

(e) *Uniformity Trials.—Blood Characteristics:* The possible usefulness of twins compared with ordinary cattle for studying variation in blood characteristics shown to be important in respect of certain metabolic disorders of cattle has been studied.

Uniformity within sets relative to non-twins is very good in blood magnesium, good in phosphorus, and only fair in calcium. In total acetone bodies and blood sugar, twins are hardly more uniform than unrelated cattle. Red-cell volume, hæmoglobin content, and red-cell count all show little variation within sets and a large variation between sets. Efficiency values calculated for these three characteristics are approximately 10 in each case. Red-cell fragility shows a high degree of uniformity, the efficiency value being 15. In blood agglutination titres, against *Br. abortus* vaccine, twins are again fairly uniform, the relative efficiency value being 5.

(f) *Genetic Implications of Nutritional Levels on Production:* The interaction of environment and inheritance upon identical animals has been studied. Fifteen sets of twins have been placed on three widely different levels of nutrition so that twin pair comparisons are possible between each level. The three levels used have been as follows:—

Treatment A: Maximum grass plus concentrates. Hay and silage *ad lib.* when grass inadequate.

Treatment B: Maximum grass and hay plus silage *ad lib.* when grass inadequate.

Treatment C: Grass at 60 per cent. of the level of treatment B. Hay and silage at 60 per cent. of treatment B when needed.

Thus the treatment A cows have been fed to ensure production up to the maximum of their inherited capacity. The condition may be likened to those obtaining under selective testing of pedigree cows aiming at high records under C.O.R. test conditions. The treatment B cows have been fed to the limit possible under a high standard of efficiency of grassland farming. The nutrition level used may be likened to that of G.H.T. test conditions for pedigree cows on efficient grassland farms. The treatment C cows have had a restricted intake of grass and grass products by having access to only 60 per cent. of the area grazed by treatment B, the condition being comparable to G.H.T. test cattle on hard country.

The experiment has been designed to run a minimum of three years. Results for the first season (1947-48) are summarized below:—

AVERAGE PRODUCTION
(Mean of 5 sets of comparison)

—				Milk.	Butterfat.	Test.
				lb.	lb.	
Treatment A	..	..		7,699	402	5.2
Treatment B	..	..		6,047	305	5.0
Difference	..	..		1,652	97	0.2
Treatment B	..	..		5,135	266	5.2
Treatment C	..	..		4,749	237	5.0
Difference	..	..		386	29	0.2
Treatment A	..	..		6,019	316	5.3
Treatment C	..	..		3,605	179	5.0
Difference	..	..		2,414	137	0.3