ROTHAMSTED RESEARCH

Yields of the Field Experiments 1948

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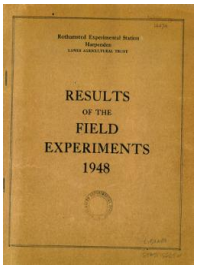

Yields of the Field Experiments 1948 - Results

Rothamsted Research

Rothamsted Research (1949) *Yields of the Field Experiments 1948 - Results ;* Yields Of The Field Experiments 1948, pp 1 - 98

Rothamsted Experimental Station
Harpenden
LAWES AGRICULTURAL TRUST

RESULTS
OF THE
FIELD
EXPERIMENTS
1948

Rothamsted Experimental Station

Harpenden

Lawes Agricultural Trust

RESULTS of the FIELD EXPERIMENTS 1948

The summaries given in this report are similar to those contained in the appendices to the Annual Reports of the Station before the war. With one or two special exceptions only experiments conducted at Rothamsted and Woburn are included. The design and supervision of these experiments are the responsibility of the Field Plots Committee (present members: E.M.Crowther (Chairman) H.V.Garner (Secretary), H.H.Mann, J.R.Moffatt, D.J.R.Watson, F.Yates). The results of series of experiments conducted on commercial farms (such as the factory series of sugar beet fertilizer experiments) will be published elsewhere.

Reports covering the war years are being prepared.

Price: 5/-

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Classicals

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48/A/1.1

WHEAT - BROADBALK 1948

The 105th year

Treatments as listed in 1938 Report p.p. 115-6, except that since the year 1940-41 rape cake has been replaced by castor bean meal, at the same rate of application.

Cultivations, etc.:

Cropped sections. Dung applied: Sept.24. Ploughed: Sept 22-Sept. 24. Artificials applied: Oct.13-15. Rolled and springtine harrowed: Oct. 22. Tooth harrowed: Oct. 23. Seed drilled: Oct. 24-25. Harrowed in: Oct. 25. Harrowed: Apr. 12. Ring rolled: Apr. 20. Nitrogeneous fertilizers applied: Apr. 27-28. Second dressing of nitrate of soda applied to plot 16: May 7. Wild oats hand pulled: various days June 15 - July 30. Harvested: Aug. 19-20. Variety: Squareheads Master (13/4).

Fallow section. Ploughed: Sept. 22-24. Rolled and springtine harrowed: Oct.22. Tooth harrowed: Oct. 23 and 25. Springtine harrowed: Apr. 12. Thistles cut: Apr. 20. Ploughed: May 25-27. Ring rolled: June 9. Thistles cut: July 1. Ploughed: July 14-15. Rolled and springtine harrowed: Aug.6.

	Total Grain: cwt. per acre					Total straw: * cwt. per acre				
Section	II	I	III	IV	Mean	II	I	III	IV	Mean
Years after Fallow	1	2	3	4		1	2	3	4	
Plot 2A	32.4	23.5	20.0	23.1	24.8	62.0	47.5	29.5	50.0	47.2
2B	36.0	30.4	23.8	25.3	28.9	68.9	58.5	47.8	51.8	56.8
3	17.3	17.2	10.9	9.8	13.8	31.3	27.5	19.5	19.1	24.5
5	20.9	14.9	9.8	10.4	14.0	38.2	28.5	21.8	22.4	27.7
6	21.6	20.5	14.3	14.5	17.7	42.0	37.3	26.8	31.9	34.5
7	26.1	27.9	20.2	20.4	23.6	47.8	48.3	41.7	44.0	45.4
8	28.4	31.8	25.6	27.5	28.3	55.2	67.5	52.2	52.6	56.9
9	22.2	22.3	15.4	16.6	19.1	40.1	40.8	31.2	29.6	35.4
10	14.2	24.2	17.6	12.8	17.2	32.2	40.8	28.1	24.9	31.5
11	16.3	21.8	17.8	14.7	17.6	28.8	38.1	30.7	26.8	31.1
12	20.2	24.4	19.7	19.7	21.0	33.2	38.8	32.6	34.0	34.6
13	26.2	26.4	18.7	17.7	22.2	43.8	46.2	33.5	35.1	39.6
14	19.4	28.3	20.2	20.6	22.1	34.7	44.7	33.8	37.7	37.7
15	21.6	18.4	16.8	15.0	18.0	41.6	41.5	31.1	33.1	36.8
16	28.1	26.6	22.6	23.1	25.1	49.5	39.9	46.6	46.3	45.6
17	20.5	22.5	17.6	16.6	19.3	42.6	39.2	33.0	34.6	37.4
18	17.3	12.9	8.8	8.2	11.8	30.9	20.7	17.8	17.5	21.7
19	19.6	26.5	18.3	17.8	20.6	38.8	43.6	34.1	36.8	38.3
20	14.0	25.1	-	-	19.6	29.4	45.1	-	-	37.2

48/A/1.2

* Includes straw, cavings and chaff

BARLEY - HOOSFIELD 1948

Treatments as listed in 1938 Report, p. 117, except that since 1940-41 rape cake has been replaced by castor bean meal at the same rate of application.

Cultivations, etc.: Ploughed (shallow): Sept.18-20. Springtine harrowed: Sept 30. Dung applied: Nov 24. Ploughed: Nov 22-28. Springtine harrowed: Mar 1-5. Artificials applied: Mar 10-11. Thistles cleared: Mar 27. Harrowed: Mar 30. Seed drilled: Mar. 31 Harrowed in: Apr 6. Rolled: Apr 10. Wild oats hand pulled: July 5-15 and July 30 - Aug 10, and scythed: Aug 9. Harvested: Aug 30.

Note: On plots 5O, 5A and 3C, sections badly infected with wild oats were scythed out and discarded. On all other plots the full area was harvested.

Plot	Total Grain cwt./acre	Total Straw* cwt./acre
1 O	7.6	10.9
2 O	10.3	11.9
3 O	8.9	11.5
4 O	14.2	18.3
5 O	16.3	21.2
1 A	10.6	16.5
2 A	16.0	21.1
3 A	12.2	20.2
4 A	21.6	27.5
5 A	19.3	23.2
1 AA	13.3	25.9
2 AA	20.5	27.1
3 AA	15.3	23.2
4 AA	22.4	27.1
1 AAS	17.5	27.8
2 AAS	21.8	31.5
3 AAS	22.4	30.0
4 AAS	24.6	30.1
1 C	15.2	21.6
2 C	17.7	23.2
3 C	17.3	26.4
4 C	23.3	18.9
7 - 1	12.6	15.6
7 - 2	28.2	40.2
6 - 1	6.6	10.1
6 - 2	8.7	11.4
1 N	12.8	22.8
2 N	16.9	27.4

* Includes straw, cavings and chaff.

48/A/3

WHEAT AFTER FALLOW - HOOSFIELD 1948

Without manure 1851 and since.

For details of treatments see 1938 Report p.109.

Cultivations, etc.:

Cropped sections: Ploughed: Sept.15-16. Rolled, springtine harrowed and harrowed: Oct.24. Seed drilled and harrowed in: Oct.25. Ring rolled: Mar.31. Weeds hand pulled: July 29. Harvested: Aug.23.

Fallow sections: Ploughed: Sept.15-16. Rolled, springtine harrowed and harrowed: Sept.24. Springtine harrowed: Mar.10. Thistles cut: Apr.22. Ploughed: May 21. Ring rolled: June 9.

	Produce: cwt. per acre			
No. of years of Fallow	1	1	3	Mean
Section	A2	A3	A4	
Total Grain	9.3	11.1	10.6	10.3
Total Straw	16.6	19.6	17.5	17.9

Note "CROPS IN ROTATION - AGDELL FIELD 1948"

Manures were applied as usual, but turnips were sown on plots 1 and 2 only. The crop was badly infected with "finger and toe", and was discarded.

48/A/4.1

MANGOLDS - BARNFIELD 1948.

Treatments as listed in 1938 Report, p.110, except that on cross dressings AC and C, rape cake has been replaced by castor bean meal at the same rate of application.

Note. Both the Mangold and Sugar Beet crops were almost destroyed by flea beetle, and only Mangolds were resown.

Cultivations, etc.: Dung applied: Nov.25. Ploughed various days: Nov. 26-Dec. 16. Cultivated: Mar. 25. Artificials applied: Apr.20 - 23. Thistles cut: Apr.24. Harrowed: Apr. 26. Rolled: Apr. 27. Seed drilled: Apr. 28. Dusted with flea beetle dust: May 14, 19 and 22. Plant almost destroyed by flea beetle by May 29, so decision made to resow mangolds only. Thistles cut: May 29. Springtine harrowed: June 8. Harrowed, rolled and seed redrilled June 9. Top dressings applied: June 10. Harrowed in seed and artificials: June 11. Dusted: June 19-22. Dung plot hoed: July 8. Hoed: July 12-15. Singled: July 12-21. Hoed: July 26-27, Aug. 16-25, Sept. 9-11, Sept 24-27 and Oct. 11. Lifted: Nov. 3-18. Variety: Yellow Globe.

Note: For leaf weights, two random rows were chosen from each plot. The weight of each of these samples was recorded separately.

Cross Dressings

Strip	O	N	A	AC	C
		Roots: tons per acre			
1	9.52	18.19	15.49	18.35	12.61
2	10.84	18.90	18.31	22.52	17.12
4	2.19	(a) 12.15	14.45	19.80	10.01
		(b) 12.88			
5	1.54	9.27	6.34	8.38	3.90
6	1.85	10.78	13.32	16.84	6.91
7	1.47	8.28	11.12	12.83	5.57
8	1.35	6.53	5.58	7.44	4.78
9	11.73				
		Leaves: tons per acre			
1	3.34	4.82	4.16	5.75	6.02
2	4.94	6.29	5.82	6.63	6.43
4	1.96	(a) 5.43	5.65	7.68	5.99
		(b) 6.14			
5	1.10	4.21	2.94	3.84	2.76
6	1.20	4.31	5.02	5.31	4.33
7	0.91	4.62	5.46	7.68	4.65
8	1.13	3.72	3.06	3.38	3.16
9	5.19				

HAY - THE PARK GRASS PLOTS, 1948.

48/A/5

For details of treatments and notes, see 1935 Report p.151 and 1938 Report p.111.

Cultivations etc.: Chain harrowed: Dec.10. Limed: Jan.3-7 Minerals applied: Jan.17-20. Ring rolled: Mar. 24. Nitrogenous manures applied: 1st dressing Apr. 5; 2nd dressing May 4. 1st cut: June 16-18. 2nd cut: Oct.7-9

Yield of Hay: cwt. per acre.

Plot	Not limed 1st Crop	Not limed 2nd Crop***	Not limed Total	Limed 1st Crop	Limed 2nd Crop***	Limed Total
1	9.1	10.0	19.1	18.0	5.4	23.4
2	15.8	9.2	25.0	16.6	6.6	23.2
3	13.9	9.0	22.9	14.6	7.0	21.6
4-1	19.1	7.0	26.1	18.3	11.9	30.2
4-2	20.2	6.2	26.4	31.0	6.9	37.9
5-1	9.4	4.2	13.6	-	-	-
5-2	16.0	12.1	28.1	-	-	-
6	30.0	14.4	44.4	-	-	-
7	31.5	17.9	49.4	32.4	17.4	49.8
8	25.5	10.6	36.1	12.2	6.9	19.1
9	34.6	11.2	45.8	41.0	7.6	48.6
10	18.7	11.6	30.3	32.5	7.0	39.5
11-1	46.2	23.9	70.1	51.5	10.0	61.5
11-2	42.3	10.4	52.7	63.3	9.1	72.4
12	13.7	9.5	23.2	-	-	-
13	28.4	12.4	40.8	31.2	7.6	38.8
14	55.1	15.0	70.1	52.5*	11.2*	63.7*
				47.2**	4.8**	52.0**
15	21.6	22.2	43.8	19.4	7.8	27.2
16	39.7	15.8	55.5	42.9	8.1	51.0
17	22.4	8.8	31.2	24.1	8.5	32.6
18	3.5	8.1	11.6	35.1+	5.8+	40.9+
	-	-	-	29.2++	8.0++	37.2++
19	26.0	10.5	36.5	26.6+	6.2+	32.8+
	-	-	-	32.7++	0.4++	33.1++
20	39.7	12.0	51.7	41.6+	11.8+	53.4+
	-	-	-	40.4++	8.9++	49.3++

* Sun
** Shade
*** The figures for the second crop are estimated hay yields calculated from the dry matter.

\+ Heavy liming
++ Light liming

48/Ba/1.1

TWO COURSE ROTATION EXPERIMENT

Cumulative Effects of Agricultural Salt

Rothamsted 1948

(For full details see 1942 Report)

Treatments:
All combinations of:

(1) Agricultural salt: None, 2½, 5 and 7½ cwt per acre applied to sugar beet or at half these rates to barley.

(2) Muriate of potash: None, the equivalent of half the single dressing of salt (approximately 1 cwt. K_2O per acre), the equivalent of the single dressings of salt (approximately 2 cwt. K_2O per acre), applied to sugar beet at sowing.

(3) Time of application of salt: In seed bed at sowing, before ploughing in winter.

(4) Salt applied to sugar beet only, salt repeated at half rate on barley.

Note: treatment (3) applies to both sugar beet and barley crops; the barley receives no potash treatment. For ease of analysis K_2O of the muriate of potash dressings is made equivalent to Cl of agricultural salt dressings.

Basal dressings, applied to all plots at sowing:
Barley: 0.3 cwt. N per acre as sulphate of ammonia
Sugar beet: 0.8 cwt. N per acre as sulphate of ammonia
0.6 cwt. P_2O_5 per acre as superphosphate.

Cultivations, etc:

Sugar Beet. Series I. Long Hoos VII
Agricultural salt applied: Oct. 21. Ploughed: Nov. 10-21. Cultivated: Mar. 16. Rolled and springtine harrowed, ring rolled: Mar. 27. Sulphate of ammonia applied: Mar. 30. Superphosphate, agricultural salt and muriate of potash applied: Apr. 12. Harrowed: Apr. 14. Seed drilled: Apr. 15. Seed harrowed in: Apr. 16. Rolled: Apr. 22. Dusted with Flea beetle dust: May 14. Plots 6, 12, 18, 24, 30, 36, 42, 48 damaged by herbicide spray from adjacent barley; May 14. Bare patches resown: late May. Hoed: May 20-21, 25. Weeds hand pulled: June 9-11. Singled: June 10-11. Hoed: June 21 - July 22. Lifted: Nov. 23-30. Variety: Klein E. Previous crop: Barley.

Barley. Series II. Long Hoos V.
Agricultural salt applied: Dec 2. Ploughed: Dec 10-12. Springtine harrowed: Mar 1. Harrowed, seed drilled, sulphate of ammonia applied: Mar 8. Applied agricultural salt, harrowed in, ring rolled: Mar 9. Sprayed with "Denocate" to clear charlock, (plots 66, 65, 64, 63, 62, 61 damaged by an overdose of spray): May 14. Hand weeded: June 30. Harvested: Aug. 14. Variety: Plumage Archer. Previous crop: Sugar Beet.

Standard errors per plot:

Sugar beet,	total sugar,	4.40 cwt.	per acre or	10.9%
	tops,	1.13 tons	per acre or	7.8%
Barley,	grain,	2.20 cwt.	per acre or	7.1%

All standard errors estimated from 22 d.f.

Series I: Sugar Beet

Salt in 1948 (cwt. per acre)	Muriate of potash K_2O cwt. per acre			Salt applied		Mean
	0.0	1.0	2.0	Winter	In seed bed	
	Total Sugar: cwt. per acre					
		(±2.20)		(±1.68)		(±1.27)
0	33.4	34.2	35.7			34.4
2.5	43.7	37.9	40.2	41.6	39.6	40.6
5.0	41.8	44.6	42.0	42.2	43.5	42.8
7.5	41.9	44.6	46.1	43.4	45.1	44.2
Mean	40.2	40.3 (±1.10)	41.0	42.4	42.7 (±1.02)	40.5
	Sugar percentage					
0	16.24	16.34	16.57			16.38
2.5	16.49	16.46	16.78	16.57	16.58	16.57
5.0	16.75	16.90	16.42	16.58	16.80	16.69
7.5	16.59	16.62	16.84	16.78	16.60	16.69
Mean	16.51	16.58	16.65	16.64	16.66	16.58
	Roots (washed): tons per acre					
0	10.26	10.44	10.74			10.48
2.5	13.27	11.50	11.97	12.56	11.93	12.25
5.0	12.49	13.20	12.74	12.69	12.93	12.81
7.5	12.63	13.42	13.71	12.92	13.59	13.25
Mean	12.16	12.14	12.29	12.73	12.81	12.20
	Tops: tons per acre					
		(±0.566)		(±0.433)		(±0.327)
0	14.21	14.80	13.90			14.30
2.5	14.57	14.27	14.68	13.05	15.97	14.51
5.0	13.28	13.75	15.36	14.86	13.40	14.13
7.5	14.90	17.08	13.56	13.79	16.57	15.18
Mean	14.24	14.98 (±0.283)	14.37	13.90	15.31 (±0.261)	14.53

Series I: Sugar Beet (contd.)

Salt in 1948 (cwt.per acre)	Muriate of potash K_2O cwt. per acre 0.0	1.0	2.0	Salt applied In seed bed Winter	bed	Mean
	Plant No.: thousands per acre					
0	22.3	22.2	21.4			22.0
2.5	22.0	21.9	22.3	21.9	22.3	22.1
5.0	21.9	22.6	21.6	21.7	22.3	22.0
7.5	22.1	22.4	21.5	22.2	21.8	22.0
Mean	22.1	22.3	21.7	21.9	22.1	22.0
	Noxious Nitrogen: m.g. per 100 grams.					
0	30.2	31.5	31.2			31.0
2.5	28.5	30.2	28.8	28.7	29.7	29.2
5.0	29.8	28.8	28.0	29.3	28.3	28.8
7.5	31.0	29.5	30.8	31.2	29.7	30.4
Mean	29.9	30.0	29.7	29.7	29.2	29.8

Series II: Barley

Salt in 1947 (cwt. per acre)	Muriate of potash K_2O cwt. per acre applied in 1947 0.0	1.0	2.0	Salt applied In seed Winter	bed	Salt in 1948 None	Half Rate	Mean
	Grain: cwt. per acre							
	(±1.10)			(±0.84)				(±0.63)
0	31.3	33.6	30.6					31.8
2.5	32.6	30.8	31.2	31.6	31.5	31.2	31.9	31.5
5.0	30.2	31.1	29.8	30.8	30.0	29.1	31.6	30.4
7.5	29.6	30.0	29.6	30.5	29.0	29.1	30.3	29.7
Mean	30.9	31.4 (±0.55)	30.3	31.0	30.2 (±0.51)	29.8	31.3	30.9
	Straw: cwt. per acre							
0	35.9	37.0	35.3					36.1
2.5	36.8	33.2	34.7	34.8	34.9	35.6	34.1	34.9
5.0	32.7	33.4	32.0	31.9	33.5	32.1	33.3	32.7
7.5	32.4	32.2	31.5	31.4	32.7	30.7	33.4	32.0
Mean	34.4	34.0	33.4	32.7	33.7	32.8	33.6	33.9

48/Ba/2.1

THREE COURSE ROTATION EXPERIMENT

Long Hoos VI, 1948

Effect of ploughing in straw

Treatments as given in 1933 Report, pp. 118-9, except that no comparisons of winter green manuring crops are now made, and that commencing in 1942 a yearly dressing of 2½ cwt. per acre magnesium sulphate is applied to one of the replicate plots of each treatment, in each crop block.

Cultivations, etc.

Barley, Series I.
Applied Adco and straw with accompanying artificials, ploughed: Nov 10-21. Springtine harrowed: Mar 1. Artificials applied: Mar 3. Harrowed, seed drilled and harrowed in: Mar 4. Ring rolled: Mar 9. Weeded: June 8. Harvested: Aug 18. Variety: Plumage Archer. Previous crop: Potatoes.

Potatoes, Series II.
Applied Adco and straw with accompanying artificials, ploughed: Nov 10-21. Cultivated: Mar 16. Harrowed and rolled: Mar 22. Ridged: Mar 24. Artificials applied, potatoes planted and covered in: Mar 25. Ridges rolled down: Mar 27. Harrowed: Apr 30. Weeded: June 11. Grubbed: June 9, 16. Earthed up: June 17. Sprayed with "Perinox": Aug 9. Sprayed to kill haulm: Sept 13. Lifted: Sept 29. Variety: Majestic. Previous crop: Sugar Beet.

Sugar Beet, Series III.
Applied Adco and straw with accompanying artificials, ploughed: Nov 10-21. Cultivated; Mar 16. Harrowed and rolled: Mar 22. Artificials applied: Apr 13. Harrowed: Apr 14. Seed drilled: Apr 15. Harrowed in: Apr 16. Rolled: Apr 22. Dusted with Flea beetle dust: May 14. Plots 54, 60, 66 and 72 were damaged by herbicide spray from 2 Course Rotation Experiment, May 14, and bare patches (including the whole of plots 66 and 72) were redrilled May 20. Hoed: May 20. Late sown plants dusted with Flea beetle dust: June 9. Weeded: June 10-11. Singled: June 12 Hoed: June 21, July 20. Lifted: Nov 12, 15. Variety: Klein E. Previous crop: Barley.

Note: Considerable damage to sugar beet tops was caused by sheep on plots 49, 50, 51, 55, 56, 57, 61, 62, 67, 68.

Standard errors per plot:

Sugar beet,	roots (washed),	±0.573 tons per acre or 5.9%
	tops,	±1.348 tons per acre or 18.8%
	total sugar,	±2.69 cwt. per acre or 7.7%
	sugar percent	±0.437
	plant number,	±1.66 thousands per acre or 7.6%
Barley,	grain,	±3.47 cwt. per acre or 10.4%
	straw,	±4.75 cwt. per acre or 12.6%
Potatoes	total tubers,	±0.661 tons per acre or 6.4%
	percentage ware	±0.581

All standard errors are based on 8 d.f.

Summary of Results

	Treatments applied 1946/7					Treatments applied 1947/8				
	Arts	Adco	St 1	St 2	Mean	Arts	Adco	St 1	St 2	Mean
Series I										
Barley Grain cwt./acre	34.0	32.1	33.3	33.3	33.1 (±1.00)	36.8	32.3	31.0	35.2	33.9 (±1.00)
		(±2.00)					(±2.00)			
Straw cwt./acre	36.8	35.9	36.8	36.5	36.5 (±1.37)	43.1	36.5	36.9	40.0	39.1 (±1.37)
		(±2.74)					(±2.74)			
Series II										
Potatoes tons/acre	8.47	10.12	9.78	10.41	9.70 (±0.191)	10.40	10.40	12.35	11.12	11.07 (±0.191)
		(± 0.382)					(±0.382)			
Percentage Ware	92.0	93.5	93.6	93.6	93.2 (±0.168)	94.0	93.7	95.3	94.4	94.4 (±0.168)
		(±0.335)					(±0.335)			
Series III										
Sugar Beet Roots (washed) tons/acre	9.30	9.12	8.95	9.63	9.25 (±0.166)	10.79	9.04	10.21	10.69	10.18 (±0.166)
		(±0.331)					(±0.331)			
Tops tons/acre	6.41	6.94	7.09	7.43	6.79 (±0.389)	9.49	6.14	7.28	7.40	7.58 (±0.389)
		(±0.778)					(±0.778)			
Sugar percentage	17.32	17.89	17.13	17.59	17.48 (±0.126)	18.18	18.18	18.12	17.88	18.09 (±0.126)
		(±0.252)					(±0.252)			
Total sugar cwt./acre	32.2	32.6	30.6	33.9	32.3 (±0.78)	39.3	32.9	37.0	38.3	36.9 (±0.78)
		(±1.55)					(±1.55)			
Plant number thous./acre	22.2	22.6	20.0	22.6	21.9 (±0.48)	21.8	22.0	22.3	22.2	22.1 (±0.48)
		(±0.96)					(±0.96)			

Responses to Magnesium Sulphate

	Treatments applied 1946/7					Treatments applied 1947/8				
	Arts	Adco	St.1	St.2	Mean	Arts	Adco	St.1	St.2	Mean
Series I										
Barley Grain cwt./acre	-4.3	-0.6	2.8	-5.0	-1.8	0.2	-8.0	-5.9	1.9	-3.0
		(±4.25)					(±4.25)			
Straw cwt./acre	-4.0	-4.2	6.1	-3.4	-1.4	-0.2	-5.4	-4.9	0.4	-2.5
		(±5.82)					(±5.82)			
Series II										
Potatoes tons/acre	-0.38	0.22	0.07	-0.07	-0.04	1.12	0.44	0.82	-1.14	0.31
		(±0.810)					(±0.810)			
Percentage Ware	-0.4	0.3	-0.6	-0.6	-0.3	0.2	0.3	0.6	0.0	0.3
		(±0.71)					(±0.71)			
Series III										
Sugar Beet Roots (washed) tons/acre	-0.34	-1.02	-1.80	-0.50	-0.92	1.06	1.28	-1.21	0.01	+0.28
		(±0.702)					(±0.702)			
Tops tons/acre	-1.77	-0.92	0.56	2.06	-0.02	1.38	1.21	-2.44	0.52	0.17
		(±1.652)					(±1.652)			
Total sugar cwt/acre	0.7	-2.7	-5.6	-2.7	-2.6	7.3	4.8	-5.0	1.1	2.0
		(±3.30)					(±3.30)			
Sugar percentage	1.02	0.56	0.36	-0.46	0.37	1.54	0.07	-0.30	0.48	0.45
		(±0.535)					(±0.535)			
Plant number thous./acre	0.6	-2.2	-7.1	-3.8	-3.1	0.6	2.6	-4.6	-1.2	-0.6
		(±2.03)					(±2.03)			

FOUR COURSE ROTATION EXPERIMENT

Hoosfield, 1948

Residual values of organic and phosphatic fertilizers.

The scheme of the experiment is as given in the 1932 Report, pp.127-8, with the following alterations:-

1. From 1935 onwards, clover ryegrass ley has been replaced by ryegrass alone, sown in autumn after ploughing barley stubble, with fertilizers applied as on wheat.

2. From 1935 onwards, lime was applied every year at the rate of 10 cwt. per acre to the potato break after the crop had been lifted.

3. Each plot of the potato break has been split from 1942 onwards, a random half of each plot receiving an additional 2 cwt. per acre sulphate of ammonia.

4. Majestic potato seed has been used since 1942 in place of Ally.

Manures applied 1947-8

RESULTS OF FIELD EXPERIMENTS - 1948

ERRATUM

48/Ba/3.1, Table of manures applied 1947-8 should read:-

Manures applied 1947-8

	Organic fertilizers (cwt. per acre)				Additional artificial fertilizers (cwt. per acre)		
Treatment	Organic matter	N	P_2O_5	K_2O	N as Sulph. of amm.	P_2O_5 as Super	K_2O as mur. of potash
Dung	50 (as FYM)	1.404	0.709	2.230	0.396	0.491	0.770
Adco	50 (as Adco)	0.980	0.510	0.419	0.820	0.690	2.581
Straw	77 (as Straw)	1.392	0.104	0.627	0.408	1.096	2.373
Super			None		0.36	1.2	0.6
Rock phosphate			None		0.36	1.2*	0.6

* As mineral phosphate

Cultivations, etc.

Potatoes, Series I.
Ploughed: Sept.8. Dung, Adco with accompanying artificials applied; straw with first dressing of artificials applied; ploughed in: Nov.20,21. Second dressing of artificials applied to straw plot: Jan.22. Ploughed, harrowed, rolled: Mar.16-23. Ridged: Mar.30. Artificials, including third dressing to straw plot applied in the ridges; Apr.2. Potatoes planted and covered in: Apr.7. Ridges rolled: Apr.10. Ridges harrowed: May 10. Grubbed: June 9-16. Weeded: June 11-13. Earthed up: June 26. Hoed: June 30. Weeded: July 29. Sprayed with "Perinox": Aug.9. Sprayed to kill haulm: Sept.13. Lifted: Sept.27,28. Variety: Majestic. Previous crop: Wheat.

Barley, Series II
Applied dung, Adco and supplementary artificials: Nov.12. Straw with first dressing of artificials applied; ploughed: Nov.12,13. Ground chalk (22 cwt. per acre) applied: Nov.13. Second dressing of artificials applied to straw plots: Jan.22. Springtine harrowed: Mar.1. Artificials applied, including third dressing to straw plots: Mar.4. Harrowed, seed drilled and harrowed in: Mar.5. Ring rolled: Mar.10. Hand weeded to clear thistles: May 28. Hoed: June 4. Harvested: Aug.19. Variety: Plumage Archer. Previous crop: Potatoes.
Note: Ground chalk was used in place of ground lime.

Wheat, Series III
Applied dung and Adco with supplementary artificials, applied straw with first dressing of artificials, ploughed: Sept.15-24. Flat rolled and harrowed: Sept.25. Artificials applied excluding special dressing straw plots and sulphate of ammonia: Sept.27. Harrowed: Oct.2. Springtine harrowed, harrowed, seed (Squareheads Master 13/4) drilled and harrowed in: Oct.3. Resown with Squareheads Master (13/4) as plant had failed, second dressing of artificials applied to straw

plot, harrowed in: Nov.29. Plant failed over winter, decided to resow, springtine harrowed, harrowed: Mar.8. Redrilled with Atle, applied sulphate of ammonia and third dressing of artificials to straw plots, harrowed in: Mar.9. Ring rolled: Mar.10. Weeded to clear thistles: May 28. Hoed: June 4. Harvested: Aug.28. Variety: Atle. Previous crop: Ryegrass.

Ryegrass, Series IV.

Dung, Adco with accompanying artificials applied: Sept.24. Straw with first dressing of artificials applied, ploughed: Sept.23-25. Harrowed and rolled: Sept.26. Autumn artificials applied not including sulphate of ammonia: Sept.27. Harrowed twice, ring rolled: Nov.10. Seed sown and harrowed in: Nov.13. Second dressing of artificials applied to straw plots: Nov.29. Applied sulphate of ammonia, third dressing of artificials applied to straw plot: Mar.17. Rolled: Mar.20. Hand weeded to clear thistles: June 12. Cut: June 15. Variety: Western Worths. Previous crop: Barley.

FOUR COURSE ROTATION

Summary of Results 1948

Manure	Year of Cycle	Wheat cwt per acre Grain	Wheat cwt per acre Straw	Barley cwt per acre Grain	Barley cwt per acre Straw	Ryegrass cwt per acre Dry matter	Total tubers tons per acre Additional N Without	Total tubers tons per acre Additional N With	Total tubers tons per acre Mean	Total tubers tons per acre Resp. to N	Percentage Ware Additional N Without	Percentage Ware Additional N With	Percentage Ware Mean	Percentage Ware Resp. to N
Manure as F.Y.M.	I	16.3	37.6	32.1	46.3	6.5	5.94	8.70	7.32	2.76	97.1	97.6	97.4	0.5
	II	9.7	29.6	27.1	28.1	5.7	7.89	10.09	8.99	2.20	97.2	97.7	97.4	0.5
	III	9.9	28.0	22.9	27.4	5.6	7.76	9.09	8.42	1.33	97.3	97.7	97.5	0.4
	IV	8.6	25.7	24.0	31.7	4.9	8.05	9.61	8.83	1.56	97.9	98.0	98.0	0.1
	V	10.4	29.2	21.4	29.0	4.4	7.62	9.42	8.52	1.80	97.2	98.4	97.8	1.2
Manure as Adco	I	20.2	47.8	35.7	26.6	16.7	9.09	10.72	9.90	1.63	98.1	98.4	98.2	0.3
	II	10.7	32.5	24.4	30.4	3.7	6.37	9.69	8.03	3.32	97.9	98.8	98.4	0.9
	III	8.9	23.0	25.1	30.4	3.5	6.04	9.71	7.88	3.67	97.4	98.2	97.8	0.8
	IV	9.0	21.2	23.6	30.6	4.4	7.94	9.46	8.70	1.52	98.1	98.2	98.2	0.1
	V	9.7	24.6	22.6	31.9	2.8	5.85	9.28	7.56	3.43	97.0	98.3	97.6	1.3
Manure as Straw	I	21.6	47.8	36.5	47.1	19.2	10.19	12.30	11.24	2.11	97.6	98.1	97.8	0.5
	II	11.0	33.0	28.3	33.6	6.6	6.54	8.55	7.54	2.01	96.1	97.3	96.7	1.2
	III	13.1	32.0	23.9	25.0	6.5	6.79	10.56	8.68	3.77	97.2	98.2	97.7	1.0
	IV	10.6	29.0	26.4	32.0	4.8	7.39	9.67	8.53	2.28	97.2	98.4	97.8	1.2
	V	9.7	25.8	24.7	28.7	2.9	8.29	10.65	9.47	2.36	97.5	97.6	97.6	0.1
Super phos-phate	I	15.1	32.4	32.1	34.2	9.3	10.69	11.65	11.17	0.96	97.5	97.2	97.4	-0.3
	II	14.1	32.0	27.6	32.5	5.5	9.20	9.81	9.50	0.61	98.1	98.8	98.4	0.7
	III	12.7	30.4	30.2	33.0	9.4	7.89	11.38	9.64	3.49	98.5	98.8	98.6	0.3
	IV	11.6	23.8	27.5	32.1	6.1	7.59	8.39	7.99	0.80	97.7	98.0	97.8	0.3
	V	11.7	28.4	29.0	31.8	2.9	7.32	8.90	8.11	1.58	97.6	98.7	98.2	1.1
Rock phos-phate	I	16.8	33.5	26.8	33.8	4.6	9.25	9.95	9.60	0.70	97.3	98.1	97.7	0.8
	II	12.1	27.1	26.2	31.2	4.0	7.03	7.82	7.42	0.79	97.3	97.8	97.6	0.5
	III	11.9	27.8	28.4	31.9	4.0	6.13	7.80	6.96	1.67	96.6	98.0	97.3	1.4
	IV	13.5	28.2	27.5	35.2	2.4	6.31	5.82	6.06	-0.49	97.2	95.9	96.6	-1.3
	V	10.3	21.8	29.0	45.6	4.6	6.74	6.22	6.48	-0.52	97.7	97.5	97.6	-0.2

48/Ba/3.4

SIX COURSE ROTATION EXPERIMENT

1947-8

Seasonal effects of N, P_2O_5 and K_2O

Rotation and treatments as given in 1932 Report, p. 131, with the exceptions that since 1934 the forage crop has been replaced by rye, harvested as a mature crop, and that the green manure crops are now omitted. Since 1934 lime has been applied at the rate of 10 cwt. per acre at two stages in the rotation: immediately after the removal of the potato crop and before sowing barley.

Cultivations, etc.:

Rothamsted, Long Hoos IV

Sugar beet. Series 3.
Ploughed: Sept 11, 12. Harrowed: Mar 22. Ploughed, harrowed and ring rolled: Apr 15, 16. Artificials applied, seed drilled and harrowed in: Apr 16. Ring rolled: Apr 22. Applied Agroxide (½ cwt. per acre) against wireworm: Apr 29. Dusted with Flea beetle dust: May 8, 14, 15. Applied Agroxide (1½ cwt. per acre): May 10. Hoed: June 8 – July 22. Singled: June 9. Lifted: Nov 10. Variety: Klein E. Previous crop: Rye.

Barley. Series 4.
Sugar beet tops remaining from 1947 crop ploughed in: Nov 7. Ground chalk applied (22 cwt. per acre); Nov 14. Springtine harrowed: Mar 1. Artificials applied: Mar 4. Harrowed, seed drilled and harrowed in: Mar 5. Ring rolled: Mar 9. Clover seed undersown: Apr 15. Harrowed and ring rolled: Apr 16. Harvested: Aug 18. Variety: Plumage Archer. Previous crop: Sugar beet.

Clover. Series 1.
Seed undersown in barley, harrowed in: Apr 12. Ring rolled: Apr 14. Phosphate and potash fertilizer applied: Dec 10. Rolled: Mar 10. Sulphate of ammonia applied: Mar.16. Self sown barley cut: Apr 26. Cut: July 6. Variety: Late flowering Montgomery Red. Previous crop: Barley.

Wheat. Series 5.
Ploughed: June 30. Twice harrowed: Oct 1. Autumn artificials applied, seed drilled and harrowed in: Oct 2. Seed resown (owing to plant failure) and harrowed in: Nov 12. Rolled: Mar 16. Sulphate of ammonia applied: Apr 15. Harvested: Aug 18. Variety: Yeoman. Previous crop: Clover.

Potatoes. Series 6.
Ploughed: Sept. 9, 10. Harrowed: Mar. 10. Ploughed and harrowed: Mar. 10, 11. Harrowed and rolled: Mar. 22. Ridged: Mar. 23. Artificials applied, potatoes planted and covered in: Mar. 24. Ridges rolled down: Mar. 27. Harrowed: Mar. 30. Hoed: June 4-10. Grubbed: June 7, 18. Earthed up: June 19. Sprayed with "Perinox": Aug.9. Sprayed to kill haulm: Sept.13. Lifted: Sept.29. Variety: Majestic. Previous crop: Wheat.

Rye. Series 2.
Ploughed: Sept. 30 - Oct.1. Harrowed twice, ring rolled, harrowed: Oct.1. Autumn artificials applied, seed drilled and harrowed in: Oct. 3. Ground chalk (22 cwt. per acre) applied: Nov. 14. Ring rolled: Mar.31. Sulphate of ammonia applied: Apr. 16. Cut: July 30. Previous crop: Potatoes.

Woburn, Stackyard Field, Series B.

Sugar beet. Series 4.
Ploughed: Sept.16, Oct.1, Feb.25-28. Springtine harrowed: Mar.17. Harrowed: Mar.19. Rolled: Mar.27. Seed drilled: Apr. 2. Artificials applied and harrowed in: Apr.5. Rolled: Apr.6. Hoed: May 19. Singled, and weeded to clear thistles, hoed: May 25 - June 1. Hoed: June 5 - July 21. Lifted: Oct.4. Variety: Klein E. Previous crop: Rye.

Barley. Series 6.
Sugar beet tops from 1947 crop ploughed in: Oct. 29-30. Ground chalk applied (96.5% $CaCO_3$, at rate of 1½ tons per acre of $CaCO_3$). Springtine harrowed: Mar.1. Artificials applied, harrowed: Mar. 4. Seed drilled and harrowed in: Mar.10. Rolled, Clover seed undersown: Mar.12. Harrowed: Mar.13. Harvested: Aug.14. Variety: Plumage Archer. Previous crop: Sugar beet.

Clover. Series 3.
Clover seed (late flowering Montgomery Red) undersown in barley: Apr. 17, 1947. Failed owing to drought. Ploughed: Sept. 26, 27, Feb. 26-28. Harrowed, all artificials including sulphate of ammonia applied: Mar. 4. Rolled, seed sown by hand and harrowed in: May 12. Harrowed and rolled: Mar.13. Cut: July 1. Variety: Early red Trifolium. Previous crop: Barley.

Wheat. Series 1.
Ploughed: July 9. Cultivated: Aug.21, Sept. 1. Rolled three times, cultivated three times, harrowed: Oct. 9. Autumn artificials applied: Oct.14. Seed drilled and harrowed in: Oct.14-15. Sowing destroyed by birds. Harrowed, seed drilled and harrowed in: Nov.14. Harrowed: Apr.14. Sulphate of ammonia applied: Apr.22. Rolled: Apr.26. Harvested: Aug.28. Variety: Squareheads Master (13/4). Previous crop: Clover.

Potatoes. Series 2.
Ploughed: Sept.30, Oct.6, Feb.27-28. Springtine harrowed: Mar.17. Harrowed: Mar.19. Rolled: Mar 27. Ridged: Apr.6-7. Artificials applied, potatoes planted and covered in: Apr.9. Ridges harrowed down: May 8. Grubbed: May 28, June 8. Hoed, earthed up: June 21. Sprayed with "Perinox": Early Aug. Sprayed to kill haulm: Sept.22. Lifted: Sept.30. Variety: Majestic. Previous crop: Wheat.

Rye. Series 5.
Ploughed: Oct.6,7. Harrowed: Oct.9. Ground chalk spread (14 cwt. per acre): Oct 13. Autumn artificials applied: Nov.14. Seed drilled and harrowed in: Nov.15. Harrowed: Apr.14. Sulphate of ammonia applied: Apr.22. Cut: July 30. Previous crop: Potatoes.

Mean yields per acre and increments in yield per cwt. of N, P_2O_5 and K_2O

	Rothamsted Response	S.E.	Woburn Response	S.E.	Rothamsted Response	S.E.	Woburn Response	S.E.
	Sugar Beet: Roots (washed) tons/acre				Clover Hay: Dry Matter cwt/acre			
Yield	11.51		8.52		36.3		32.6	
N	0.84	1.263	9.11	1.237	-1.2	5.15	-1.3	6.54
P	-1.23	1.263	-0.85	1.237	-8.1	5.15	-1.9	6.54
K	0.19	0.758	-1.35	0.742	6.3	3.09	1.1	3.92
	Tops: tons/acre				Wheat grain: cwt/acre			
Yield	10.72		6.92		26.6		20.8	
N	3.45	2.191	13.31	1.510	7.5	2.15	23.1	5.79
P	-3.17	2.191	- 2.02	1.510	-0.3	2.15	-13.2	5.79
K	0.70	1.315	- 2.28	0.906	3.3	1.29	-11.8	3.47
	Sugar Percentage				Wheat straw: cwt/acre			
Yield	17.87		17.57		47.8		40.2	
N	0.09	0.696	0.76	0.727	18.5		36.9	
P	-0.43	0.696	0.47	0.727	-1.5		-13.3	
K	-0.39	0.418	0.56	0.436	7.4		-19.9	
	Total Sugar: cwt/acre				Potatoes: total tubers tons/acre			
Yield	41.2		30.0		9.52		8.94	
N	3.1	4.38	32.9	4.02	6.09	1.541	7.62	1.326
P	-5.5	4.38	-2.1	4.02	-1.08	1.541	0.55	1.326
K	-0.3	2.63	-3.8	2.41	2.41	0.924	-0.57	0.795
	Plant Number: thous/acre				Potatoes: Percentage Ware			
Yield	20.9				97.1		93.2	
N	- 1.3	2.77			1.7	1.36	-0.7	2.30
P	2.9	2.77			-2.5	1.36	-4.8	2.30
K	0.8	1.66			1.8	0.82	3.5	1.38

Note: The underlined values are significant at 5% level.

	Rothamsted Response	S.E.	Woburn Response	S.E.	Rothamsted Response	S.E.	Woburn Response	S.E.
Barley Grain: cwt/acre					**Rye Grain: cwt/acre**			
Yield	36.2		27.5		25.8		21.2	
N	10.7	3.71	17.6	5.33	18.4	3.50	15.0	4.39
P	-2.3	3.71	3.5	5.33	2.6	3.50	-5.3	4.39
K	-1.2	2.23	1.7	3.20	2.3	2.10	7.8	2.64
Barley Straw: cwt/acre					**Rye Straw: cwt/acre**			
Yield	39.6		26.4		47.3		42.8	
N	24.7		20.9		14.7		4.5	
P	-1.6		-6.5		0.7		-3.8	
K	-3.7		3.7		4.6		10.6	

Note: The underlined values are significant at 5% level.

48/Bb/1

DEEP CULTIVATION ROTATION EXPERIMENT

Long Hoos I and III, 1948

Objects:

(1) To compare deep ploughing (about 12 inches) with shallow (about 6 inches)

(2) To compare the effects of ploughing in the mineral fertilizers at different depths with applying them in the seedbed.

(3) To compare the effects of ploughing in dung at different depths.

Rotation: Sugar beet, barley, clover-ryegrass ley, wheat, potatoes, spring oats. (Ley ploughed in (not deeper than 6 inches) soon after first cut. Sugar beet tops carted off).

Treatments:

Whole plots. All combinations of:

1. Shallow ploughing (6 inches) v. deep ploughing (12 inches). (This is done before potatoes and sugar beet, and after ley before wheat, at the same time in autumn for all three).

2. Farmyard manure: None v. 20 tons per acre for potatoes and 10 tons per acre for sugar beet, applied before ploughing.

3. Superphosphate: None v. 0.8 cwt. P_2O_5 per acre for potatoes and 0.6 cwt. P_2O_5 per acre for sugar beet.

4. Muriate of potash: None v. 1.0 cwt. K_2O per acre for potatoes and 0.6 cwt. K_2O per acre for sugar beet.

Treatments 2, 3 and 4 are applied only to potatoes and sugar beet.

Half plots (potatoes and sugar beet):
Phosphate and potash (where given) ploughed in v. applied in the seedbed.

Basal manuring: Applied in the ridges for potatoes, as a top dressing for wheat, and in the seed bed for other crops.
Sulphate of ammonia, for potatoes 0.6 cwt. N per acre, for sugar beet 0.8 cwt. N per acre, for spring oats 0.2 cwt. N per acre, for wheat 0.5 cwt. N per acre, for barley 0.3 cwt. N per acre.
Basic slag, for barley 0.6 cwt. P_2O_5 per acre.

Area of each whole plot: 0.03125 acre (before rejecting edge rows).

Cultivations, etc.:
Ley. Series 1-KS.
Seeds undersown in barley: Apr 12, 1947. Rolled: Mar 10, 1948. Cut: June 14, 15. Seeds mixture per acre: 18 lb. ryegrass (Aberystwyth S2.4), 8 lb. late flowering red clover (Cert. N.Z. Mother seed), 2 lb. Alsike clover. Previous crop: Barley.

Potatoes. Series 2 - KP.
Artificials applied: Sept 29. Dung applied (before deep ploughing), ploughed deep (about 12 inches): Sept 30. Dung applied (before shallow ploughing), ploughed shallow (about 6 inches): Oct 1,2. Cultivated: Mar 11, 20. Rolled and springtine harrowed: Mar.22. Harrowed twice, ring rolled: Mar.23. Ridged: Mar 31. Spring artificials applied, potatoes planted and covered in: Apr 7. Rolled down ridges: Apr 12. Ridges harrowed: May 10. Grubbed: June 9, 18. Earthed up: June 19,21. Hand weeded: June 10-11, July 28. Sprayed with "Perinox": Aug 9. Sprayed to kill haulm: Sept 13. Lifted: Sept 30. Variety: Majestic (Scotch seed A). Previous crop: Wheat.

Spring oats. Series 3 - KO.
Ploughed: Oct 15-20. Springtine harrowed: Mar 1. Sulphate of ammonia applied; seed drilled and harrowed in: Mar 5. Ring rolled: Mar.9. Weeded: May 28 - June 7. Harvested: Aug 16. Variety: Star. Previous crop: Potatoes.

Sugar beet. Series 4 - KS.
Artificials applied (before ploughing): Sept 29. Dung applied (before deep ploughing), ploughed deep (about 12 inches): Sept 30. Dung applied (before shallow ploughing);ploughed shallow (about 6 inches): Oct. 1,2. Cultivated: Mar 11,20. Rolled and springtine harrowed: Mar 22. Harrowed twice, ring rolled: Mar 23. Spring artificials applied: Apr 13. Harrowed: Apr 14. Seed drilled: Apr 15. Harrowed in: Apr 16. Ring rolled: Apr.22. Dusted with Flea beetle dust: May 8, 14, 15. Thistles hand weeded: June 5. Hoed: June 7 - July 21. Singled: June 8. Hand weeded for thistles: July 28. Lifted: Dec 2-4. Variety: Klein E. Previous crop: Oats.

Barley. Series 5 - KB.
Ploughed: Nov 22-25. Springtine harrowed: Mar 1. Artificials applied, seed drilled and harrowed in: Mar 5. Ring rolled: Mar 9. Seeds mixture undersown: Apr 15. Harrowed and ring rolled: Apr 16. Weeded: May 28 - June 7. Harvested: Aug 16. Variety: Plumage Archer. Previous crop: Sugar beet.

Wheat. Series 6 - KW.
Ploughed: June 17-18, 1947. Ring rolled: June 19. Ploughed deep (about 12 inches): Sept 1. Ploughed shallow (about 6 inches) Sept 2. Cultivated (deep ploughed plots twice, shallow ploughed plots once), ring rolled deep ploughed plots, all plots cultivated: Oct 2. Rolled twice and springtine harrowed: Nov 1. Rolled and springtine harrowed twice: Nov 3. Seed drilled and harrowed in: Nov 4. Rolled: Mar 16. Sulphate of ammonia applied: May 5. Weeded: May 28-June 7. Harvested: Aug 16. Variety: Yeoman. Previous crop: Seeds

Standard errors per plot:
Ley. 1.58 cwt. per acre or 2.4% (4 d.f.)
Potatoes. Ware yield, whole plot, 2.058 tons per acre or 13.9% (4 d.f.)
sub-plot, 2.506 tons per acre or 16.9% (7 d.f.)
Spring oats. Grain, 4.46 cwt. per acre or 14.5% (4 d.f.)

Sugar beet. Total sugar, whole plot, 3.19 cwt. per acre or 6.0% (4 d.f.)
sub-plot, 5.87 cwt. per acre or 11.1% (7 d.f.)
Tops, whole plot, 0.651 tons per acre or 3.5% (4 d.f.)
sub-plot, 1.849 tons per acre or 9.9% (7 d.f.)

Barley. Grain, 0.846 cwt. per acre or 2.1% (4 d.f.)

Wheat. Grain, 2.89 cwt. per acre or 7.1% (4.d.f.)

Series I, Ley

Residual Effects

	Mean	Ploughing Shallow	Ploughing Deep	Responses to treatments: Dung Abs.	Dung Pres.	Super Abs.	Super Pres.	Potash Abs.	Potash Pres.
Hay: Mean yield 66.5 cwt. per acre (±1.12, Means ±0.79)									
Ploughing deep -shallow	-1.1	-	-	-1.6	-0.6	-1.7	-0.5	-1.1	-1.1
Dung	3.3	2.8	3.8	-	-	0.9	5.7	2.2	4.4
Superphosphate	1.0	0.4	1.6	-1.4	3.4	-	-	4.2	-2.2
Potash	5.8	5.8	5.8	4.7	6.9	9.0	2.6	-	-

Series 2, Potatoes

	Mean	Ploughing Shallow	Ploughing Deep	Responses to treatments: Dung Abs.	Dung Pres.	Super Abs.	Super Pres.	Potash Abs.	Potash Pres.
Ware tubers: Mean yield 14.85 tons per acre (±1.46, Means ±1.03)									
Ploughing deep -shallow	0.23	-	-	0.63	-0.17	0.98	-0.52	-1.62	2.08
Dung	4.64	5.04	4.24	-	-	4.23	5.05	6.29	2.99
Superphosphate	1.57	2.32	0.82	1.16	1.98	-	-	0.56	2.58
Potash	2.37	0.52	4.22	4.02	0.72	1.36	3.38	-	-
Percentage ware: Mean 98.7									
Ploughing deep -shallow	0.3	-	-	0.2	0.4	0.4	0.2	0.2	0.4
Dung	0.4	0.3	0.5	-	-	0.3	0.5	0.6	0.2
Superphosphate	0.0	0.1	-0.1	-0.1	0.1	-	-	0.1	-0.1
Potash	0.5	0.4	0.6	0.7	0.3	0.6	0.4	-	-

Series 2, Potatoes

	Superphosphate			Potash		
	None	Ploughed in	In ridges	None	Ploughed in	In ridges	Mean
Ware tubers: tons per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	13.57	14.77	17.02	14.47	14.58	15.41	14.74
Deep	14.55	14.51	16.24	12.85	15.82	18.34	14.97
No Dung	11.95	11.40	14.82	10.52	13.39	15.70	12.53
Dung	16.18	17.88	18.44	16.81	17.02	18.05	17.17
Mean	14.06	14.64	16.63	13.66	15.20	16.87	14.84
Percentage ware							
Shallow	98.5	98.4	98.8	98.3	98.6	99.0	98.5
Deep	98.8	98.6	98.8	98.5	99.0	99.2	98.8
No Dung	98.5	98.2	98.7	98.1	98.6	99.0	98.5
Dung	98.8	98.8	98.9	98.7	99.0	99.1	98.9
Mean	98.7	98.5	98.8	98.4	98.8	99.1	98.7

Standard errors (a) ±1.03 (b) ±1.25 (c) ±1.36

Standard error (b) is for use in horizontal comparisons only; standard errors (a) and (c) for use in all other comparisons.

Series 3, Spring Oats

Residual Effects

	Mean	Responses to treatments: Ploughing		Dung		Super		Potash	
		Shallow	Deep	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
Grain: Mean yield 30.8 cwt. per acre (±3.16, Means ±2.23)									
Ploughing deep - shallow	0.9	-	-	2.4	-0.6	-1.8	3.6	-0.1	1.9
Dung	-0.2	1.3	-1.7	-	-	-0.2	-0.2	-2.1	1.7
Superphosphate	-1.0	-3.7	1.7	-1.0	-1.0	-	-	0.8	-2.8
Potash	-1.3	-2.3	-0.3	-3.2	0.6	-0.5	-3.1	-	-
Straw: Mean yield 49.8 cwt. per acre									
Ploughing deep - shallow	2.5	-	-	4.1	0.9	0.4	4.6	1.8	3.2
Dung	1.8	3.4	0.2	-	-	3.0	0.6	1.0	2.6
Superphosphate	-3.0	-5.1	-0.9	-1.8	-4.2	-	-	-1.4	-4.6
Potash	-1.9	-2.6	-1.2	-2.7	-1.1	-0.3	-3.5	-	-

Series 4: Sugar Beet

	Mean	Responses to treatments: Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Super Abs.	Super Pres.	Potash Abs.	Potash Pres.
Total Sugar: Mean yield 52.9 cwt. per acre (±2.25, Means ±1.59)									
Ploughing deep -shallow	-4.5	-	-	-0.8	-8.2	-4.9	-4.1	-1.3	-7.7
Dung	2.6	6.3	-1.1	-	-	3.7	1.5	5.5	-0.3
Superphosphate	-0.4	-0.8	0.0	0.7	-1.5	-	-	-0.3	-0.5
Potash	0.6	3.8	-2.6	3.5	-2.3	0.7	0.5	-	-
Roots (washed): Mean yield 15.75 tons per acre									
Ploughing deep -shallow	-1.13	-	-	-0.15	-2.11	-1.22	-1.04	-0.35	-1.91
Dung	0.91	1.69	-0.07	-	-	1.09	0.73	1.48	0.34
Superphosphate	-0.06	-0.15	0.03	0.12	-0.24	-	-	-0.24	0.12
Potash	0.25	1.03	-0.53	0.82	-0.32	0.07	0.43	-	-
Sugar Percentage: Mean 16.79									
Ploughing deep -shallow	-0.19	-	-	-0.06	-0.32	-0.22	-0.16	0.01	-0.39
Dung	-0.15	-0.02	-0.28	-	-	0.00	-0.30	0.14	-0.44
Superphosphate	-0.02	-0.05	0.01	0.13	-0.17	-	-	0.19	-0.23
Potash	-0.08	0.12	-0.28	0.21	-0.37	0.13	-0.29	-	-
Tops: Mean yield 18.62 tons per acre (±0.461, Means ±0.326)									
Ploughing deep -shallow	2.60	-	-	2.54	2.66	1.52	3.68	2.13	3.07
Dung	1.65	1.59	1.71	-	-	0.94	2.36	0.64	2.66
Superphosphate	-0.01	-1.09	1.07	-0.72	0.70	-	-	-0.96	0.94
Potash	1.44	0.97	1.91	0.43	2.45	0.49	2.39	-	-
Plant Number: Mean 18.3 thousands per acre									
Ploughing deep -shallow	-0.7	-	-	-0.4	-1.0	-0.5	-0.9	-0.3	-1.1
Dung	0.4	-0.7	0.1	-	-	0.6	0.2	0.4	0.4
Superphosphate	-0.3	-0.1	-0.5	-0.1	-0.5	-	-	-0.1	-0.5
Potash	-0.1	0.3	-0.5	-0.1	-0.1	0.1	-0.3	-	-
Noxious Nitrogen: Mean 43.9									
Ploughing deep -shallow	4.9	-	-	5.8	4.0	4.1	5.7	4.9	4.9
Dung	1.8	2.7	0.9	-	-	2.4	1.2	-0.1	3.7
Superphosphate	-0.9	-1.7	-0.1	-0.3	-1.5	-	-	0.6	-2.4
Potash	2.4	2.4	2.4	0.5	4.3	3.9	0.9	-	-

Series 4. Sugar Beet

	Superphosphate			Potash			
	None	Ploughed in	In seed bed	None	Ploughed in	In seed bed	Mean
Total Sugar: cwt per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	55.5	57.0	52.5	53.2	60.1	54.0	55.1
Deep	50.6	53.0	48.4	52.0	54.3	44.3	50.7
No dung	51.2	53.4	50.6	49.9	57.8	48.9	51.6
Dung	54.9	56.6	50.3	55.3	56.6	49.4	54.2
Mean	53.1	55.0	50.5	52.6	57.2	49.2	52.9
Roots (washed): tons per acre							
Shallow	16.40	16.83	15.66	15.80	17.75	15.93	16.32
Deep	15.17	16.02	14.39	15.45	16.55	13.30	15.19
No dung	15.23	15.69	15.04	14.89	17.01	14.41	15.30
Dung	16.33	17.17	15.01	16.37	17.29	14.82	16.21
Mean	15.78	16.43	15.02	15.63	17.15	14.61	15.75
Sugar Percentage							
Shallow	16.91	16.93	16.78	16.83	16.94	16.95	16.88
Deep	16.69	16.59	16.82	16.84	16.44	16.68	16.70
No dung	16.80	17.04	16.84	16.76	16.98	16.96	16.87
Dung	16.80	16.49	16.78	16.90	16.40	16.67	16.72
Mean	16.80	16.76	16.80	16.83	16.69	16.81	16.79

Standard errors (b) are for use in horizontal comparisons only, (a) and (c) for use in all other comparisons

Standard errors	(a)	(b)	(c)
Total sugar	±1.59	±2.93	±2.62

Series 4. Sugar Beet

	Superphosphate			Potash			
	None	Ploughed in	In seed bed	None	Ploughed in	In seed bed	Mean
	Tops: tons per acre						
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	17.86	17.14	16.40	16.83	18.21	17.40	17.32
Deep	19.39	21.51	19.39	18.97	21.84	19.91	19.92
No dung	18.15	17.65	17.21	17.58	18.62	17.39	17.79
Dung	19.10	21.00	18.58	18.22	21.43	19.92	19.44
Mean	18.62	19.33	17.90	17.90	20.02	18.65	18.62
	Plant Number: thous. per acre						
Shallow	18.7	18.3	18.9	18.5	18.9	18.7	18.7
Deep	18.2	17.4	18.0	18.2	17.7	17.7	17.9
No dung	18.1	18.0	18.1	18.1	18.1	18.0	18.1
Dung	18.7	17.7	18.8	18.5	18.5	18.4	18.5
Mean	18.4	17.9	18.4	18.3	18.3	18.2	18.3
	Noxious Nitrogen						
Shallow	42.2	40.2	41.0	40.2	44.0	41.2	41.4
Deep	46.4	46.2	46.2	45.1	48.0	47.0	46.3
No dung	43.1	41.8	44.0	42.8	43.5	43.0	43.0
Dung	45.5	44.6	43.2	42.6	48.5	45.2	44.8
Mean	44.3	43.2	43.6	42.7	46.0	44.1	43.9

Standard errors (b) are for use in horizontal comparisons only, (a) and (c) for use in all other comparisons.

Standard errors:	(a)	(b)	(c)
Tops	±0.326	±0.925	±0.730

Series 5. Barley

Residual effects

Responses to treatments.

	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Super Abs.	Super Pres.	Potash Abs.	Potash Pres.
Grain: Mean yield 40.9 cwt. per acre (±0.60, Means ±0.42)									
Ploughing deep -shallow	0.2	-	-	1.4	-1.0	0.0	0.4	0.4	0.0
Dung	1.6	2.8	0.4	-	-	3.1	0.1	2.4	0.8
Superphosphate	1.3	1.1	1.5	2.8	-0.2	-	-	2.4	0.2
Potash	-1.0	-0.8	-1.2	-0.2	-1.8	0.1	-2.1	-	-
Straw: Mean yield 44.8 cwt. per acre									
Ploughing deep -shallow	0.1	-	-	0.0	0.2	1.0	-0.8	-0.5	0.7
Dung	2.3	2.2	2.4	-	-	3.6	1.0	4.9	-0.3
Superphosphate	0.2	1.1	-0.7	1.3	-1.1	-	-	-1.0	1.4
Potash	0.2	-0.4	0.8	2.3	-2.4	-1.0	1.4	-	-

Series 6. Wheat

Residual effects

Responses to treatments

	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Super Abs.	Super Pres.	Potash Abs.	Potash Pres.
Grain: Mean yield 40.7 cwt. per acre (±2.04, Means ±1.45)									
Ploughing deep -shallow	-3.5	-	-	-4.5	-2.5	-2.5	-4.5	-2.3	-4.7
Dung	2.2	1.2	3.2	-	-	2.3	2.1	4.5	-0.1
Superphosphate	0.7	1.7	-0.3	0.8	0.6	-	-	1.0	0.4
Potash	0.9	2.1	-0.3	3.2	-1.4	1.2	0.6	-	-
Straw: Mean yield 60.6 cwt. per acre									
Ploughing deep -shallow	-3.4	-	-	-3.2	-3.6	-1.2	-5.6	-1.6	-5.2
Dung	2.7	2.9	2.5	-	-	3.3	2.1	6.3	-0.9
Superphosphate	0.2	2.4	-2.0	0.8	-0.4	-	-	-0.6	1.0
Potash	0.2	2.0	-1.6	3.8	-3.4	-0.6	1.0	-	-

48/Bc/1.1

GREEN MANURING EXPERIMENT

LB and LU - Woburn Stackyard, Series A, 1948

Treatments as given in 1936 Report, p. 203, with the exceptions that from 1946 onwards lupins replace tares, and rape replaces mustard as green manuring crops, while kale is replaced by winter cabbages as a testing crop. From 1944 onwards a top dressing of sulphate of ammonia has been applied to half the plots under barley, and in 1946 this top dressing was applied to the green manuring crops. The experiment is now in half replicate, according to the identity I ≡ (R + C - M - F - T)DSNA, A representing the top dressing of sulphate of ammonia.

Cultivations, etc.:

Upper Half. Cabbages

Red Clover and Italian Ryegrass undersown in barley: Apr 25, 1947. Failed owing to drought. Whole area ploughed : Nov 24 - Dec 8. Springtine harrowed: Feb 18-19, Mar 9. Harrowed: Mar 17. Rolled: Mar 22. Rape sown, ryegrass and clover resown, sulphate of ammonia applied, harrowed in: Mar 24. Lupins drilled: Apr 2, 6. Rape plots dusted with Flea beetle dust: Apr 27. Lupin plots hoed: May 11. All plots hoed: May 20-24. Lupin plots hoed: June 8. Fallow plots cultivated: June 25. Dung and straw applied on appropriate plots, green manures rolled: June 28. Whole area ploughed: June 30. Harrowed: July 1. Basal manures and sulphate of ammonia applied, harrowed: July 2. Rolled: July 3. Cabbages transplanted: July 5-8. Gaps filled in: July 14-15, July 31 - Aug 7. Hoed: Aug 16-20, Sept. 6-7, Oct 8. Harvested: Jan 24, Feb 11, 23, Mar 3. Variety: January King. Previous Crop: Barley.

Lower Half. Barley

Ploughed: Mar 3-9. Harrowed: Mar 9. Lime at 3 cwt. CaO per acre applied: Mar 10. Harrowed: Mar 11. Sulphate of ammonia applied to appropriate plots, seed drilled: Mar 12. Harrowed in: Mar 17. Rolled: Mar 22. Dorset Mail Clover and Italian Ryegrass undersown on appropriate plots: Apr 16. Harrowed in: Apr 23. Whole area rolled: Apr 26. Hand weeded: June 15. Harvested: Aug 14. Variety: Plumage Archer. Previous Crop: Cabbages.

Standard errors per plot:

Cabbages:	total yield,	1.175 tons per acre or 15.7% (9 d.f.)
	plant number,	0.27 thousands per acre or 1.5% (9 d.f.)
Barley:	grain,	2.78 cwt. per acre or 12.4% (9 d.f.)
	straw.	3,26 cwt. per acre or 11.9% (9 d.f.)

Upper Half - Cabbages

Green manure crop	None	Lupins	Clover	Rape	Ryegrass	Mean
	Total Weight: tons per acre (±0.588)					(±0.263)
No Dung	6.02	7.61	7.41	4.76	5.98	6.36
Dung	8.12	9.37	9.67	7.89	8.18	8.65
No Straw	6.47	8.83	8.37	6.94	7.31	7.58
Straw	7.68	8.15	8.72	5.70	6.86	7.42
Sulph. amm.						
2 cwt./acre	6.47	6.56	7.80	5.21	6.44	6.50
4 cwt./acre	7.68	10.42	9.29	7.43	7.73	8.51
Sulph. amm. to barley						
Absent	6.20	8.44	9.26	6.16	7.24	7.46
Present	7.95	8.54	7.82	6.48	6.93	7.54
Mean (±0.415)	7.07	8.49	8.54	6.32	7.08	7.50
	Total number: thousands per acre (±0.136)					(±0.061)
No Dung	17.4	17.6	17.6	17.3	17.6	17.5
Dung	17.5	17.7	18.0	17.7	17.7	17.7
No Straw	17.2	17.7	17.7	17.4	17.7	17.5
Straw	17.6	17.6	17.9	17.6	17.5	17.6
Sulph. amm.						
2 cwt./ acre	17.4	17.7	17.8	17.5	17.7	17.6
4 cwt./acre	17.4	17.7	17.8	17.6	17.6	17.6
Sulph.amm. to barley						
Absent	17.5	17.7	17.9	17.5	17.6	17.6
Present	17.4	17.6	17.8	17.5	17.6	17.6
Mean (±0.096)	17.4	17.7	17.8	17.5	17.6	17.6

Upper Half - Cabbages

Differential Responses

	Mean	Dung Abs.	Dung Pres.	Straw Abs.	Straw Pres.	Sulph. amm. Abs.	Sulph. amm. Pres.	Sulph. amm. to barley Abs.	Sulph. amm. to barley Pres.
	Total Weight: tons per acre (±0.531 Means ±0.372)								
Dung	2.29	-	-	2.30	2.27	2.33	2.24	2.36	2.21
Straw	-0.16	-0.14	-0.17	-	-	-0.01	-0.30	-0.28	-0.03
Sulph. amm.	2.01	2.05	1.96	2.15	1.86	-	-	2.11	1.90
Sulph. amm. to barley	0.08	0.15	0.00	-0.04	0.20	0.18	-0.02	-	-
	Total number: thousands per acre (±0.12) Means (±0.09)								
Dung	0.2	-	-	0.2	0.1	0.2	0.1	0.1	0.2
Straw	0.1	0.1	0.0	-	-	0.1	0.0	0.1	0.0
Sulph. amm.	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Sulph. amm. to barley	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-

Lower Half - Barley

Green Manure Crop	Lupins	Rape	Clover	Ryegrass	Fallow	Mean
	Grain: cwt. per acre (± 1.39)					(±0.62)
No Dung to Cabbages	21.7	20.7	23.3	16.9	22.9	21.1
Dung	25.6	21.9	26.6	22.1	22.6	23.8
No Straw to Cabbages	22.6	21.6	25.0	19.8	21.7	22.1
Straw	24.7	21.0	24.9	19.2	24.1	22.8
Sulph.amm. to Cabbages						
2 cwt./acre	23.0	22.1	24.9	17.3	21.5	21.8
4 cwt./acre	24.3	20.6	25.0	21.6	24.3	23.2
Sulph.amm. to Barley						
Absent	19.9	18.2	20.9	15.0	18.9	18.6
Present	27.4	24.5	29.0	23.9	26.8	26.3
Mean (±0.98)	23.7	21.3	24.9	19.5	22.9	22.4
	Straw: cwt. per acre (±1.63)					(±0.73)
No Dung to Cabbages	26.8	24.5	26.5	19.0	26.8	24.7
Dung	31.5	28.8	32.7	26.2	31.2	30.1
No Straw to Cabbages	28.2	26.4	28.0	23.0	28.1	26.7
Straw	30.1	26.9	31.2	22.2	30.0	28.1
Sulph.amm. to Cabbages						
2 cwt./acre	27.7	24.4	29.1	21.3	27.7	26.0
4 cwt./acre	30.6	28.9	30.1	23.8	30.3	28.7
Sulph.amm. to Barley						
Absent	25.6	22.8	25.0	19.3	24.4	23.4
Present	32.7	30.4	34.2	25.8	33.6	31.3
Mean (±1.15)	29.2	26.6	29.6	22.6	29.0	27.4

Lower Half - Barley

	Mean	Differential Responses: Dung Abs.	Dung Pres.	Straw Abs.	Straw Pres.	Sulph. amm. Abs.	Sulph. amm. Pres.	Sulph. amm. to barley Abs.	Sulph. amm. to barley Pres.
Grain: cwt. per acre (±1.26 Means ±0.88)									
Dung to Cabbages	2.7	-	-	1.4	3.9	4.3	1.0	3.3	2.0
Straw to Cabbages	0.6	-0.6	1.8	-	-	-0.6	1.8	1.3	-0.1
Sulph. amm. to Cabbages	1.4	3.0	-0.2	0.1	2.6	-	-	1.8	0.9
Sulph. amm. to Barley	7.8	8.4	7.1	8.5	7.0	8.2	7.3	-	-
Straw: cwt. per acre (±1.47 Means ±1.03)									
Dung to Cabbages	5.4	-	-	5.3	5.4	7.1	3.6	5.5	5.2
Straw to Cabbages	1.3	1.2	1.3	-	-	1.0	1.5	2.6	0.0
Sulph. amm. to Cabbages	2.7	4.4	0.9	2.4	2.9	-	-	2.6	2.7
Sulph. amm. to Barley	7.9	8.0	7.7	9.2	6.5	7.8	7.9	-	-

48/Bd/1.1

LEY AND ARABLE ROTATIONS

Woburn - Stackyard Series D, 1948

Details as given in 1938 Report, pp. 135-137, except that owing to the unsatisfactory crops obtained on kale plots in the years 1938-44 sugar beet has been substituted for kale from 1945 onwards.

Cultivations, etc.:

Block I. Ley. Second year. Grazed by sheep: May 3-21, June 13-17, July 9-13, Aug 17-25, Sept 7-11, Nov 4-10.
Lucerne. Second year. Harrowed three times: Nov 1. Hoed: Nov 3. First cut: July 9. Second cut: Sept 6. Third cut: Nov 12.
Wheat. Ploughed: Oct 7-8. Harrowed: Oct 9. Seed (Squarcheads Master) drilled, harrowed: Oct 14,15. Failure due to birds. Harrowed, seed redrilled: Oct 21. Plant failure due to damage by birds. Harrowed, sulphate of ammonia applied, seed (Atle) drilled, harrowed: Mar 10. Rolled: Mar 13. Harrowed: Apr 23. Rolled: Apr 26. Harvested: Sept 4. Variety: Atle. Previous crop: Potatoes.

Block II. Ley. Third year. Grazed by sheep: May 14-20, June 17-21, July 13-17, Aug 25-Sept 2, Sept 11-15, Nov 10-14.
Lucerne. Third year. Hoed: June 14-18. First cut: July 9. Second cut: Sept 6. Third cut (small crop only): Nov 12.
Hay. Grass and clover mixture under sown in wheat: Apr 17, 1947. Total failure due to drought.
All wheat plots ploughed: Sept 30. Springtine harrowed: Mar 1. Sulphate of ammonia applied, harrowed: Mar 10. Harrowed twice: Mar 18. Rolled: Mar 22. Seed sown: Mar 23. Harrowed and rolled: Mar 25. Rolled: Mar 27. First cut: June 9. Second cut (small): Sept 6. Seeds mixture: Giant Italian Ryegrass (22 lb per acre) and Trifolium (27 lb per acre). Previous crop: Wheat.
Sugar beet. Ploughed: Sept 30, Mar 18. Harrowed: Mar 19. Rolled: Mar 27. Seed drilled: Apr 2. Nitrate of soda applied: Apr 5. Rolled: Apr 6. Hoed: Apr 19, June 1-3. Singled: June 1-3. Hoed: June 8-July 2. Lifted: Oct 5, 6. Variety: Klein E. Previous crop: Wheat.

Block III. Ley. First year. Ploughed: Sept 27-29. Springtine harrowed, harrowed: Mar 10. Rolled, harrowed, rolled: Mar 20. Artificials applied: Mar 23. Seed sown and harrowed in: Mar 25. Topped, toppings left on ground: July 9. Grazed by sheep: June 9-13, July 1-9,

July 17-22, Aug 9-17, Sept 2-7, Sept 15-16 (Plot 44 only), Nov 29-Dec 4. Seeds mixture: S.23 Perennial Ryegrass (21 lb per acre), S.143 Cocksfoot (12 lb per acre), late flowering Montgomery Red Clover (6 lb per acre), S.100 White Clover (3 lb per acre). Previous crop: Barley.

Lucerne. First year. Ploughed: Sept 27-29. Springtine harrowed, harrowed: Mar 10. Rolled, harrowed, rolled: Mar 20. Artificals applied: Mar 23. Rolled, seed sown: Mar 24. Failed, probably due to Flea beetle attack. Harrowed and rolled: Mar 25. Cultivated: May 15. Seed drilled: May 18. Dusted with Flea beetle dust: June 11. Cleaned: June 13, 23. Hoed: June 22-Sept 22. First cut: Sept 6. Second cut: Nov 12. Variety: Provence. Previous crop: Barley.

Potatoes. Ploughed: Sept 27-29. Springtine harrowed: Mar 10. Rolled, harrowed, rolled: Mar 20. Rolled: Mar 27. Ridged: Apr 6-7. Artificials applied, potatoes planted and covered in: Apr 9. Ridges harrowed: May 8. Grubbed: May 28. Earthed up: June 21. Sprayed with "Perinox": Aug 11. Sprayed to kill haulm: Sept 20. Lifted: Sept 30. Variety: Majestic. Previous crop: Barley.

Block IV. Potatoes. Ploughed: Oct 30-Nov 4. Springtine harrowed: Mar 1, 18. Harrowed: Mar 20. Rolled: Mar 27. Ridged: Apr 6-7. Dung applied: Apr 8. Potatoes planted, artificials applied, covered in: Apr 9. Ridges harrowed down: May 8. Grubbed: May 28. Earthed up: June 21. Sprayed with "Perinox": Aug 11. Lifted: Oct 1, 2. Variety: Majestic. Previous crop: Ley, lucerne, hay, sugar beet.

Block V. Barley. Ploughed: Oct 9-10. Springtine harrowed: Feb 27. Lime applied (14 cwt per acre, 82% CaO), harrowed, sulphate of ammonia applied: Mar 4. Harrowed, seed drilled: Mar 10. Rolled: Mar 13. Harvested: Aug 16. Variety: Plumage Archer. Previous crop: Potatoes.

Standard errors per plot:

Block V.

Barley, grain: whole plot, 1.61 cwt per acre or 5.3%
sub-plot, 1.49 cwt per acre or 4.9%
straw: whole plot, 2.68 cwt per acre or 6.5%
sub-plot, 1.50 cwt per acre or 3.6%

Block IV

Potatoes, total produce: whole plot, 0.626 tons per acre or 3.7%
sub-plot, 0.903 tons per acre or 5.3%

percentage ware: whole plot, 0.380
sub-plot, 0.435

All standard errors are estimated from 4 d.f.

Note: For the ley plots of blocks I, II, III, only the mean number of sheep days of grazing per acre and the mean number of sheep carried per acre for the year are given for each block in the summary tables. Each plot was grazed separately, but the number of grazing days is not sufficiently accurately determined for each plot to justify treatment comparisons.

Block I

Ley. 2nd Year.

	Sheep days of grazing per acre	No. of sheep carried per acre for the year
Mean	1986	5.4

Lucerne. 2nd Year.

Yield of Lucerne Hay (85% dry matter): tons per acre

	1st crop	2nd crop	3rd crop	Total
No dung	2.10	1.74	0.47	4.32
Dung in 1945	2.01	1.77	0.52	4.30
Mean	2.06	1.76	0.49	4.30
Increase	-0.09	0.03	0.05	-0.02
Previous Rotation				
Lucerne	1.94	1.64	0.48	4.04
Arable with sugar beet	2.18	1.88	0.51	4.56

Wheat

	Grain: cwt. per acre	Straw: cwt. per acre
No dung	14.7	30.2
Dung in 1945	14.1	31.4
Mean	14.4	30.8
Increase	-0.6	1.2
Previous Rotation		
Ley	18.6	37.2
Lucerne	14.2	29.8
Arable with hay	12.7	27.0
Arable with sugar beet	12.1	29.0

Block II

Ley. 3rd Year.

	Sheep days of grazing per acre	No. of sheep carried per acre for the year
Mean	1551	4.3

Lucerne 3rd year.
Yield of Lucerne Hay (85% Dry Matter): tons per acre

	1st Crop	2nd Crop	3rd Crop	Total
No Dung	1.38	1.41	0.04	2.84
Dung in 1944	1.84	1.68	0.08	3.61
Mean	1.62	1.54	0.06	3.22
Increase	0.46	0.27	0.04	0.77
Previous Rotation				
Lucerne	1.40	1.30	0.06	2.75
Arable with hay	1.83	1.80	0.08	3.70

Hay	1st Crop	2nd Crop	Total
No Dung	1.04	0.20	1.24
Dung in 1944	1.34	0.24	1.58
Mean	1.19	0.22	1.41
Increase	0.30	0.04	0.34
Previous Rotation			
Lucerne	1.38	0.16	1.54
Arable with hay	1.00	0.28	1.28

Sugar Beet

	Clean Beet tons per acre	Tops tons per acre	Total Sugar cwt per acre	Sugar %
No Dung	10.40	10.54	35.8	17.21
Dung in 1944	9.64	9.00	34.7	18.02
Mean	10.02	9.78	35.2	17.62
Increase	-0.76	-1.54	-1.1	0.81
Previous Rotation				
Ley	10.41	9.54	36.6	17.62
Arable with sugar beet	9.63	10.01	33.8	17.62

Block III

Ley. 1st Year.

	Sheep days of grazing per acre	No. of sheep carried per acre for the year
Mean	1986	5.4

Potatoes

	Total tubers tons per acre	Percentage Ware
No Dung	14.90	96.7
Dung in 1946	17.13	97.4
Mean	16.01	97.0
Increase	2.23	0.7
Previous Rotation		
Ley	17.08	97.35
Lucerne	15.35	96.45
Arable with hay	15.22	97.30
Arable with sugar beet	16.42	97.00

Lucerne 1st Year.

Yield of Lucerne Hay (85% dry matter): Tons per acre

No Dung	0.32
Dung in 1946	0.66
Mean	0.49
Increase	0.34
Previous Rotation	
Lucerne	0.46
Arable with hay	0.53

Block IV

Potatoes

Previous Crop Rotation

	Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
			Total tubers: tons per acre		
No Dung (±0.632)(1)	15.86	16.37	14.19	13.63	15.01
Dung in 1948	19.02	21.35	19.00	17.44	19.20
Mean (±0.443)	17.44	18.86	16.59	15.54	17.11
Increase (±0.903)	3.16	4.98	4.81	3.81	4.19 (±0.452)
			Percentage Ware		
No Dung (±0.35)(1)	97.8	97.4	96.6	96.5	97.1
Dung in 1948	97.8	97.7	97.1	97.2	97.5
Mean (±0.27)	97.8	97.6	96.8	96.9	97.3
Increase (±0.44)	0.0	0.3	0.5	0.7	0.4 (±0.22)

Block V

Barley

	Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
			Grain: cwt per acre		
No Dung (±1.36)(1)	30.6	31.6	29.2	28.1	29.9
Dung in 1947	32.5	28.3	33.1	31.3	31.3
Mean (±1.14)	31.5	30.0	31.1	29.7	30.6
Increase (±1.49)	1.9	-3.3	3.9	3.2	1.4 (±0.75)

Standard error (1) for comparisons other than vertical ones.

Block V

Barley

	Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
	Straw: cwt. per acre				
No Dung (±2.03)(1)	42.3	41.3	36.2	34.6	38.6
Dung in 1947	46.3	42.3	44.1	41.2	43.5
Mean (±1.89)	44.3	41.8	40.2	37.9	41.0
Increase (±1.50)	4.0	1.0	7.9	6.6	4.9(±0.75)

Standard error (1) for comparisons other than vertical ones

WOBURN MARKET GARDEN EXPERIMENT

Globe Beet and Peas. First crops of 7th year.

The use of heavy dressings of organic manures for making a market garden soil, and the effect of sulphate of ammonia.

JRB and JPE – Lansome, 1948.

System of replication: 2 series, one of each crop, each consisting of 4 randomized blocks of 10 plots each, certain interactions being confounded with block differences.

Area of each plot: 1/80 acre.

Treatments:
Organic manures: Dung, sewage sludge compost, sewage sludge (West Middlesex), and vegetable compost, each at 15 and 30 tons per acre.
Sulphate of ammonia: None, 0.2 cwt. N per acre on organic manure plots. None, 0.2, 0.4, 0.6 cwt. N per acre on plots without organic manure.

Basal manuring: Superphosphate, 0.4 cwt. P_2O_5 per acre.
Muriate of potash, 0.5 cwt K_2O per acre.

Cultivations, etc.:
Series A. Globe Beet.
Organic manures applied: Mar 31. Ploughed: Apr 1. Harrowed: Apr 2. Ground lime applied to all plots receiving sulphate of ammonia (plots 1,7 at 33 cwt per acre, plots 24, 27 at 22 cwt per acre, other plots at 11 cwt per acre). Harrowed in: Apr 5. Rolled, basal manures and sulphate of ammonia dressings applied, seed drilled and harrowed in: Apr 6. Ring rolled: Apr 10. Dusted with Flea beetle dust: Apr 27. Hoed: May 6–10 Hoed and hand weeded: May 13–28. Harvested: July 6,12–13. Variety: Crimson Globe. Previous crop: Leeks.

Series B. Peas.
Organic manures applied: Jan 16–19. Ploughed: Jan 19–20 Springtine harrowed: Feb 17–19. Harrowed: Mar 15. Rolled, basal manures and sulphate of ammonia applied, peas drilled: Mar 16. Ring rolled: Mar 23. Hoed: Apr 29, May 10. Harvested: July 14–26. Variety: Kelvedon Wonder. Previous crop: Winter cabbage*.

Note: The winter cabbage crop failed owing to drought.

Standard errors per plot:
Peas, marketable produce, 11.88 cwt.per acre or 18.3%
Globe beet, weight of marketable produce, 1.272 tons per acre or 24.0%
total plant number, 4.01 thousands per acre or 12.3%
weight of bulbs, 0.719 cwt per acre or 26.4%

Summary of Results

Organic manures	Level of manuring (tons/acre)	Sulphate of ammonia, cwt. N per acre None	0.2	0.4	0.6	Mean
Green peas, marketable produce: cwt. per acre (±8.40, means ±5.94)						
None		66.1	61.8	45.0	71.1	63.9*
Dung	15	96.1	75.0			85.5
Dung	30	79.3	44.3			61.8
Composted sewage sludge	15	75.7	85.0			80.4
	30	80.4	73.9			77.1
Sewage sludge	15	47.1	46.8			47.0
	30	35.7	38.2			37.0
Vegetable compost	15	85.4	84.3			84.8
	30	52.1	57.1			54.6
Globe beet, total produce: tons per acre (±0.900, means ±0.636)						
None		1.30	2.92	3.86	2.37	2.11*
Dung	15	4.50	6.02			5.26
Dung	30	9.34	7.58			8.46
Composted sewage sludge	15	3.07	3.68			3.38
	30	4.72	6.19			5.45
Sewage sludge	15	6.37	5.94			6.15
	30	6.74	6.35			6.54
Vegetable compost	15	4.32	5.02			4.67
	30	6.85	8.78			7.82
Globe beet, weight of bulbs: tons per acre (±0.508, means ±0.360)						
None		0.47	1.37	2.04	1.20	0.92*
Dung	15	2.04	3.20			2.62
Dung	30	5.01	4.12			4.56
Composted sewage sludge	15	1.39	1.77			1.58
	30	2.46	3.26			2.86
Sewage sludge	15	3.25	3.08			3.17
	30	3.50	3.30			3.40
Vegetable compost	15	2.10	2.62			2.36
	30	3.53	4.74			4.14

* These means are for 0.0 and 0.2 cwt. N per acre only

Organic manures	Level of manuring (tons/acre)	Sulphate of ammonia, cwt. N per acre None	0.2	0.4	0.6	Mean
Globe beet, total plant number: thous. per acre (±2.84, means ±2.01)						
None		27.1	32.4	33.4	25.2	29.8*
Dung	15	32.8	31.6			32.2
Dung	30	42.8	29.4			36.1
Composted sewage sludge	15	29.6	35.0			32.4
	30	33.5	34.2			33.9
Sewage sludge	15	37.6	29.9			33.8
	30	28.8	27.2			28.0
Vegetable compost	15	37.0	39.0			38.0
	30	31.8	34.9			33.4

*These means are for 0.0 and 0.2 cwt. N per acre only

48/Be/2.1

WOBURN MARKET GARDEN EXPERIMENT

Leeks and Winter Cabbage. 2nd crops for 7th year

The use of heavy dressings of organic manures for making garden soil, and the effect of sulphate of ammonia.

JLE and JU - Lansome 1948 - 9

System of replication: 2 series, one for each crop, each consisting of 4 randomized blocks of 10 plots each, certain interactions being confounded with block differences.

Area of each plot: $\frac{1}{80}$ acre.

Treatments:
Organic manures (applied to previous crops): Dung, sewage sludge compost, sewage sludge (West Middlesex), and vegetable compost, each at 15 and 30 tons per acre.
Sulphate of ammonia: None, 0.4 cwt. N per acre on organic manure plots. None, 0.4, 0.8, 1.2 cwt. N per acre on plots without organic manure.

Basal manuring: None.

Cultivations, etc:
Series A. Winter Cabbage.
Ploughed and harrowed: July 15, 16. Rolled, sulphate of ammonia applied, cabbages planted: July 19, 20. Cabbages replanted where necessary: Aug 3 - 7. Hoed: Aug 24 - Sept 29. Cut: Jan 11, Feb 8, 15, 22. Variety: January King. Previous crop: Globe beet.

Series B. Leeks.
Ploughed: July 26, 27. Harrowed, rolled: July 27. Sulphate of ammonia applied, plots 48, 51, 72, 78 receiving only half dressings: July 30. Leeks planted: Aug 3 - 5. Hoed: Aug 24 - Sept 29. Second dressing of sulphate of ammonia to plots 48, 51, 72, 78: Sept 27. Harvested: Mar 16 - 29. Variety: Musselburgh. Previous crop: Peas.

Standard errors per plot:
Winter cabbages, marketable weight, ±0.828 tons per acre or 11.8%
total number, 0.372 thousands per acre or 2.1%
Leeks, total weight 14.40 cwt. per acre or 12.0%
total number, 0.879 thousands per acre or 2.1%

Summary of Results

Organic manures	Level of manuring tons per acre	Sulphate of Ammonia cwt N per acre: None	0.4	0.8	1.2	Mean
		Cabbages, Marketable Weight: tons per acre (±0.586 Means ±0.414)				
None		2.41	5.98	7.59	7.49	4.20*
Dung	15	3.36	6.66			5.01
Dung	30	8.14	7.86			8.00
Composted sewage sludge	15	4.98	6.91			5.94
	30	5.88	8.05			6.96
Sewage sludge	15	8.34	9.66			9.00
	30	9.77	9.88			9.82
Vegetable compost	15	5.68	6.99			6.33
	30	6.95	8.26			7.61
		Cabbages, Total Number: thous. per acre (±0.263 Means ±0.166)				
None		17.6	17.9	18.0	18.2	17.8*
Dung	15	16.7	18.3			17.5
Dung	30	18.3	18.0			18.1
Composted sewage sludge	15	17.8	18.2			18.0
	30	18.1	17.8			17.9
Sewage sludge	15	17.8	17.8			17.8
	30	17.4	18.0			17.7
Vegetable compost	15	17.9	17.5			17.7
	30	18.0	18.3			18.2

* These means are for 0.0 and 0.4 cwt N. per acre only.

Organic Manures	Level of manuring tons per acre	Sulphate of Ammonia cwt. N per acre None	0.4	0.8	1.2	Mean
Leeks, Total Weight: cwt per acre						
		(±10.2 Means ±7.20)				
		66.3	113.7	107.3	116.2	90.0*
None	15	114.4	113.6			114.0
Dung	30	139.6	143.7			141.6
Dung	15	103.8	124.1			114.0
Composted sewage sludge	30	120.5	113.2			116.8
Sewage sludge	15	127.6	125.5			126.5
	30	131.8	163.5			147.6
Vegetable compost	15	109.0	106.2			107.6
	30	124.4	126.8			125.6
Leeks, Total Number: thous. per acre						
		(±0.622 Means ±0.440)				
		40.9	42.6	38.7	41.1	41.8*
None	15	41.8	41.9			41.9
Dung	30	42.8	40.6			41.7
Dung	15	41.5	41.9			41.7
Composted sewage sludge	30	41.1	40.6			40.8
Sewage Sludge	15	40.9	39.9			40.4
" "	30	41.5	42.4			41.9
Vegetable compost	15	43.5	40.5			42.0
" "	30	42.3	42.1			42.2

* These means are for 0.0 and 0.4 cwt N per acre only.

GRAZING EXPERIMENT

Highfield - 1948

The effects of cake feeding and equivalent manures on the nutritive value of the herbage.

For details see 1937 Report, pp. 24-26

Area of each plot: Plots 4, 5, 6: 4.93 acres

Cultivations: All plots topped to cut off thistles: June 17-18

Grazing periods: Cattle: May 4 - June 30, and Nov. 4 - Dec. 3
Sheep: June 8 - Sept. 22

Block II

Plot	5	4	6
	No Manure	Cake 1938,40,43,46	Equivalent Manures
	Live weight increases: lb per acre		
Cattle	631	480	566
Sheep	116	134	128
	Grazing days per acre		
Cattle	144	104	160
Sheep	327	289	336
	Starch equivalent: lb per acre		
Cattle	2285	1720	2236
Sheep	889	911	922

48/Ca/1.1

WHEAT

Control of "Eyespot"

The effects of sulphate of ammonia, of rate and depth of sowing and of spraying, on the sixth successive Wheat crop.

RW - Little Knott 1948

System of replication: 3 x 3 x 3 design in 6 blocks of 9 plots each, certain three-factor interactions and the effect of spraying being confounded with block differences.

Area of each plot 0.0151 acre.

Treatments:
Sulphate of ammonia: None. 0.4, 0.8 cwt N per acre applied as a top-dressing in March (N_0 N_1 N_2).
Depth of sowing: Shallow ($\frac{1}{2}$"), normal ($1\frac{1}{2}$"), deep (3") (D_0 D_1 D_2).
Rate of sowing: $1\frac{1}{2}$, $2\frac{1}{2}$ or $3\frac{1}{2}$ bushels per acre (R_0 R_1 R_2).
Spraying: 3 Blocks sprayed with sulphuric acid ($12\frac{1}{2}$% by volume B.O.V. at 100 gallons per acre) before germination and again in spring.

Basal Manuring: 3 cwt per acre superphosphate and 1 cwt per acre muriate of potash drilled across the plots.

Cultivations etc:
Ploughed: Sept 8 - 13. Basal Manures applied: Oct 8. Cultivated: Oct 17. Ring-rolled: Oct 18. Springtined, rolled and springtined and ring-rolled: Oct 21. Seed drilled: Oct 22. Harrowed in: Oct 23. Sprayed with B.O.V.: Nov 1 and again Mar 8. Sulphate of Ammonia applied: Mar 15. Ring-rolled: Apr 28. Sprayed against weeds: May 14. Hand pulled rye: May 21. Hand pulled wild oats and other weeds: June 15 - 16. Hand pulled wild oats: various days: June 20 - 30. Harvested: Aug 21. Variety: Squarcheads Master ($13/4$). Previous crop: Wheat.

Standard errors per plot:

Grain:	2.02 cwt per acre or 10.4%	(24 d.f.)
Straw:	5.19 cwt per acre or 7.9%	(24 d.f.)
% Eyespot, (transformed values).		
	Sprayed blocks 2.57	6 d.f.
	Unsprayed 6.48	6 d.f.
% Take All (transformed values)	8.68	24 d.f.

Note: The analysis of diseased wheat has been carried out on percentages transformed to degrees and all tests of significance should be applied to the transformed values.

Grain: cwt per acre (± 1.17 Means ± 0.67)

	Unsprayed				Sprayed				Effect of Spraying (± 0.95)(1)
	R_0	R_1	R_2	Mean	R_0	R_1	R_2	Mean	
D_0	15.0	17.8	16.0	16.3	25.8	22.9	23.4	24.0	7.7
D_1	16.4	15.6	13.5	15.2	23.5	21.2	22.6	22.4	7.2
D_2	17.2	17.2	12.9	15.8	24.9	22.8	20.9	20.9	7.1
	N_0	N_1	N_2		N_0	N_1	N_2		
D_0	17.0	14.2	17.7		20.4	25.6	26.1		
D_1	14.4	15.8	15.4		17.0	23.7	26.7		
D_2	15.2	15.7	16.5		15.7	25.1	27.9		
R_0	17.7	13.6	17.3	16.2	18.9	26.2	29.1	24.7	8.5
R_1	17.0	16.1	17.6	16.9	19.1	23.5	24.3	22.3	5.4
R_2	11.7	16.1	14.7	14.2	15.0	24.7	27.2	22.3	8.1
Mean	15.5	15.2	16.5	15.8	17.7	24.8	26.9	23.1	
Effect of spraying	(± 0.95)(1)				2.2	9.6	10.4		

Straw: cwt per acre (± 3.13 Means ± 1.81)

	Unsprayed				Sprayed				Effect of Spraying (± 2.45)(1)
	R_0	R_1	R_2	Mean	R_0	R_1	R_2	Mean	
D_0	55.3	62.6	55.4	57.7	81.1	74.9	78.2	78.1	20.4
D_1	59.3	58.3	52.1	56.6	75.0	69.9	72.7	72.5	15.9
D_2	56.5	63.7	48.6	56.3	76.2	72.2	70.0	72.8	16.5
	N_0	N_1	N_2		N_0	N_1	N_2		
D_0	55.4	54.6	63.3		71.0	80.3	83.0		
D_1	49.4	56.8	63.5		57.8	74.5	85.3		
D_2	51.9	55.8	61.1		54.5	78.5	85.4		
R_0	56.7	51.7	62.7	57.0	64.3	79.2	88.8	77.4	20.4
R_1	57.0	59.3	68.3	61.5	61.1	76.2	79.7	72.3	10.8
R_2	42.9	56.2	56.9	52.0	57.9	77.9	85.1	73.6	21.6
Mean	52.2	55.7	62.6	56.9	61.1	77.8	84.5	74.5	
Effect of spraying		(± 2.45)(1)			8.9	22.1	21.9		

(1) Standard error for comparison between main effects only.

Percentage Straws showing Severe Eyespot at Harvest 46/Oa/1.5

(means from transformed values)

	Unsprayed				Sprayed				Effect of Spraying
	R_0	R_1	R_2	Mean	R_0	R_1	R_2	Mean	
D_0	51.6	57.5	42.5	50.5	10.3	15.0	9.7	11.4	-39.1
D_1	62.3	38.6	66.5	56.0	11.4	12.1	11.3	11.7	-44.3
D_2	35.3	58.0	52.2	48.4	10.9	15.0	9.1	12.2	-36.2
	N_0	N_1	N_2		N_0	N_1	N_2		
D_0	37.2	62.8	51.8		12.3	12.8	9.7		
D_1	35.7	58.8	72.3		6.4	13.3	16.2		
D_2	37.5	55.4	52.8		10.3	16.1	10.7		
R_0	41.3	56.0	51.8	49.7	9.1	13.8	11.8	11.4	-38.3
R_1	36.8	52.8	64.3	51.4	14.4	14.8	13.0	14.0	-37.4
R_2	32.3	68.0	61.0	53.8	5.8	13.7	11.4	10.1	-43.7
Mean	36.8	59.0	59.0	51.6	9.4	14.0	12.1	11.8	
Effect of Spraying					-27.4	-45.0	-46.9		

(Transformed values)

	Unsprayed				Sprayed				Effect of Spraying (± 2.32)(1)
	(± 3.74 Means ± 2.16)				(± 1.48 Means ± 0.86)				
	R_0	R_1	R_2	Mean	R_0	R_1	R_2	Mean	
D_0	45.9	49.3	40.7	45.3	18.7	22.8	18.1	19.8	-25.5
D_1	52.1	38.4	54.6	48.4	19.8	20.4	19.7	20.0	-28.4
D_2	36.5	49.6	46.2	44.1	21.0	22.8	17.6	20.5	-23.6
	N_0	N_1	N_2		N_0	N_1	N_2		
D_0	37.6	52.4	46.0		20.5	20.9	18.1		
D_1	36.7	50.1	58.3		14.6	21.4	23.8		
D_2	37.8	48.1	46.5		18.7	23.7	19.1		
R_0	40.0	48.4	46.0	44.8	17.6	21.8	20.1	19.8	-25.0
R_1	37.4	46.6	53.3	45.8	22.3	22.6	21.1	22.0	-23.8
R_2	34.6	55.6	51.4	47.2	13.9	21.7	19.8	18.5	-28.7
Mean	37.4	50.2	50.2	45.9	17.9	22.0	20.4	20.1	
Effect of Spraying		(± 2.32)(1)			-19.5	-28.2	-29.8		

(1) Standard error for comparison between main effects only.

Percentage Straws showing "take-all" at Harvest 48/Ca/1.4

(means from transformed values)

	Unsprayed				Sprayed				Effect of Spraying
	R_0	R_1	R_2	Mean	R_0	R_1	R_2	Mean	
D_0	17.9	23.3	19.8	20.3	28.9	28.1	27.0	28.0	7.7
D_1	6.6	23.3	30.8	19.0	29.8	18.7	36.3	28.0	9.0
D_2	14.5	20.6	16.6	17.1	20.6	34.7	41.3	32.0	14.9
	N_0	N_1	N_2		N_0	N_1	N_2		
D_0	35.5	17.1	10.8		37.5	26.5	20.6		
D_1	37.3	9.0	14.4		50.2	19.1	17.6		
D_2	39.2	15.0	4.4		42.2	37.7	17.4		
R_0	23.2	20.4	1.3	12.5	41.2	24.0	15.8	26.3	13.8
R_1	34.2	17.0	17.4	22.4	30.2	27.2	23.5	26.8	4.4
R_2	55.8	5.5	14.4	22.0	59.0	31.5	16.6	34.7	12.7
Mean	37.3	13.6	9.3	18.9	43.2	27.5	18.6	29.2	
Effect of Spraying					5.9	13.9	9.3		

(Transformed values)

($\pm$ 5.01 Means $\pm$ 2.89)

	Unsprayed				Sprayed				Effect of Spraying ($\pm$ 4.09)(1)
	R_0	R_1	R_2	Mean	R_0	R_1	R_2	Mean	
D_0	25.0	28.9	26.4	26.3	32.5	32.0	31.3	31.9	5.1
D_1	14.9	28.9	33.7	25.8	33.1	25.6	37.1	31.9	6.1
D_2	22.4	27.0	24.1	24.5	27.0	36.1	40.0	34.4	9.9
	N_0	N_1	N_2		N_0	N_1	N_2		
D_0	36.6	24.5	19.2		37.8	31.0	27.0		
D_1	37.7	17.5	22.3		45.1	25.9	24.8		
D_2	38.7	22.8	12.0		40.5	37.9	24.7		
R_0	28.8	26.9	6.5	20.7	39.9	29.3	23.4	30.9	10.2
R_1	35.8	24.4	24.7	28.3	33.3	31.4	29.0	31.2	2.9
R_2	48.3	13.5	22.3	28.0	50.2	34.1	24.1	36.1	8.1
Mean	37.7	21.6	17.8	25.7	41.1	31.6	25.5	32.7	
Effect of Spraying		($\pm$ 4.09)(1)			3.4	10.0	7.7		

(1) Standard error for comparison between main effects only.

WHEAT

Residual effects of various dungs, of additional straw to dungs, of rotted bracken and of straw with sulphate of ammonia added.

RW – Great Harpenden II 1948

System of replication: The design was intended to be a 5 x 5 lattice square in 3 replicates, but owing to the interchange of a pair of treatments in two of the three blocks, the lattice design was not attained, and it was impracticable to treat the experiment as other than 3 randomized blocks of 25 plots.

Area of each plot: 0.0171 acre.

Treatments: Applied in 1947 to potatoes.
Of the 25 plots in each replicate, 3 received no organic manures, and the remaining 22 were treated with the following organic manures, applied at two rates: rotted bracken (B) straw with sulphate of ammonia added (A), and nine dungs:- from boxes:- stored (2 months) made with normal and heavy litter (W and X); from straw bale yards:- fresh, made with normal and heavy litter (Y and Z), stored (12 months), made with normal and heavy litter (R and S) and fresh (low ration and low ration plus sulphate of ammonia to straw) (T and V); from sunken yards:- stored (12 months) commercial dung (L).

Rates of application: The commercial dung (L) and rotted bracken (B) at 8 and 16 tons per acre, the straw with sulphate of ammonia (A) at 2 and 4 tons of chaffed straw per acre plus 0.3 and 0.6 N per acre as sulphate of ammonia, the stored normal dung from boxes (W) at the equivalent of 8 and 16 tons per acre weighed before storing, dung X, Y, Z , R and S, at weights produced by the same quantity of feeding stuffs as 8 and 16 tons of fresh normal dung from bullock boxes, and dungs T and V at the same rates as Z.

Actual rates of application
Tons per acre

Dungs		Level 1	Level 2	Litter straw lbs/head/day
	W	5.37	10.74	9.0
	X	4.79	9.58	18.0
	Y	8.66	17.32	9.2
	Z	10.78	21.55	17.1
	R	6.79	13.57	9.8
	S	7.76	15.51	19.7
	TV	10.78	21.55	16.1

Basal Manuring: 2 cwt. Sulphate of Ammonia per acre

Cultivations etc: Ploughed: Oct. 31 – Nov. 4. Rolled and springtine harrowed: Nov. 4 and again Nov. 5. Seed drilled: Nov. 6. Harrowed in: Nov. 7. Ring rolled: Apr. 23. Sulphate of ammonia drilled: early May. Cut and shocked: Aug. 10–12. Reset shocks: Aug. 18. Raked and carted in: Aug. 19–20. Threshed Sept. 6–10. Variety: Bersee. Previous crop: Potatoes.

Standard error per plot: Grain 2.52 cwt. per acre or 5.75% (50d.f.)

Organic Manure	Grain: cwt. per acre Level of organic 1	2	Mean	Straw: cwt. per acre Level of organic 1	2	Mean
	(±1.45)		(±1.03)			
None			41.9(1)			54.1
Stored (bullock boxes) normal litter	42.5	45.2	43.9	55.9	61.1	58.5
Stored (bullock boxes) heavy litter	41.4	44.9	43.2	55.9	58.1	57.0
Fresh (straw bale yards) normal litter	42.4	42.6	42.5	54.2	56.7	55.5
Fresh (straw bale yards) heavy litter	43.7	46.9	45.3	56.8	65.3	61.1
Stored (straw bale yards) normal litter	42.8	45.2	44.0	54.7	56.3	55.5
Stored (straw bale yards) heavy litter	42.6	44.1	43.3	54.8	56.3	55.5
Fresh (straw bale yards low feeding)	41.6	43.6	42.6	54.0	58.4	56.2
As above with Sulphate of Ammonia	44.9	44.6	44.7	57.0	59.0	58.0
Stored (Sunken yard)	45.3	44.8	45.1	61.9	59.0	60.5
Rotted Bracken	41.9	44.4	43.1	56.5	54.1	55.3
Straw with Sulphate of Ammonia	44.4	49.1	46.8	58.0	67.5	62.7
Mean	43.0	45.0	43.8	56.3	59.3	57.4

Standard error (1): ± 0.84

48/Ca/2.3

WHEAT

Wireworm Experiment (1)

The effect of various insecticides, and their methods of application.

RW - Little Hoos 1948

System of replication: 3 randomized blocks of 9 plots each

Area of each plot: 0.0289 acre

Treatments:
None
D.D. injected 400 lbs per acre.
Ethylene Dibromide 4% solution injected 15 gallons per acre.
D.D.T. dust combine drilled $\frac{5}{4}$ cwt per acre.
Gammexane; broadcast 2 cwt per acre, combine drilled $\frac{3}{4}$ cwt per acre, or applied as seed dressing.

Basal manuring: $2\frac{3}{4}$ cwt per acre sulphate of ammonia.

Cultivations etc.: Ploughed: Sept 16-27. Harrowed and rolled: Oct 7. DD and Ethylene Dibromide injected: Oct 10. Seed drilled, and remaining treatments applied: Oct 29-30. Harrowed in: Oct 30. Harrowed: Mar 30. Ring rolled: Apr 1. Sulphate of ammonia drilled: May 5. Hand weeded: June 5, 7-8, 22-23, and various days June 28 - July 23. Harvested: Aug 17. Variety: Bersee. Previous crop: Linseed.

Standard errors per plot:
Grain, 2.62 cwt per acre or 12.6% (18 d.f.)
Straw, 6.37 cwt per acre or 13.5% (18 d.f.)

	Untreated	DD Injected	Ethylene Dibromide Injected	DDT Dust Drilled	Gammexane Broadcast	Gammexane Drilled	Treated seed	Mean
				Grain: cwt. per acre				
Mean Yield (±1.51)	8.9(1)	28.3	32.1	20.7	30.6	24.8	24.0	20.8
Increase (±1.74)		19.4	23.2	11.8	21.7	15.9	15.1	
				Straw: cwt. per acre				
Mean Yield (±3.68)	22.8(2)	64.1	71.6	46.0	65.9	54.2	54.6	47.2
Increase (±4.25)		41.3	48.8	23.2	43.1	31.4	31.8	

Standard errors (1) ±0.87
(2) ±2.12

48/Ca/4.1

WHEAT

Wireworm Experiment (2)

The effect of treatment of seed with gammexane and of three strengths of gammexane dust.

RW - Little Hoos 1948

System of replication: 3 replicates of 3 incomplete randomized blocks of 3 plots each.

Area of each plot: 0.0289 acre

Treatments:
None.
Seed treated with gammexane dressing.
Gammexane dust, $\frac{1}{4}$, $\frac{1}{2}$ and 1 cwt per acre; combine drilled with seed (filler added where necessary to make total dressing of 1 cwt per acre)

Basal Manuring: $2\frac{3}{4}$ cwt per acre sulphate of ammonia.

Cultivations etc:
Ploughed: Sept 16-27. Harrowed and rolled: Oct 7. Seed and gammexane dust drilled: Oct 29-30. Harrowed in: Oct 30. Harrowed: Mar 30. Ring rolled: Apr 1. Sulphate of ammonia drilled: May 5. Hand weeded: June 5, 7-8, 22-23, and various days June 28-July 23. Harvested: Aug 17.
Variety: Bersee. Previous crop: Linseed.

Standard errors per plot:

Grain:	Block error,	1.61 cwt per acre	or 7.15% (4d.f.)
	Plot error,	2.28 cwt per acre	or10.1% (16d.f)
Straw:	Block error,	2.29 cwt per acre	or 4.63% (4d.f.)
	Plot error,	4.88 cwt per acre	or 9.86% (16d.f.)

Mean Yields

	Untreated (o)	Treated Seed (S)	Gammexane Dust (D)			Standard errors		
			¼ cwt/acre (D_1)	½ cwt/acre (D_2)	1 cwt/acre (D_3)	O v S v D	D_1 v D_2 v D_3	O,S v D_1,D_2,D_3
Grain: cwt/acre	13.6	26.3	28.4	27.7	27.1	±0.76	±1.42	±1.12
			28.4	27.5	27.1			
Straw: cwt/acre	32.8	56.2	60.2	59.6	58.0	±1.63	±2.65	±2.23
			60.2	60.4	58.0			

48/Ca/5.1

SPRING WHEAT

The effects of inoculation and wetting of seed, and of sulphate of ammonia.

RW – Long Hoos 1948

System of replication: 3 randomized blocks of 6 plots each.

Area of each plot: 0.0158 acre.

Treatments:
Seed: untreated, inoculated by wet method, wetted but not inoculated.
Sulphate of ammonia: None, 0.3 cwt. N per acre.

Note: The inoculum was a bacterial culture of French origin.

Basal manuring: 3 cwt. Superphosphate and 1 cwt. muriate of potash per acre.

Cultivations, etc.: Ploughed: Sept.30 – Oct.2. Rolled and springtine harrowed: Mar.10. Sulphate of ammonia applied and basal manuring broadcast by machine: Mar.12. Harrowed and seed drilled: Mar.13. Harrowed in: Mar.15. Rolled: Mar.20. Weeds hand pulled: June 8. Harvested: Aug.24.
Variety: Bersee.

Standard errors per plot (10 d.f.): Grain, 3.35 cwt.per acre or 17.1%
Straw, 3.00 cwt.per acre or 7.20%

	Seed Untreated	Seed inoculated (wet method)	Seed wetted not inoculated	Mean
Grain: cwt. per acre				
Mean (±1.37)	19.8	18.5	20.5	19.6
Sulphate of Ammonia:				
Absent	16.5	17.2	17.8	17.2
Present (±1.93)	23.2	19.8	23.1	22.0
Response (±2.74)	6.7	2.6	5.3	4.8 (±1.58)
Straw: cwt. per acre				
Mean (±1.22)	41.3	41.3	42.3	41.6
Sulphate of Ammonia:				
Absent	38.4	38.6	38.7	38.6
Present (±1.73)	44.2	44.1	45.8	44.7
Response (±2.45)	5.8	5.5	7.1	6.1 (±1.41)

48/Oa/6.1

SPRING WHEAT VARIETY TRIAL

The comparison of eight varieties of spring wheat, and the effect on them of three levels of sulphate of ammonia.

RW – Little Knott 1948.

System of replication: 2 randomized blocks of 8 plots, plots split into 3 for the application of sulphate of ammonia.

Area of each sub-plot: 0.022 acre.

Treatments.
Whole plots: Varieties: Atle, Meteor, Fylgia, Extra Kolben II Bersee, Vilmorin 27, April Bearded, Vilmorin 29
Sub-plots: Sulphate of ammonia; none, 0.4, 0.8 cwt N per acre.

Basal dressing: None.

Cultivations, etc.: Ploughed: various days Dec. to Jan. Springtine harrowed: Mar.4, and again Mar.11. Tooth harrowed: Mar.15 and again Mar.16. Sulphate of Ammonia applied: Mar.16. Seed drilled: Mar.18. Harrowed in: Mar.19. Rolled: Mar.23. Sprayed against weeds: May 19. Weeds pulled: June 7. Wild oats pulled: June 20-30. Harvested North block except Vilmorins by binder: Sept 7. Harvested Vilmorins North block: Sept.22. Harvested South block by combine: Sept.27. Previous crop: Kale

Standard Errors per plot: Grain
Whole plot: 1.99 cwt. per acre or 7.53%
Sub-plot: 1.88 cwt. per acre or 7.14%

Grain: cwt. per acre

Sulphate of ammonia	Atle	Meteor	Fylgia	Kolben II	Bersee	Vilmorin 27	April Bearded	Vilmorin 29	Mean
									(±0.47)
None	30.6	24.3	21.6	27.0	29.2	24.5	23.4	24.5	25.6
0.4 cwt. N per acre	31.4	25.2	24.6	27.7	30.0	24.0	23.5	25.9	26.5
0.8 cwt. N per acre	31.5	24.8	25.5	25.5	33.4	28.2	24.2	23.3	27.0
Mean	31.2	24.8	23.9	26.7 (±1.41)	30.8	25.6	23.7	24.5	26.4

Standard errors for body of table: ±1.33 for vertical comparisons only
±1.78 for all other comparisons

Straw: cwt. per acre*

Sulphate of ammonia	Atle	Meteor	Fylgia	Kolben II	Bersee	Vilmorin 27	April Bearded	Vilmorin 29	Mean
None	51.5	54.1	55.3	52.8	43.8	80.0	64.1	83.5	60.6
0.4 cwt. N per acre	55.6	53.4	52.5	56.8	53.5	72.2	61.0	83.8	61.1
0.8 cwt. N per acre	58.2	54.9	54.3	58.4	59.3	81.8	64.9	79.6	63.9
Mean	55.1	54.1	54.1	56.0	52.2	78.0	63.3	82.3	61.9

* 1 Block (North) only

48/Ca/6.2

48/Cb/1.1

SPRING SOWN CEREAL EXPERIMENT

Comparison of barley, oats and two varieties of wheat, and of the effects on them of four levels of sulphate of ammonia, of superphosphate, and of muriate of potash.

RV – Long Hoos III, 1948

System of replication: 4 randomized blocks of four plots each, each plot being split into 4, certain first-order interactions of artificials being confounded with whole plots.

Area of each sub-plot: 0.0191 acre.

Treatments:
Whole plots: Crops:- Oats (S.84), wheat (Atle and Bersee) and barley (Plumage Arthur)
Sub-plots: Sulphate of ammonia: None, 0.3, 0.6, 0.9, cwt N per acre
Superphosphate: None, 0.6 cwt. P_2O_5 per acre
Muriate of potash: None 0.6 cwt. K_2O per acre

Basal manuring: None.

Cultivations, etc.: Ploughed Sept.30 – Oct.2. Rolled and Springtine harrowed: Mar.10. Artificials applied: Mar.13. Harrowed: Mar.15. All seed drilled and harrowed in: Mar.17. Rolled: Mar.20. Hand weeded: June 7-8. All crops harvested: Aug. 23-24. Previous crop: Barley.

Standard errors: (grain):
per whole plot, 1.49 cwt. per acre or 6.9% (6.d.f.)
per sub-plot, 2.82 cwt. per acre or 13.0% (24 d.f.)

	Grain: cwt. per acre				Straw: cwt. per acre			
	Oats	Wheat (Atle)	Wheat (Bersee)	Barley	Oats	Wheat (Atle)	Wheat (Bersee)	Barley
			(±0.75)					
Mean	19.0	21.6	19.1	26.9	46.1	46.0	43.8	36.4
			(a) and (b)					
Sulphate of ammonia								
None	14.6	18.2	13.4	22.5	44.2	37.4	33.5	27.4
0.3 cwt. N per acre	19.6	20.8	20.0	27.3	48.6	44.0	41.2	35.2
0.6 cwt. N per acre	20.9	23.4	20.8	29.3	47.3	50.3	50.6	40.6
0.9 cwt. N per acre	20.9	24.1	22.2	28.6	44.4	52.5	49.9	42.6
			(±1.03)*					
Superphosphate								
Absent	18.3	22.3	19.1	26.2	46.5	46.1	42.9	35.7
Present	19.7	20.9	19.1	27.7	45.8	46.0	44.7	37.1
			(±1.41)					
Response	1.4	-1.4	0.0	1.5	-0.7	-0.1	1.8	1.4
			(±1.03)*					
Muriate of Potash								
Absent	19.5	21.8	17.8	25.9	46.7	45.2	43.9	35.8
Present	18.5	21.4	20.4	28.0	45.6	46.9	43.7	37.1
			(±1.41)					
Response	-1.0	-0.4	2.6	2.1	-1.1	1.7	-0.2	1.3

Standard errors: (a) ± 1.41 (for vertical comparisons only)
(b) ± 1.43 (for all other comparisons)

* Standard error for use in horizontal comparisons only

48/Cb/1.2

BEANS

The comparison of four varieties of beans and the effects on them of two methods of placement, two rates and two times of sowing.

RE - Great Field I 1948

System of replication: 4 randomized blocks of 8 plots each, the effect of time of sowing and certain high order interactions being confounded with block differences.

Area of each plot: 0.0286 acre.

Treatments:
- Varieties: Giant, Essex, Lincs and Wilts.
- Methods of placement: Seed broadcast before ploughing, dropped in furrow during ploughing.
- Rate of sowing: 2 cwt, 3 cwt seed per acre.
- Time of sowing: Early, Oct 28th. Late, Nov 18th.

Basal dressings: Dung: 10 tons per acre
Superphosphate 2 cwt per acre drilled across the plots
Muriate of potash: 2 cwt per acre
Nitrochalk: 2 cwt per acre.

Cultivations etc: Superphosphate and Muriate of Potash applied: Oct 20. Dung applied, ploughed in, beans placed in furrows, 1st sowing "Early": Oct 27-29. Tractor rolled and disced each way after ploughing: Oct 29. Chalk 45 cwt per acre applied: Nov 6. Dung spread, ploughed in beans placed in furrows, 2nd sowing "Late": Nov 17-18. Harrowed "Early" plots: Mar 16. Ring rolled all plots: Mar 30. Harrowed late plots: Mar 31. Nitrochalk applied: May 4. Harvested: Aug 25. Previous crop: Linseed.

Standard errors per plot :
- Grain: 2.62 cwt per acre or 10.7% (11 d.f.)
- Straw: 4.40 cwt per acre or 11.2% (11 d.f.)

Grain: cwt per acre

		Giant	Essex	Lincoln -shire	Wilts	Mean
(±0.92)	Mean	23.8	26.5	24.4	23.2	24.5
(±1.31)	Broadcast	23.2	25.3	24.4	24.1	24.3
	Ploughed In	24.3	27.7	24.3	22.3	24.6(±0.65)
(±1.85)	Ploughed In -Broadcast	1.1	2.4	-0.1	-1.8	0.3(±0.92)
	Seed rate per acre					
(±1.31)	2 cwt	21.5	24.1	22.8	22.1	22.6(±0.65)
	3 cwt	26.1	28.9	26.0	24.3	26.3
(±1.85)	3 cwt - 2 cwt	4.6	4.8	3.2	2.2	3.7(±0.92)
(±1.85)*	Early-Late Sowing	4.1	8.0	7.2	6.0	

		Seed rate per acre 2 cwt	3 cwt	Difference	Early-Late Sowing
(±0.92)	Broadcast	22.4	26.1	3.7 (1)	7.1
	Ploughed in	22.8	26.5	3.7	5.5
(±1.31)	Difference	0.4	0.4	0.0(2)	-1.6(2)
	Early-Late Sowing	7.3	5.3	-2.0(2)	

Standard errors (1) ±1.31

(2) ±1.85

* Standard error for comparison between main effects only

Straw: cwt per acre

		Giant	Essex	Lincoln -shire	Wilts	Mean	
(±1.56)	Mean	39.6	38.5	38.7	40.3	39.3	
(±2.20)	Broadcast	39.3	36.8	39.8	40.2	39.0	(±1.10)
	Ploughed In	39.9	40.3	37.7	40.4	39.6	
(±3.11)	Ploughed In -Broadcast	0.6	3.5	-2.1	0.2	0.6	(±1.56)
	Seed rate per acre						
(±2.20)	2 cwt	36.4	34.9	36.9	37.3	36.4	(±1.10)
	3 cwt	42.8	42.1	40.6	43.3	42.2	
(±3.11)	3 cwt - 2 cwt	6.4	7.2	3.7	6.0	5.8	(±1.56)
(±3.11)*	Early-Late Sowing	7.5	8.2	9.2	11.6		

		Seed rate per acre 2 cwt	3 cwt	Difference	Early-Late Sowing
(±1.56)	Broadcast	36.7	41.3	4.6	10.8
	Ploughed In	36.0	43.1	7.1 (1)	7.4
(±2.20)	Ploughed In -Broadcast	-0.7	1.8	2.5 (2)	-3.4 (2)
	Early-Late Sowing	8.9	9.3	0.4 (2)	

Standard Errors (1) (±2.20)

(2) (±3.11)

* Standard error for comparison between main effects only

48/Cd/1.1

POTATOES.

Effects of various dungs, of additional straw to dung, of rotted bracken, and of sulphate of ammonia and muriate of potash.

RP - Sawyers II, 1948

System of replication: 5 x 5 lattice square in 3 replicates, plots split into two for application of nitrogen and potash, the interaction of these being confounded with whole plots.

Area of each sub-plot 0.0126 acre.

Treatments:
Of the 25 whole plots in each replicate, 3 received no organic manures, and the remaining 22 were treated with the following organic manures, applied at two rates: rotted bracken (B) and ten dungs: from bullock boxes:- fresh, made with normal and heavy litter (W and X), and stored (12 months under cover) made with normal and heavy litter (R and S): from straw bale yards:- fresh made with normal and heavy litter (Y and Z), stored (12 months in open) made with normal and heavy litter (A and K) and stored (12 months in open) low ration, and low ration plus sulphate of ammonia to straw (T and V).

Rates of application: The rotted bracken (B) and the fresh normal dung from boxes (W) at 8 and 16 tons per acre, dungs X, Y, Z, R, S, A and K at weights produced by the same quantity of feeding stuffs as 8 and 16 tons of fresh normal dung from boxes, and dungs T and V at the same rates as Z.

		Actual rates of application Tons per acre Level 1	Level 2	Litter Straw lbs/head/day
Dungs	W	8.00	16.00	10.6
	X	6.90	13.81	20.3
	Y	8.74	17.49	10.4
	Z	8.21	16.42	20.9
	R	2.65	5.31	9.1
	S	2.74	5.49	18.3
	A	3.04	6.09	9.3
	K	3.66	7.33	17.3
	T and V	3.66	7.33	16.2

Sulphate of ammonia: None, 0.6 cwt N per acre
Muriate of potash: None, 1.0 cwt K_2O per acre

Basal Manuring: 3.75 cwt. Superphosphate per acre

Cultivations, etc: Ploughed: during Jan. Cultivated: Mar.16 Harrowed: Mar. 25. Ridged: Apr.23-24. Superphosphate drilled, sulphate of ammonia and muriate of potash applied Apr.26. Organics applied: Apr.29-30. Potatoes planted and covered in: Apr. 30-May 1. Rolled down ridges: May 6 Harrowed: May 25. Grubbed: June 15. Weeded and earthed up: July 2-3. Sprayed with "Perinox": Aug.10. Sprayed to kill off haulm: Sept.15. Lifted: Oct.1-4. Variety: Majestic (Scotch A). Previous crop: Barley.

Standard errors per plot:

Total tubers, per whole plot, 0.661 tons per acre or 5.28% (24 d.f.).
per sub-plot, 0.983 tons per acre or 7.84% (29 d.f.).

Total tubers: tons per acre

Level	Mean Yield 1	Mean Yield 2	Response to N 1	Response to N 2	Response to K 1	Response to K 2	Mean Yield	Averaging over two levels of organic: Response to N	Averaging over two levels of organic: Response to K
Organic Manure	(±0.438)		(±0.851)				(±0.310)	(±0.602)	
	10.44 (1)		−0.21 (2)		3.81 (2)		10.44 (1)	−0.21 (2)	3.81 (2)
None									
Dung: Fresh (boxes) normal litter	12.16	12.85	1.40	0.04	−0.08	1.73	12.51	0.72	0.82
Fresh (boxes) heavy litter	12.44	13.05	2.50	1.42	1.66	0.96	12.75	1.96	1.31
Fresh (yards) normal litter	12.03	12.55	1.14	−0.02	0.35	−0.56	12.29	0.56	−0.11
Fresh (yards) heavy litter	11.94	12.50	0.66	0.65	−0.31	−0.08	12.22	0.65	−0.20
Stored (boxes) normal litter	12.99	13.43	2.18	1.52	0.71	−0.44	13.21	1.85	0.14
Stored (boxes) heavy litter	13.08	13.50	1.58	0.34	1.02	−0.60	13.29	0.96	0.21
Stored (yards) normal litter	12.06	12.81	2.01	1.07	1.69	0.46	12.44	1.54	1.07
Stored (yards) heavy litter	13.41	13.25	1.29	0.75	0.99	0.52	13.33	1.02	0.76
Stored (yards) low feeding	13.84	13.51	3.08	0.27	1.10	0.20	13.18	1.68	0.65
As above with Sulphate of Ammonia	12.39	13.15	1.84	1.71	1.06	0.11	12.77	1.77	0.59
Rotted bracken	13.17	12.81	0.84	−0.09	0.12	0.31	12.99	0.37	0.22

Standard errors (1) ±0.253 (2) ±0.466

48/Oa/1.3

48/Cd/2.1

POTATOES

Effects of intensive intertillage, of earthing up, of mulching with straw, of applying artificials before and after ridging, and of spraying haulm before lifting.

RP - Sawyers II, 1948

System of replication: 4 randomized blocks of 10 plots each.

Area of each plot (after rejecting edge rows): 0.0098 acres.

Treatments:
- Cultivations: All four combinations of intensive and little intertillage between rows, with and without earthing up; also intensive cultivation until the crop was well through the ground, then mulching with 3 tons chaffed straw per acre between rows.
- Application of fertilizers: Broadcast before ridging, applied in the bouts.
- Spraying: Two of the four blocks were sprayed with sulphuric acid to kill off haulm before lifting.

Cultivations, etc.:
Ploughed: during Jan. Cultivated: Mar 16. Harrowed: Mar 25. Artificials applied before ridging: Apr 10. Ridged, artificials applied, potatoes planted and covered in: Apr 12. Rolled ridges: Apr 21. Chain-harrowed: May 18. Grubbed "intensive intertillage" plots: June 14. Grubbed, all plots: June 19. Earthed up, appropriate plots: June 26. Chaffed straw applied: July 8. Sprayed to kill off haulm: Sept 14. Lifted: Oct 5, 6. Variety: Majestic (Scotch A). Previous crop: Barley.

Standard errors per plot:

Total tubers,	1.35 tons per acre or 10.2%
Percentage ware,	0.780
Percentage greened,	5.02

All standard errors estimated from 22 d.f.

	Little Intertillage		Intensive Intertillage				
	Not earthed up	Earthed up	Not earthed up	Earthed up	Mulched	Mean	Effect of Spraying
	Total tubers; tons per acre (±0.673)						
Artificials applied before ridging	12.12	12.87	12.15	11.72	14.26	(±0.301) 12.63	(±0.602) -0.38
Artificials applied after ridging	13.69	13.19	13.72	13.21	15.00	13.76	-0.06
Mean (±0.476)	12.91	13.03	12.93	12.46	14.63	13.19	
Effect of Spraying (±0.952)	-0.26	0.60	-0.64	-0.57	-0.23		
	Percentage Wares. (±0.276)						
Artificials applied before ridging	97.92	97.75	97.42	98.90	98.08	(±0.174 93.02	(±0.349) 0.27
Artificials applied after ridging	97.70	98.50	97.92	98.80	98.82	98.35	0.54
Mean (±0.276)	97.81	98.12	97.68	98.85	98.45	98.18	
Effect of Spraying (±0.552)	0.32	0.40	-0.10	0.15	1.25		

48/Ca/2.2

48/Ca/2.3

	Little Intertillage		Intensive Intertillage				
	Not earthed up	Earthed up	Not earthed up	Earthed up	Mulched	Mean	Effect of Spraying
Percentage Greened: (±1.774)							
Artificials applied before ridging	3.61	4.93	13.56	5.82	6.61	(±1.122)	(±2.244)
after ridging	9.92	3.60	8.92	2.53	6.08	6.91	-3.16
						6.21	-3.05
Mean (±1.774)	6.76	4.26	11.24	4.18	6.34	6.56	
Effect of Spraying (±3.548)	-3.52	-2.08	-0.69	-2.46	-6.77		

48/Cd/3.1

POTATOES

The effects of four times of planting, of dung, sulphate of ammonia, superphosphate and muriate of potash.

RP - Sawyers II, 1948

System of replication: 4 randomized blocks of 16 plots each, certain high order interactions being confounded with block differences.

Area of each plot: 0.0133 acre

Treatments:
Time of planting: 10th April, 24th April, 8th May, 22nd May.
Dung: None, 15 tons F.Y.M. per acre
Sulphate of ammonia: None, 0.6 cwt. N per acre
Superphosphate: None, 0.6 cwt. P_2O_5 per acre
Muriate of Potash: None, 1.0 cwt. K_2O per acre.

Cultivations: Whole experiment; Ploughed: during Jan. Cultivated: Mar 16 Tooth harrowed: Mar 25. Sprayed with Perenox: Aug 10. Sprayed with 20% B.O .V. to kill off haulm: Sept 15. Lifted: Oct 4-5.

1st planting; Bouted: Apr 8. Artificials applied: Apr 9. Dung applied, potatoes planted and covered in: Apr 10. Rolled ridges: Apr 12. Chain harrowed: May 18. Grubbed: June 14 and again June 19. Earthed up: June 21.

2nd planting; Ridged, dung and artificials applied, potatoes planted and covered in: Apr 24. Rolled ridges: May 6. Chain harrowed: May 18. Grubbed: June 14 and again June 19. Earthed up: June 26.

3rd planting; Thistles cut, ridged, dung and artificials applied, potatoes planted and covered in: May 7. Rolled ridges: May 8. Chain harrowed: June 5. Weeded: July 5. Earthed up: July 7.

4th planting; Thistles cut: May 7. Dung and artificials applied, potatoes planted and covered in: May 21. Rolled ridges: May 22. Chain harrowed: June 5. Weeded: July 5. Earthed up: July 29.

Variety: Majestic (Scotch A), Previous crop: Barley.

Standard error per plot: Total tubers, ±1.98 tons per acre or 21.0% (34 d.f.)

Total tubers: tons per acre 48/Ca/3.2

	Time of Planting				
	10th April	24th April	8th May	22nd May	Mean
Mean (±0.496)	12.15	9.22	9.42	6.91	9.42
No Dung (±0.701)	10.75	8.35	8.61	7.10	8.71
Dung	13.55	10.08	10.23	6.71	10.14
Response to Dung (±0.992)	2.80	1.73	1.62	-0.39	1.43(1)
No Nitrogen (±0.701)	11.96	9.53	8.92	6.54	9.24
Nitrogen	12.34	8.91	9.92	7.28	9.61
Response to Nitrogen (±0.992)	0.38	-0.62	1.00	0.74	0.37(1)
No Superphosphate (±0.701)	10.98	8.63	9.46	7.36	9.11
Superphosphate	13.32	9.81	9.38	6.46	9.74
Response to Superphosphate (±0.992)	2.34	1.18	-0.08	-0.90	0.63(1)
No Potash (±0.701)	11.22	9.19	9.17	6.83	9.10
Potash	13.08	9.25	9.68	6.99	9.75
Response to Potash (±0.992)	1.86	0.06	0.51	0.16	0.65(1)

Standard Error (1) ±0.496

48/Cd./3.3

Responses to Treatments ± 0.701

Response to	Dung		Sulphate of Ammonia		Super-phosphate		Muriate of Potash	
	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
Dung	–	–	1.14	1.74	1.69	1.19	1.97	0.91
Sulphate of ammonia	0.07	0.67	–	–	0.41	0.33	0.60	0.14
Super-phosphate	0.89	0.39	0.68	0.60	–	–	0.58	0.70
Muriate of potash	1.18	0.12	0.88	0.42	0.59	0.71	–	–

SUGAR BEET

The effects of two methods of broadcasting and of two other methods of placement of two levels of a compound fertilizer.

RS - Long Hoos. 1948

System of replication: 3 randomized blocks of 11 plots each

Area of each plot (after rejecting edge rows): 0.00906 acre

Treatments:
Levels of fertilizer: None, 5, 10 cwt per acre of National Compound No 2 (9% N, 7% P_2O_5, 4½% K_2O)
Methods of placement: Broadcast before all cultivations, broadcast on seedbed and harrowed in at once, placed in band 2" below and 1" to side of seed, placed in band 2" below and 3" to side of seed.

Basal Manuring: None

Cultivations etc: Ploughed: Sept 30 - Oct 2. Springtine harrowed then rolled and springtined: Mar 10. Ground chalk applied 2 tons per acre: Mar 13. Fertilizer broadcast before cultivation on appropriate plots: Mar 19. Cultivated: Mar 20. Rolled and springtine harrowed: Mar 22. Harrowed and ring rolled, fertilizer broadcast on seedbed, seed drilled, and fertilizers placed: Mar 30. Dusted against flea beetle: May 7, 14 and 15. Hoed: May 27 - 28. Singled: June 4 - 5. Hoed: June 12 - 15, 16, 23 - 24, July 15 - 16 and 19 - 20. Lifted: Dec 8. Variety: Klein E. Previous crop: Barley.

Standard errors per plot:

Clean beet:	±0.950 tons per acre or 7.33%
Sugar percentage:	±0.352
Total sugar:	±3.27 cwt per acre or 7.4%
Tops:	±1.70 tons per acre or 12.2%
Plant number:	±1.02 thousand per acre or 4.4%

All standard errors estimated from 22 d.f.

Fertilizer (cwt/acre)	Broad-cast before cultivations	Broad-cast on seed bed	Band 2" below and 1" to side	Band 2" below and 3" to side	Mean	
Clean Beet: tons per acre (±0.549)						
None					11.49	(±0.317)
5	13.49	13.77	13.24	13.19	13.42	(±0.274)
10	13.88	13.37	13.98	13.23	13.61	
Mean (±0.388)	13.68	13.57	13.61	13.21	12.97	
Sugar Percentage: (±0.203)						
None					17.14	(±0.117)
5	17.09	17.11	17.11	16.98	17.07	(±0.102)
10	16.77	16.79	16.79	17.26	16.90	
Mean (±0.144)	16.93	16.95	16.95	17.12	17.03	
Total Sugar: cwt per acre (±1.89)						
None					39.4	(±1.09)
5	46.1	47.1	45.3	44.8	45.8	(±0.95)
10	46.6	44.9	47.0	45.7	46.0	
Mean (±1.34)	46.3	46.0	46.2	45.2	44.1	
Tops: tons per acre (±0.983)						
None					10.44	(±0.567)
5	13.64	12.36	13.52	15.01	13.63	(±0.491)
10	16.42	15.96	18.89	16.55	16.95	
Mean (±0.695)	15.03	14.16	16.21	15.78	13.97	
Plant Number: thous. per acre (±0.589)						
None					23.2	(±0.340)
5	22.7	22.7	23.1	23.3	23.0	(±0.295)
10	23.2	23.1	23.4	22.6	23.1	
Mean (±0.417)	23.0	22.9	23.3	22.9	23.1	

48/Cf/1.1

LINSEED

The effects of time of sowing, seed rate, sulphate of ammonia, superphosphate and muriate of potash.

R/JL – Bones Close 1948

System of replication: 4 randomised blocks of 8 plots each; certain high order interactions confounded with block differences.

Area of each plot: 0.0212 acre.

Treatments:
Time of sowing: 24th March (Early), 20th April (Late).
Seed rate: 60 and 90 lbs per acre.
Sulphate of ammonia: None, 0.45 cwt N per acre.
Superphosphate: None, 0.60 cwt P_2O_5 per acre.
Muriate of Potash: None, 0.45 cwt K_2O per acre.

Basal Manuring: None.

Cultivations etc: Ploughed: Nov 10–18. Springtine harrowed: Mar 3–4. Rolled and springtine harrowed: Mar 12. Harrowed: Mar 23. "Early" seed drilled, and artificials applied to "Early" plots: Mar 24. Harrowed in: Mar 25. Ring rolled: Mar 27. "Late" seed drilled, and artificials applied to "Late" plots: Apr 20. Harrowed and light ring rolled: Apr 21. Dusted against flea beetle: May 18. Thistles hand hoed: May 25. Agroxone used against weeds: May 27. Hoed: June 4–7 and 8–9. Harvested: Aug 28. Variety: Royal Previous crop: Barley.

Note: The late sown crop was practically a failure, and was discarded.

Standard error per plot: ±0.979 per acre or 12.6% (3 d.f.)

Grain: cwt per acre

Mean yield 7.78

Responses to treatments (±0.693. Means ±0.490)

Responses to:	Mean	Sulphate of Ammonia		Superphosphate		Muriate of Potash		Seed Rate lb per acre	
		Abs.	Pres.	Abs.	Pres.	Abs.	Pres.	60	90
Sulphate of Ammonia	1.61	-	-	1.23	1.99	-	-	1.25	1.97
Superphosphate	-1.08	-1.46	-0.70	-	-	-0.75	-1.41	-1.75	-0.41
Muriate of Potash	1.90	-	-	2.23	1.57	-	-	3.18	0.62
Seed Rate 90-60	1.28	0.92	1.64	0.61	1.95	2.56	0.00	-	-

Note: Owing to the discarding of the late sown crop, the interaction of Sulphate of Ammonia and Muriate of Potash was confounded with block differences.

48/Cf/1.2

LINSEED

The effects of rates and methods of application of a compound fertilizer.

R/JL - Bones Close 1948

System of replication: 4 randomized blocks of 6 plots each.

Area of each plot: 0.0191 acre.

Treatments:
None
$4\frac{1}{2}$ and 9 cwt compound fertilizer per acre, broadcast.
$2\frac{1}{4}$ and $4\frac{1}{2}$ cwt compound fertilizer per acre, drilled.

The compound fertilizer was made up of:

	lb
Sulphate of Ammonia	32
Superphosphate	57
Muriate of Potash	11
Total	100

= 6.7% N, 9.0% P_2O_5, 6.7% K_2O.

Basal Manuring: None.

Cultivations etc: Ploughed: Nov 10-18. Springtine harrowed: Mar 3-4. Rolled and springtine harrowed: Mar 12. Tooth-harrowed: Mar 23. Seed drilled, and compound drilled and broadcast: Mar 24. Harrowed in: Mar 25. Ring rolled Mar 27. Dusted against flea beetle: May 18. Thistles hand hoed: May 25. Agroxone applied against weeds: May 27. Hoed: June 4-7 and again 8-9. Harvested: Aug 28. Variety: Royal. Previous crop: Barley.

Standard error per plot: ·1.42 cwt per acre or 14.4% (16 d.f.)

Grain: cwt per acre

		Compound		
	None	Broadcast	Drilled	Mean
Level 1		11.2	9.6	10.4
		(±0.71)		(±0.50)
Level 2		8.2	7.9	8.1
Mean (±0.50)	11.2	9.7	8.8	9.9
Difference (±1.01)		-3.0	-1.7	-2.3 (±0.71)

LINSEED

The effects of time of sowing, seed rate, sulphate of ammonia, superphosphate and muriate of potash.

Broad Mead I Woburn 1948

System of replication: 4 randomized blocks of 8 plots each; certain high order interactions confounded with block differences.

Area of each plot: 0.0212 acre.

Treatments:

Time of sowing:	22nd March (Early), 16th April (Late)
Seed rate:	60 and 90 lbs per acre.
Sulphate of ammonia:	None, 0.45 cwt N per acre.
Superphosphate:	None, 0.60 cwt P_2O_5 per acre.
Muriate of potash:	None, 0.45 cwt K_2O per acre

Basal Manuring: None.

Cultivations etc: Ploughed: Feb 4 and Mar 1. Rolled: Mar 2. Harrowed three times: between Mar 12-18. "Early" seed sown and artificials applied to "Early" plots: Mar 22. Harrowed and rolled: Mar 23. "Late" seed sown and artificials applied to "Late" plots: Apr 16. Harrowed and rolled: Apr 16. Dusted against flea beetle: May 5-8, and again May 14. Weeds pulled: June 8. Early plots harvested: Aug 19. Late plots harvested: Sept 9.

Standard Error per plot: ±1.296 cwt per acre or 14.7% (13 d.f.)

Grain: cwt per acre

Mean yield: 8.79

Responses to treatments: (±0.648. Means ±0.458)

Response to:	Mean	Sulphate of Ammonia		Super phosphate		Muriate of potash		Sowing		Seed Rate lbs per acre	
		Absent	Present	Absent	Present	Absent	Present	Early	Late	60	90
Sulphate of Ammonia	0.05	-	-	0.47	-0.37	0.40	-0.30	-1.06	1.16	0.84	-0.74
Superphosphate	-0.16	0.26	-0.58	-	-	0.77	-1.09	-0.32	0.00	0.52	-0.84
Muriate of Potash	0.29	0.64	-0.06	1.22	-0.64	-	-	0.10	0.48	-0.26	0.84
Sowing Late-Early	-1.00	-2.11	0.11	-1.16	-0.84	-1.19	-0.81	-	-	-0.26	-1.74
Seed Rate 90-60	0.26	1.05	-0.53	0.94	-0.42	-0.29	0.81	1.00	-0.48	-	-

48/Cf/3.2

LINSEED

The effects of rates and methods of application of a compound fertilizer.

W/JL - Broad Mead I Woburn 1948

System of replication: 4 randomized blocks of 6 plots each.

Area of each plot; 0.0212 acre.

Treatments:
None.
4½ and 9 cwt compound fertilizer per acre, broadcast
2¼ and 4½ cwt compound fertilizer per acre, drilled.

The compound fertilizer was made up of:

	lb
Sulphate of Ammonia	32
Superphosphate	57
Muriate of Potash	11
Total	100

= 6.7% N. 9.0% P_2O_5 6.7% K_2O

Basal Manuring: None.

Cultivations etc: Ploughed: Feb 4 - Mar 1. Rolled: Mar.2. Harrowed three times: Mar 12-18. Seed sown and fertilizer applied to all plots: Mar 22. Harrowed and ring rolled: Mar 23. Dusted against flea beetle: May 5-8 Weeds pulled: June 8. Harvested: Aug 19. Variety: Royal. Previous crop: Ley.

Standard error per plot: 1.26 cwt. per acre or 13.0%. (16 d.f.)

Grain: cwt per acre

		Compound		
	None	Broadcast	Drilled	Mean
Level 1		9.9	10.5	10.2
		(±0.63)		(±0.45)
Level 2		6.9	8.6	8.7
Mean (±0.45)	10.2	9.4	9.5	9.7
Difference (±0.89)		-1.0	-1.9	-1.5 (±0.63)

PEAS

The effects of two methods of broadcasting and of two other methods of placement of two levels of a compound fertilizer.

R/PE - Long Hoos, 1948

System of replication: 3 randomized blocks of 12 plots each

Area of each plot: 0.0150 acre

Treatments:
- Levels of fertilizer: None, 3, 6 cwt. per acre of a special mixture (10% P_2O_5, 20% K_2O)
- Methods of placement: Broadcast before all cultivations, broadcast on seedbed and harrowed in at once, placed in band 2" below and 1" to side of seed, placed in band 2" below and 3" to side of seed.

Basal manuring: None

Cultivations, etc.: Ploughed: Sept 30 - Oct 2. Springtine harrowed then rolled and springtined: Mar 10. Ground chalk, 2 tons per acre, applied: Mar 13. Broadcast fertilizers, before cultivations on appropriate plots: Mar 19. Cultivated: Mar 20. Rolled and springtine harrowed: Mar 22. Harrowed, and ring rolled: Mar 30. Fertilizers broadcast in seedbed, seed drilled and fertilizers placed: Mar 30. Plant almost failed so decision made to resow, thistles cut, and seed redrilled: Apr 20. Harrowed and light ring rolled: Apr 21. Weeds pulled: June 7-9. Hoed: June 12.

Standard errors per plot:
- Yield, 1.61 cwt. per acre or 9.2% (25 d.f.)
- Plant number, 1.47 tens of thousands per acre or 10.5% (25 d.f.)

Fertilizer (cwt/acre)	Broadcast before cultivations	Broad-cast on seed bed	Band 2" below and 1" to side	Band 2" below and 3" to side	Mean
	Yield of threshed peanut cwt. per acre (±0.927)				(±0.464)
None					16.3
3	17.8	17.2	18.2	18.6	17.9
6	17.3	17.2	19.2	18.1	17.9
Mean (±0.656)	17.5	17.2	18.7	18.4	17.4
	Plant number: tens of thousands per acre (±0.851)				(±0.425)
None					13.4
3	14.0	13.2	13.5	15.5	14.1
6	14.6	13.7	15.3	14.2	14.5
Mean (±0.601)	14.3	13.5	14.4	14.9	14.0

48/Da/1

MEADOW HAY

17th Season

Direct and residual effects of mixed artificials and compost.

Lady Manners School, Bakewell 1948

System of replication: 4 randomized blocks of 9 plots each

Area of each plot: 0.00492 acre

Treatments: 3 x 3 factorial design.
No manure, mixed artificials (2 cwt nitrate of soda, 3 cwt superphosphate and 1 cwt miriate of potash per acre), 8 tons per acre compost applied in alternate years from 1932 to 1948 or from 1933 to 1947.

Basal Manuring: None

Soil: Limestone

Cultivations: Compost and artificials applied: Mar 22. Harvested: July 1.

Standard error per plot: ±7.02 cwt. per acre or 16.0% (24 d.f.)

Hay: cwt. per acre

Alternate years 1932 - 1948	Alternate years 1933 - 1947			Mean	Increase
	No Manure	NPK	Compost		
		(±3.51)		(±2.03)	(±2.87)
No manure	29.9	27.7	43.5	33.7	
NPK	41.7	44.0	49.0	44.9	11.2
Compost	51.2	54.4	53.1	52.9	19.2
Mean (±2.03)	41.0	42.0	48.5	43.8	
Increase (±2.87)		1.0	7.5		

48/Da/2

MEADOW HAY

18th Season

Effects of nitrate of soda, superphosphate and muriate of potash

Lady Manners School, Bakewell 1948

System of replication: 3 randomized blocks of 8 plots each.

Area of each plot: 0.00723 acre

Treatments: 2 x 2 x 2 factorial design
Nitrate of soda: None, 2 cwt per acre
Superphosphate: None, 3 cwt per acre
Muriate of Potash: None, 1 cwt per acre

Basal Manuring: None

Soil: Limestone.

Artificials applied: Mar 22. Harvested: June 30

Standard error per plot: ±7.08 cwt per acre of 21.2% (14 d.f.)

Hay: cwt per acre

Mean yield 33.3

Responses to treatments (±4.09 Means ±2.89)

	Mean	Nitrate of soda		Superphosphate		Muriate of potash	
		Absent	Present	Absent	Present	Absent	Present
Nitrate of Soda	7.2	-	-	7.4	7.0	2.5	11.9
Superphosphate	3.7	3.9	3.5			-1.2	8.6
Muriate of potash	9.1	4.4	13.8	4.2	14.0	-	-

CHEMICAL ANALYSES OF MANURES USED IN THE THREE, FOUR AND SIX COURSE ROTATIONS 1948

Three Course Rotation

Manures	% Organic matter	% N	% P_2O_5	% K_2O
Chaffed Straw	82.0	0.41	0.11	0.66
Adco	21.9	0.43	0.22	0.18
Sulphate of Ammonia		21.0		
Nitrate of Soda		15.5		
Superphosphate			17.7 (total)	
Muriate of Potash				62.0

Four Course Rotation

Manures	% Organic matter	% N	% P_2O_5	% K_2O
Chaffed Straw	82.0	0.41	0.11	0.66
Dung	20.6	0.58	0.29	0.92
Adco	21.9	0.43	0.22	0.18
Sulphate of Ammonia		21.0		
Superphosphate			17.7	
Mineral Phosphate			33.3	
Muriate of Potash				62.0

Six Course Rotation

Manures	% Organic matter	% N	% P_2O_5	% K_2O
Sulphate of Ammonia		21.0		
Superphosphate			17.7 (total)	62.0
Muriate of Potash				62.0