differ markedly from the sudden advances found in our other experiments in that there was no lag period, and a much higher proportion of the lines showed an advance which, in some instances, was greater than ever reached before. Less than 10 per cent of all the previous lines selected from line 70 showed a sudden response after a lag of 5-10 generations. The control selections from line 70 established in parallel with the present experiments have shown no sudden advances by the seventh generation in 30 lines; a most striking contrast.

A probable explanation of these results is that restriction of variability to one chromosome was effective, by eliminating interactions, in exposing additive genetic variability, thus enabling selection to cause greater and more rapid response. An alternative explanation might be that the use of isogenic 5a-8 had introduced a particular pattern of interaction, normally rare in line 70, that made response possible. We favour the first explanation, but clearly this type of experiment needs to be repeated on different isogenic backgrounds including that of line 70.

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Further Evidence of Heterozygosity in Parthenogenetic Turkeys

It has been reported that first and second set skin grafts from parthenogenetic Boltsville Small White turkey sires to some of their progeny by unrelated turkey females are rejected by typical homograft reactions. The finding that skin from any one parthenogenetic sire can be compatible with some of his progeny and incompatible with others was interpreted as evidence of segregation having occurred at one or more of his genetic loci assumed to control histocompatibility. On this basis it was concluded that a detectable degree of heterozygosity can exist in male turkey parthenogens¹.

However, this conclusion prompted the question that since the parthenogens' dams were not the dams of the recipient progeny the graft rejections might have been an expression of some sort of 'maternal effect'. The validity of this point was appraised by the following experiment.

Two male parthenogenetic turkeys (P-2789 and P-386) were mated each to his own dam and produced seven and four progeny respectively. These are hereafter called back-cross progeny, and each of them received a full-thickness wattle skin graft from its own parthenogenetic sire. The only variation from previously published surgical procedures^{1,2} was in the method of bandaging. Here, rather than use a cotton bolus, we protected the sutured graft with a layer of spray-on plastic surgical dressing followed by a piece of petrolatum gauze, and finally a loosely applied gauze pad.

The skin of P-2789 was found to be compatible with three and incompatible with four of his back-cross progeny, while the skin of P-386 was compatible with two and incompatible with two of his back-cross progeny.

In view of these results it is hard to conceive how the graft rejections in the previously published work¹ could be accounted for on the basis of the parthenogenetic sires

and their progeny having had different maternal parents. Instead, they strongly support the former conclusion that parthenogens can be heterozygous at one, at least, of the segregating genetic loci assumed to control histocompatibility in turkeys.

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Non-independent Occurrence of α_{s1} and β -Casein Variants of Cow's Milk

THE β -casein fraction of cow's milk has been found to show genetic variants distinguishable by electrophoresis¹. Part of the α_s -casein fraction, now called α_{s1} -casein (ref. 2), also shows genetic variation³. The α_{s1} -casein type B and the β -casein type A are prevalent, while the other two known variants of each only occur in some breeds of cattle^{4,5}. In Jersey cows α_{s1} -casein type C and β -casein type B are seen in a fair proportion of cases.

Examination of the results of typing one herd of British Jerseys suggested that the α_{s1} - and β -variants did not occur independently and this trend was confirmed by more numerous data for British and American Jerseys. The pooled results for all available cows (not a random sample of the breed) gave the following pattern of occurrence:

		β -casein		
		A	AB	
α_{s1} -casein	B	60	73	56
	BC	45	82	—
	C	35	—	—

The joint distribution shows a complete absence of three combinations of types. Based on expectations derived from the marginal totals of the above table, the absence of these three classes is judged to be highly significant and extremely unlikely to be due to chance ($P < 0.00001$).

Pooled data for Guernsey cattle typed in Britain and the United States were arranged in the same manner.

		β -casein			
		A	AB	AC	
α_{s1} -casein	B	85	5	11	1
	BC	52	2	5	—
	C	9	—	—	—

The absence of certain combinations is noticeable, although the expectation of observations in these classes is here small. A similar picture was found for American Brown Swiss cows:

		β -casein			
		A	AB	B	AC
α_{s1} -casein	B	146	69	4	2
	BC	22	5	—	—
	C	2	—	—	—

Here again the absence of some classes could easily be ascribed to chance, but the similarity to the other results suggests that this is not the explanation.

Evidence has been produced to show that both α_{s1} - and β -casein variants are inherited in a straightforward Mendelian manner^{1,3}. The loci have been designated α_{s1} -Cn and β -Cn. The present finding that the two kinds of variants do not occur independently suggests that the two loci may be linked, and in the Jersey breed, for example, the following chromosomes would be postulated: α_{s1} -Cn^B, β -Cn^A; α_{s1} -Cn^B, β -Cn^B; and α_{s1} -Cn^C, β -Cn^A. Since the α_{s1} -Cn^B, β -Cn^A combination prevails in all