Table 1
Mean values of the plants selected (1st experiment)
after three generations of selections

Characters	Direction of selection	Control = Or	1500r	3000r
Number of branches on the tassel	plus	14.95	14.33	14.28
	average	13.49	13.11	13.03
	minus	13.38	13.70	13.04
Number of inter-nodes below the highest ear	plus	13.02	13.06	13.23
	average	13.02	13.21	12.94
	minus	12.98	13.17	12.93
Total length of internodes below the highest ear	plus	59.56	57.55	58.56
	average	59.58	60.83	57.43
	minus	56.40	59.94	56.66

Table 2
Mean values of the plants selected (2nd experiment)
after three generations of selections

Characters	Direction of selection	Control = Or	1500r	3000r
Number of branches on the tassel	plus	13.24	13.53	13.27
	average	13.40	13.23	13.11
	minus	13.28	13.36	13.53
Number of inter-nodes below the highest ear	plus	13.24	13.42	13.44
	average	13.43	13.34	13.37
	minus	13.20	13.32	13.24
Total length of internodes below the highest ear	plus	48.12	47.20	45.77
	average	45.07	47.07	43.12
	minus	44.19	43.89	45.29

D. L. Palenzona

BOSTON COLLEGE
Chestnut Hill 67, Massachusetts
Department of Biology

1. <u>B-chromosomes in Mexican teosinte</u>.

Seeds from open-pollinations of Guanajuato teosinte of Mexico were planted in the summer of 1966. Microsporocytes of five plants of this teosinte were examined cytologically. One to five B-chromosomes were present in all of these plants.

Morphologically these B-chromosomes are the same as those found in various maize strains. They were acrocentric. Next to the centromere, there was a heterochromatic region or a knob. It was followed by a euchromatic region equivalent to about one-fourth of the total length of the chromosome. Heterochromatin organized into four discrete segments occupied the distal portion of this chromosome. The senior author has reported finding evidence of teosinte introgression into maize (American Naturalist, 1967). The observation of common B-chromosomes in maize and teosinte constitutes one more proof of this introgression. Studies on the inheritance of B-chromosomes in teosinte and on the effects of these chromosomes on the plants are in progress.

Y. C. Ting
R. G. Pendola

2. Fine structure of maize bivalent chromosomes.*

Despite the rapid progress made in the studies of cytoplasmic organelles of both plants and animals with the application of electron microscopy, results of the studies on chromosomes with the same technique have been very disappointing. The reasons are two-fold: (1) The electron microscope fails to demonstrate the characteristic structure of the components of chromosomes as revealed with the light microscope and concluded by cytogenetic investigations. (2) Up to the present, there has been no fine structure model of the chromosome accepted by biologists. However, the discovery of the synaptinemal complex in the chromosomes of meiotic prophase in certain plant and animal species has made electron microscopy promising in chromosome research. With the observation of this complex it is safe to say that chromosomes at meiotic prophase are not structureless under the electron microscope. This is also the case for maize.

In the summer of 1966, maize anthers at meiotic prophase were studied under the electron microscope by following the standard method of fixation and staining. At the same time anthers at the same division stage were also examined with the light microscope in order to relate the observations to those of electron microscopy. The synaptinemal complex was consistently found from early prophase to the stage of diplonema. Each bivalent had only one such complex which consisted of three parallelly arranged elements. In clear micrographs these elements could easily be identified. Their average diameter measured about 400Å. However, between the central element and the two lateral ones in each complex there were clear zones along the whole length of the bivalent chromosome. The width of the clear zones was approximately 300Å. Even though not so conspicuous as the longitudinal sections, cross sections of the synaptinemal complex could be discerned with little difficulty. The three component elements were also clearly delimited.

Among a limited number of nuclei examined, this complex was not found to be attached at one end to the nuclear membrane even though this was observed in certain animal species by other investigators.

*The experiment was done in the Department of Biology, Brookhaven National Laboratory, Long Island, New York. Credit should go to Dr. A. Underbrink of the Laboratory for his collaboration.

After diplonema, the synaptinemal complex was no longer observed. The polycomplex comprised of various synaptinemal complexes observed in the oocytes of mosquito after diplonema was certainly not demonstrated.

Since the synaptinemal complex has also been identified in the nerve cells of mosquito, the question as to what role this complex plays in chromosome synapsis and crossing over remains to be answered. It is likely, however, that with continued research, the function and the exact fine structure of this complex will soon be revealed.

Y. C. Ting

3. Further studies on haploid maize.

a. Fertility: In the summer of 1966, three haploid maize plants grew to maturity in the field. They were completely male sterile due to poorly developed pollen. Ears of these plants were pollinated with sib plants. Eighteen well-developed kernels were obtained from the three ears. When the ovules were counted, it was calculated that more than one per cent set seed. This is much higher than the expected less than 0.1 per cent seedset for haploid maize. It might be accounted for by the fact that some of the megasporocytes formed restitution nuclei instead of undergoing complete division at the first meiosis. Therefore, the two spores produced by any restitution nucleus might receive the regular 10 chromosomes. A study of the chromosome constitutions in the immediate generation of sib-crossings is in progress.

b. Production: During the last two years, experiments with the objective of obtaining a large number of haploid maize plants were carried out. Two strains of maize were employed as kernel parent: one was homozygous for gl_1, the other homozygous for C (colored endosperm and scutellum). Plants of these strains were pollinated by Coe's stock No. 6, homozygous for C^I (colorless endosperm and scutellum). Over seven thousand kernels from the cross gl_1 gl_1 X C^I C^I were obtained. After careful screening, 95 putative haploid seedlings were selected. As root tip chromosomes were counted, it was found that over 50 per cent of the plants were diploid. Therefore, this technique is inefficient in screening haploids. The inefficiency can probably be accounted for by the difficulty in discriminating glossy from normal seedlings. However, among about 300 selected kernels (colored scutella) in the cross CC X C^IC^I, almost all proved to be maternal haploids by root tip chromosome counts. Hence, the technique based on the use of the colored scutellum marker in selecting for maternal haploid embryos is highly efficient.

c. Radiosensitivity: In a preliminary test, it was found that haploid maize seedlings two weeks old were more susceptible to the damage of ionizing radiations than diploids of the same age. A detailed report of this experiment is in preparation.

Y. C. Ting
Carolmarie Smith