(c) deficiency for the terminal knob and part of the long arm, leaving the normal homologue as a univalent; the deficient segment of this pair occurs terminally in the short arm of a corn bivalent (probably chromosome X), which therefore assumes heteromorphy; occasionally the two heteromorphic bivalents pair in the univalent regions bearing the terminal knob; the expected quadrivalents, however, are not found in later stages;

(d) Homomorphic but devoid of the two terminal knobs; these are located terminally on two univalent chromosomes of the corn genome within the same nucleus.

Because of the close similarity of type 1 of T. floridanum with the chromosome extracted from T. dactyloides, it is probably the unaltered form of the homeolog. Such an interpretation would also be consistent with the regular and normal pairing reported in the F_1 of T. dactyloides x T. floridanum (Tantravahi, 1968) at least in so far as this chromosome is concerned. Consequently type 2, which has a higher arm ratio resulting from an increased length of its long arm, has to be regarded as the derived condition, which in all probability is related to the variations described under (a) to (d).

Occurrence of types 1 and 2 as well as the phenomena (a) to (d) among sister nuclei of the same anther seems to indicate that these chromosomal alterations took place in the pre-pachytene nuclei. Natural fragmentation and reunion of the bits resulting repeatedly in the same types of altered forms seems improbable, unless we assume some sort of break-susceptibility of particular regions on the concerned chromosomes.

B. G. S. Rao
W. C. Galinat

18. Spontaneous duplication of the nucleolus organizing body of chromosome VI in the genome of maize.

Supernumerary nucleoli were observed in the pollen mother cells of Lg gl plants which were derived from an interchange between the short arm of chromosome II of the recessive maize parent and its homeolog from T. dactyloides (chromosome 9) carrying the dominant alleles Lg_1 and Gl_2.

Detailed studies at pachytene and diakinesis of 482 cells have shown that, in addition to chromosome VI primarily concerned with the organization of the nucleolus, there is one other satellited chromosome pair in the complement. Both the primary and the secondary nucleolar chromosome pairs may undergo fusion of their nucleolar organizers and form a common nucleolus or they may form two separate nucleoli; in the latter case, the two nucleoli either remain distinct or may subsequently undergo fusion. The frequency of cells with one or more nucleoli in each of them and the mode of occurrence of the two bivalents concerned in their organization are given below:

	No. of cells observed		
	Pachytene	Diakinesis	Total
1. PMCs with a single nucleolus:			
(a) with two bivalents attached separately to nucleolus:	65	166	231
(b) with two bivalents showing fusion of nucleolar organizers	73	125	198
2. PMCs with two nucleoli:			
(a) with two bivalents separate--one pair for each of the two nucleoli:	15	5	20
(b) with two bivalents showing fusion of nucleolar organizers and associated with one nucleolus, while the other had no chromosome associated	17	10	27
3. PMCs with more than two nucleoli:			
(a) 3 nucleoli	2	2	4
(b) 4 nucleoli	-	2	2
Total	172	310	482

In the 73 pachytene nuclei showing fusion of the nucleolar organizers of the two bivalents, the short arm between the centromere and the nucleolar organizer of chromosome VI was not paired to any degree

with the region proximal to the satellited portion of the secondary nucleolar chromosome. The duplication therefore is confined only to the nucleolus organizing body and its satellited part. Such a view is confirmed from the absence of quadrivalents at metaphase I, which would normally be expected in at least a small proportion of the 100 cells examined had there been any duplication of the short arm of chromosome VI.

As to its origin, it is obviously due to a break at the region of the nucleolus organizing body followed by its transposition to the terminal region of a non-homologous chromosome within the genome. Since fusion can take place only between two broken ends, apparently the recipient chromosome also suffered a simultaneous fracture. Such chromosome breakages could be of a spontaneous type or due to some form of mutagenic effect resulting from the introduction of an alien chromosome into the genome, under particular conditions. Pedigrees of the stocks used in this study show that the breakage-transposition-duplication reported now could not have occurred more than three generations ago:

Pedigree of the material used in the study: (Each generation was selfed)

Plant or Stock No.	Phenotype	
1967-230-4	Lg gl	20+2 corn and tripsacum chromosomes; no evidence of supernumerary nucleoli or other abnormalities at meiosis.
1968-177	Lg gl	Only one plant survived; cytology not studied.
1969-332-3	Lg gl	20+2 chromosomes; supernumerary nucleoli and duplication of nucleolar organizer and satellite noticed.
-4	"	
-5	"	

B. G. S. Rao
P. Chandravadana
W. C. Galinat

19. Comparative studies of American Maydeae and the Andropogoneae: I. Morphology of pachytene chromosomes of Elyonurus tripsacoides.

A knowledge of the morphology of their pachytene chromosomes could indicate the most probable hybrid bridge between the American Maydeae and the more closely related Andropogoneae. If such a hybrid were then produced experimentally, the data on chromosome morphology would serve