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## Report for 1937

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## Manuring of Hay

### Rothamsted Research

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*Cwt. for one beast on one acre*

	Days	Cake	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
Early summer ..	50	2.7	0.07	0.04	0.02
Late summer ..	70	6.3	0.28	0.06	0.06
Per annum ..	120	9.0	0.35	0.10	0.08

In the following winter or spring a neighbouring plot will receive the following manures :—

	Cwt. per acre	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
$\frac{1}{4}$ cake N as hoof and horn meal ..	0.68	0.09	—	—
$\frac{1}{4}$ cake N as sulphate of ammonia ..	0.43	0.09	—	—
$\frac{3}{4}$ cake P <sub>2</sub> O <sub>5</sub> as steamed bone flour ..	0.27	—	0.08	—
$\frac{3}{4}$ cake K <sub>2</sub> O as sulphate of potash ..	0.12	—	—	0.06
Total fertilizer .. .. .	1.50	0.18	0.08	0.06

The lengths of the grazing period will, naturally, have to vary with seasonal conditions but we shall aim at getting on a fixed amount of cake per acre per annum. In the event of seasonal changes the necessary adjustments can be made in the following year in the amounts of fertilizers added.

In the two years following the cake year the stocking will be altered from time to time according to the state of the herbage, but the proportion of one bullock to three sheep will be maintained. All animals will be weighed fortnightly. The plots will be closed from some time in November and December until the herbage is ready for grazing in May or thereabouts.

#### MANURING OF HAY

The immediate and first year residual effects on the hay crop of 8 tons compost (mainly from grass mowings) were compared with those of artificials consisting of 2 cwt. nitrate of soda, 3 cwt. superphosphate and 1 cwt. of 30 per cent. potash salt per acre. The experiment was conducted at Lady Manners School, Bakewell, Derby, and commenced in 1932. Certain plots receive their manuring only in 1932 and alternate years, others only in 1933 and alternate years, while a third set are manured every year.

TABLE II  
*Meadow Hay—Immediate Effects of Artificials and Compost*

	Mean yield cwt. per acre	No manure in previous year		Manured in previous year	
		Response to Artificials	Response to Compost	Response to Artificials	Response to Compost
1933	39.5	+19.2	+16.4	+21.0	+9.4
1934	43.1	+8.5	+4.5	-0.3	-2.4
1935	44.3	+18.9	+14.2	+13.8	+8.9
1936	62.8	+14.9	+14.4	+10.5	+6.0
1937	70.5	+27.2	+20.7	+19.5	+7.6

The immediate response to artificials is greater than the immediate response to compost every year. Further, as is to be

expected, the responses to both manures are greater on plots without manuring in the previous year than on plots which were then manured. The average differences between the increases to artificials and the increases to compost are 3.7 cwt. per acre on plots unmanured and 7.0 cwt. per acre on plots manured. This indicates that artificials are more effective relatively to compost at higher levels of yield.

TABLE III  
*First Year Residual Effects of Artificials and Compost*

	No manure in current year		Manured in current year	
	Response to Artificials	Response to Compost	Response to Artificials	Response to Compost
1933	+0.7	+2.8	-0.8	-0.9
1934	+9.8	+21.7	+8.1	+7.8
1935	+2.8	+9.7	-3.2	+5.2
1936	+7.5	+10.2	+1.4	+3.4
1937	+3.2	+13.4	-1.8	-2.3

In most years there were also good responses to a previous year's dressing of manures on plots receiving no manure in the current year. The relative effectiveness of the two manures has, however, been reversed, compost giving about 6.7 cwt. per acre more than artificials. On plots manured in the current year, the residual effects were small or negligible except in 1934, in which the residual responses to the two manures were roughly equal; at these higher levels of yield compost has apparently little residual value, a result in accordance with that indicated above.

## ARABLE LAND

### THE LIMING PROGRAMME

Some of the results of the 1936-37 experiments have an important bearing on the liming programme of the Ministry of Agriculture. In many parts of England there is a dislike of magnesian limestone and of the lime prepared from it. We have made a number of experiments in different parts of the country but so far obtained no evidence that the magnesian limestones are detrimental. When used in the quantities indicated by the ordinary lime requirement methods they give fully as good results as the corresponding high-calcium products. In some pot experiments, indeed, magnesium proved beneficial, but not in any of the field experiments. No full survey has been made but there is no present evidence of widespread magnesium deficiency in English soils.

### RESIDUAL EFFECTS OF CHALK

The residual effects of chalk have been studied in three experiments, in two of which there were several dressings of chalk so as to determine the most effective amount to apply.

At Tunstall on an acid sandy soil, chalk was applied in 1932 but nothing was added afterwards. Sugar-beet was grown by Mr. A. W. Oldershaw, for the first four years, 1932-5.