An unusual chloroplast mutant — An albino corn mutant, v*-4801, arose during the examination of the F_2 of dwarf d-Tall x d crosses. In a population of 3000 dwarf F_2 seedlings, segregating 1:2:1 for the dwarf alleles, there were 150 albino mutants.

The mutant is unusual in that there is incomplete penetrance of expression. The albino plants are able to develop green leaves or regions of green in the leaves. There are never yellow regions, and white areas do not occur in a "banded" pattern. Seedlings that emerge green sometimes subsequently produce white leaves or regions of white in green leaves. Plants that survive develop green in the first and second leaves; the remaining leaves either are entirely white, have green bundle sheaths or develop normally. Only 20 plants have survived to the five leaf stage, and only one plant produced a tassel.

The mutant appears to be chromosomal since the same type of albino mutant has appeared in populations of homozygous d plants. However, the mutant has not been observed in the F_2 of dwarf d x d-T. It is thought not to be a temperature sensitive mutant since it has appeared in both greenhouse and growth chamber plantings. At present, research is underway to develop purebred lines and to examine development under varying conditions of light and temperature.

Charles F. Mischke and Barbara S. Mischke

BOSTON COLLEGE
Department of Biology, Chestnut Hill, Massachusetts

Further studies on maize x perennial teosinte hybrids — Pachytene chromosomes of the F_1 plants of perennial teosinte x maize were again examined with the light microscope to see if the chromosome pairings occurred at random; particular attention was paid to the short chromosomes. Great difficulty was encountered in identifying the chromosomes because of their extreme entanglements. Limited data lead to a conclusion that teosinte chromosomes paired preferentially with teosinte chromosomes, and the maize homologue was left unpaired in most of the cases. The single chromosomes (the third homologue) frequently synapsed nonhomologously on themselves. At anaphase I the distributions of chromosomes were extremely irregular; among a few hundred microsporocytes studied, no 10-20 distributions of chromosomes were observed.

The fertility of the F_1 plants was, as expected, very poor. Only one well-developed kernel was obtained from more than 200 pollinations including both selfs and backcrosses to the maize parent. This was apparently due to the unbalanced chromosome constitutions in the gametes produced.

Phenotypically the F_1 plants were very similar to the teosinte parent when they were grown in the field, particularly with respect to the characteristics of fruits and flowers. When these F_1 hybrids were grown in the greenhouse it was even more difficult to distinguish their growth habit from that of the inbred perennial teosinte.

The microsporocytes of these F_1 hybrids are currently under study with the electron microscope to see if there is any difference in the structural organization of the synaptonemal complexes between the homologously associated chromosomes and the nonhomologously associated ones.

In order to facilitate backcrossing the F_1 hybrids to the parental species, clones of these hybrids were subjected to colchicine treatments. It appears hopeful that some of these plants will become hexaploid subsequent to these treatments, because they have thick leaves and slow growth.

Y. C. Ting

The fine structure of the bivalent chromosome 6 of Chalco-teosinte — A brief report on the gross structure of the nucleolus and nucleolar bodies of Chalco-teosinte was given last year (M.G.C.N.L. 48:17). Further studies with the electron microscope were carried out on these organelles and on the bivalent chromosome 6 (nucleolar chromosome). It was consistently found that there were nucleolar bodies, varying in size and number from cell to cell, in addition to the regular nucleolus. These bodies were always without a nucleolar cup and unattached to any chromosomes. No fiber-like structures were seen in them; however, granular substances embedded in the homogeneous matrix were always present. In contrast, fibers of 300-400 Å width in the form of a helical arrangement were present in the cup-like structure of the regular nucleolus. These are probably the nucleolonema. Connections between these fibers and the chromatin region of chromosome 6 were also observed. These connections appeared to consist of fine fibrils having an average width of 100 Å. Both the nucleolar bodies and the regular nucleolus possessed vacuoles, which also varied in number and size but were invariably spherical in shape.

At pachynema, the central element of the synaptonemal complex of bivalent chromosome 6 measured about 300 Å in width, which is less than that of diploid and haploid maize and Michoana-teosinte. It was also frequently found that the central element was composed of two components, each with a cross dimension of 100 Å. In the centromere region, fibers with a cross dimension of 300 Å were sometimes observed connecting the densely stained chromatin regions of the two arms. In addition the centromere region possessed a less darkly stained area flanking the fibers and extending into the nucleoplasm.

Up to the present no synaptonemal complex has been definitely identified in the