Table 2
Pigment Scores for Aleurone with Two R Alleles Present Where R Has Been Heterozygous with R^{st} for One to Eight Generations

	R^1	R^2	R^3	R^4	R^5	R^6	R^7	R^8
Pooled $\bar{X}$ (6 ears/ treatment)	21.92	21.71	21.21	20.28	19.67	20.00	19.48	18.76

The mechanism of R pigment control still remains to be discovered. Since the extreme phenotypes cannot be selected for, it appears that it is the penetrance conditions which are being progressively altered from one generation to the next as R is maintained with R^{st}. This progressive penetrance control of R expression provides an interesting genetic phenomenon with "memory" capabilities. The endosperm pigment system cannot only be manipulated in a directed way—i.e. taught to respond--but its "I.Q." can be tested by means of the "read-out" supplied by the endosperm pigmentation. Thus the pooled ear means constitute gene-treatment histories reaching back as far as eight generations, recalled now and summarized as a single figure.

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3. Light controlled diurnal rhythm in corn seedlings.

Germinating seeds were found to show diurnal responses in water uptake beginning 24 hours after initial contact with water. Seeds of inbreds W22 x W23 were placed in shallow, glass-covered germinating pans and maintained eight days under the controlled light and temperature conditions of two growth chambers. Seeds were germinated during this period on pads of germinating paper soaked with distilled water. One chamber environment was maintained on alternating 12 hour light and 12 hour dark cycles; the other chamber had constant light conditions. A chamber light intensity of approximately 1700 foot candles was diffused through a white cloth placed over the glass-covered pans; ambient temperature within the chamber was 22.5° C. From the start of germination, 20 seeds were weighed each 12 hour period (at the beginning and end of each dark cycle).

Tables 1 and 2 show the typical rhythmic patterns. Those seeds grown on the 12:12 cycle (LD) show a clear rhythm beginning after the first 24 hours of germination. This rhythm continues for the next three days. The seeds were then transferred to constant light conditions (LL). After transfer to LL conditions, the rhythm is damped and the rate of weight gain is reduced with the loss of the rhythm. It may also be noted that under the LD conditions it is during the dark period that most activity is taking place.

Where seeds were started under LL conditions there is no apparent rhythm in water uptake. After four days under LL the seeds were transferred to LD conditions where a pronounced rhythm becomes observable and a marked

Table 1
Hybrid W22 x W23 Seeds Started Under Alternating Conditions of 12 Hrs. Light and 12 Hrs. Dark, Then Shifted to Constant Light 108 Hrs. After Start of Germination

	Time in Hours														
	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180
	L*	D	L	D	L	D	L	D	L	L	L	L	L	L	L
Wt. gain in gms.	.70	.37	.11	.17	.01	.27	.07	.44	.11	.13	.13	.04	.08	.01	.06

Table 2
Hybrid W22 x W23 Seeds Started Under Constant Light Conditions Then Transferred to Alternating 12 Hour Light and Dark Periods 108 Hours After Start of Germination

	Time in Hours														
	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180
	L	L	L	L	L	L	L	L	L	D	L	D	L	D	L
Wt. gain in gms.	.94	.28	.04	.10	.05	.12	.21	.27	.24	.62	.16	.56	.05	.55	.16

*L = light period 12 hours; D = dark period 12 hours.

change in rate of water uptake takes place. After these first eight days seeds become too difficult to manage by the above weighing procedures.

Rhythmic activity such as that outlined above has important experimental implications. During certain periods of great activity in the plant, the biologist is quiescent; during the greatest activity periods of the biologist, the plant is quiescent!

B. C. Mikula

4. Antigenic substances connected with the R locus.

A fundamental assumption in biology is that genetic information must be translated into molecular information in the form of protein. Because immunological mechanisms of animals are able to detect foreign protein, laboratory animals provide a means for the detection of gene-related antigenic materials of plants. Since a great many important basic questions hinge on the ability to detect gene-related molecules, an attempt was made to see if any of the alleles of R might produce distinct, antigenically active substances. To overcome difficulties experienced by others who have used plant materials as antigens, a minimum preparation was given the plant extracts which were injected into young rabbits. Fresh roots of a W22 x W23 hybrid containing the genes $R^r r^g$ were harvested after five to six days of germination on pads soaked with distilled water. Roots were ground in normal saline with a mortar and pestle in an ice