Homozygous corn-grass.

For the first time we have obtained homozygous corn grass lines which approach the original "grassy" extreme reported by Singleton. Cg Cg plants of the grass extreme suddenly appeared in a line which was thought to be homozygous minus-modified corn grass but which so closely approached normal corn that identification was usually impossible. These new Cg Cg stocks are uniform and breed true. They are much more profusely tillered than teopod and yet are more amenable to hand pollination. The breeding behavior of the new Cg Cg suggests a change at the Cg locus to a new stable allele. These new Cg stocks will be studied further in regard to the development of a forage or ensilage-type of corn as a possible substitute for sudan grass.

18. Papyrescent (Pn) linkage data for long arm of chromosome - 7.

According to the data (see below), the sequence of genes linked to papyrescent glumes is gl<sub>1</sub> - ij - bd - Pn. The Pn gene is to the right of bd and separated from it by about 5 map units. The cross-over value between bd and Pn was measured as a difference in the linkage of each to either G1 or Ij. This value (5 units) was not obtained directly because of difficulty in scoring certain decayed branched-silkless (bd) ears for glume character.

The Pn character should be more useful as a marker gene than the other factors near it in the long arm of chromosome-7. Bn (brown aleurone) is often difficult to classify and bd (branched-silkless) must be maintained as a heterozygote because it usually has no silks. The Pn gene also extends the genetic coverage of the long arm of chromosome-7 by 5 units beyond that previously known.