It is interesting to note that the $\underline{R}^{st}\underline{R}^{nj}$ class represents part of the transmission frequency of two chromosomes 10 through the pollen, which would alone be much higher than that estimated by McClintock and Hill (1931). (B') is a reciprocal cross of one of the plants listed under series (B). In this cross an even greater deficiency of the $\underline{R}^{st}$ class is observed in the absence of the $\underline{R}^{nj}$ class.

The data obtained from reciprocal crosses, namely the increased deficiency of $\underline{R}^{st}$ when transmitted through the pollen, suggest a chromosomal condition linked to $\underline{R}^{st}$ having an effect on the male gametophyte. These results seem to fit the hypothesis that a deletion (or deletions) affects the ability of a chromosome to be transmitted, although more data are needed. The trisomic stock was kindly supplied by the Coop.

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4. Detection of chromosome aberrations involving chromosome 1 as the result of spontaneous breakage and nondisjunction.

Chromosome aberrations of any type are known to occur spontaneously. Although their frequency is relatively low, a study of such aberrations should furnish information on the underlying mechanisms causing them.

The scarcity of data on the frequency of spontaneous chromosome aberrations is mainly due to the lack of a powerful genetic method to select for a particular type of chromosome aberration.

In the spring of 1967, after crossing a chromosome 9 tester and a chromosome 5 tester as the female parents by an all dominant male parent, some exceptional F_1 progenies appeared having the female trait in the endosperm and the male trait in the embryo. These were often small seeds. After planting these exceptions, some obviously off-type plants appeared together with some apparently normal. A thorough investigation was not carried out on all of these plants. However, the same type of cross described above was extended to chromosome 1. Many $\underline{bz}_2$ plants were crossed as the female parents to $\underline{BzBz}$ plants in the summer of 1969. The F_1 progeny was estimated at 79,184 kernels. Of these, 78 or less than 1/1000 were exceptions carrying a $\underline{bz}_2$ endosperm, which made them easily detectable. Some of these exceptions were small seeds and had colored scutellum (Bz). Chromosome counts were done on root tips after germination yielding as follows:

Chromosomes counted	19	20	21	Total
Number of plants	1	62	15	78

These findings encouraged further investigation. The plants were classified according to the chromosome number found, phenotypical traits and genetic performance:

Class	Endosperm	Plant	Pollen sterility	19	20	21	Total
	Chromosomes counted			19	20	21	Total
	Seedling failures			0	5	1	6
1	bz	bz	N	0	20	0	20
2	bz	bz	50%	1	0	0	1
3	bz	bz	50%	0	4	0	4
4	bz	Bz	N	0	17	0	17
5	bz	Bz	50%	0	16	0	16
6	bz	Bz	30-40%	0	0	14	14

Class 1 plants proved to be normal in all regards and were considered as probable self- or sib contaminants. They were true breeding in testcrosses with bz and were removed from the group of exceptional F_1 individuals (see Table 1).

Class 2 had one plant only which was regarded as a monosomic for chromosome 1. This plant gave no progeny, although semisterility was ascertained. The two sperms giving rise to this plant were both deficient. Either nondisjunction in the first pollen grain division or whole loss of chromosome 1 in the second division could be the cause of this monosomic condition.

Class 3 had four plants which, judging by their phenotype and pollen sterility, were regarded as deficient for part of chromosome 1. According to the kernel phenotype and the chromosome count, this deficiency must be the result of a chromosome breakage, proximal to Bz, taking place in one of the pollen grain divisions.

Class 4 had 17 plants with a loss of Bz limited to the endosperm, with apparently no change in the embryo. Only one of the two sperms was

Table 1

Genetic and morphological comparison of the plants described in the text

Material	Chromosome count	Pollen sterility	No. plants examined	Plant phenotype	Aver. plant height (cm)	st.err	Aver. leaf blade width (cm)	st.err
bz tester	20	N	45	Norm.	113.6	2.0	9.6	0.2
bz x Bz (Normal F_1)	20	N	25	Norm.	172.5	4.7	9.9	0.3
bz sib contaminations class 1 (normal)	20	N	20	Norm.	134.4	2.7	8.1	0.4
true exceptions: class 2 (monosomic)	19	50%	1	Def.	59.0	-	2.6	-
class 3 (prox. def.)	20	50%	4	Df.	58.7	13.4	3.5	0.6
class 4 (normal)	20	N	17	Norm.	142.4	4.5	7.7	0.4
class 5 (dist. def.)	20	50%	16	Def.	84.1	6.6	5.9	0.7
class 6 (trisomics)	21	10% - 40%	14	Abnor.	125.2	3.0	9.7	0.8

Table 2

Genetic and morphological analysis of plants with 21 chromosomes

No.	Pedigree	Plant phenotype	Pollen classification (% sterility)	Plant height (cm)	Leaf blade width (cm)	Reciprocal testcrosses ♀ x ♂ bz/bz: Bz	♀ x ♂ bz/bz: bz	♂ x ♀ bz/bz: Bz	♂ x ♀ bz/bz: bz
1	1455- 4	N Bz	10-15 %	104	5.0	43	24	95	208
2	- 7	Slow Bz	20 %	150	10.2	30	13	134	108
3	- 9	N Bz	20-30 %	152	10.7	25	9	113	76
4	- 10	Slow Bz	20 %	79	12.4	116	36	20	44
5	- 11	N Bz	30-35 %	139	9.9	111	59	64	173
6	- 12	N Bz	25 %	140	10.1	234	102	187	144
7	- 25	Def. Bz (†)	-	-	-	-	-	-	-
8	1456- 1	N Bz	30 %	153	11.4	123	125	56	54
9	- 8	Def. Bz	30-35 %	71	3.2	63	34	86	192
10	- 10	N Bz	30-35 %	131	12.7	189	103	62	171
11	- 17	Slow Bz	30-40 %	92	6.6	87	50	53	110
12	- 24	Slow Bz	30 %	99	8.1	100	56	94	200
13	- 35	Slow Bz	40 %	151	8.9	103	54	114	98
14	1460- 2	Slow Bz	20-30 %	144	13.6	141	73	79	166
15	- 3	Slow Bz	20-30 %	148	12.9	77	26	108	160

affected. No endosperm analysis could be done to discover whether loss of Bz was to be ascribed to chromosome breakage or chromosome loss.

Class 5 had 16 semisterile plants. Seed and plant phenotypes suggested deficiencies in both sperms: a proximal deficiency (with regard to Bz) was presumably in the sperm that fused with the polar nuclei, or the whole chromosome was lost; a distal deficiency in the other sperm could account for the Bz plant phenotype, plant aspect and pollen semisterility. The few genetic data obtained from these plants are not enough for a conclusive statement, but suggested abnormal segregations (they are not included in this report).

Class 6 had 15 trisomic plants one of which died at the seedling stage. Plant no. 8 gave normal disomic ratios, and could be the result of somatic loss of one of the extra chromosomes carrying Bz or, less likely, it could be trisomic for another chromosome. The remaining plants were considered to be trisomic 1 individuals. However, in testcrosses they gave quite abnormal ratios for Bz : bz which do not fit those usually found with either normal or trisomic plants (see Table 2). These data seem to suggest that the nondisjunction event, which made one of the sperms hyperploid and the other sperm deficient, was associated with (or was the cause of) chromosome breakages which could possibly account for the abnormal ratios found.

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1. A chromosomal region with more crossing over in megasporogenesis than microsporogenesis.

Several chromosomal regions in maize exhibit differences in the frequency of recombination occurring in mega- versus microsporogenesis. The Rg-lg_2 and Rg-d regions in chromosome 3, the la-su region in chromosome 4, the A_2-bt, A_2-bm, bt-pr, and bm-pr regions in chromosome 5, the y-pb region in chromosome 6, the gl-In region in chromosome 7, and the sh-gl_{15} and wx^c-wx^{90} regions in chromosome 9 consistently have been