Rothamsted Experimental Station
Harpenden
LAWES AGRICULTURAL TRUST

RESULTS
OF THE
FIELD
EXPERIMENTS
1949

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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. 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/-

Index

Classicals

Long Term

Short Term

Outside Experiments

Miscellaneous Data

WHEAT - BROADBALK 1949

The 106th 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Treatments as listed in 1938 Report, p.p. 115-6, except that since the year 1940-41 rape cake has been replaced by castor bean meal, at the same rate of application.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. Ploughed: Sept 2-16. Dung applied: Sept 11-12 Springtine harrowed: Oct 22. Harrowed: Nov 11. Seed drilled: Nov 11-13. Artificials applied: Nov 11-15. Harrowed in: Nov 13-15. Harrowed: Apr 14. Ring rolled: Apr 19. Nitrogenous fertilizers applied: Apr 27. Weeds hand pulled: May 17-23. Second dressing of nitrate of soda applied to plot 16: May 23. Wild oats hand pulled: various days June 27 - July 6 and July 25-27. Harvested: Aug 5-6. Variety: Squareheads Master (13/4).
Fallow section. Ploughed: Sept 2-16. Springtine harrowed: Oct 22. Ploughed: Jan 24-31. Springtine harrowed: Mar 22 and Apr 14. Thistles cut: May 30 and June 27. Ploughed: July 4-5. Harrowed: July 18. Ring rolled and harrowed: July 20.

	Total Grain: cwt per acre					Total straw:* cwt per acre				
Section	V.	II	I	III	Mean	V	II	I	III	Mean
Years after Fallow	1	2	3	4		1	2	3	4	
Plot 2A	28.0	26.2	18.0	19.5	22.9	71.2	52.6	39.4	38.6	50.4
2B	32.4	28.8	23.3	14.9	24.8	79.5	56.6	52.1	52.4	60.2
3	21.6	10.4	9.8	9.9	12.9	34.3	15.5	16.8	16.2	20.4
5	22.9	7.3	8.5	11.5	12.6	39.0	14.9	18.8	20.3	23.2
6	27.1	12.3	12.7	12.6	16.2	46.4	22.0	26.1	23.8	29.6
7	32.2	18.1	14.3	16.1	20.2	55.6	29.9	27.0	29.8	35.6
8	30.5	24.1	21.5	15.5	22.9	58.3	42.2	43.1	39.4	45.8
9	29.4	13.8	13.3	13.0	17.4	54.2	23.3	24.5	24.4	31.6
10	23.9	20.4	14.9	11.4	17.6	38.1	31.1	26.8	25.2	30.3
11	20.5	20.4	18.8	16.1	19.0	35.3	31.6	34.4	26.5	32.0
12	24.6	21.1	19.5	16.5	20.4	44.9	34.6	33.1	28.1	35.2
13	29.4	15.6	17.7	17.6	20.1	53.6	32.3	32.2	32.7	37.7
14	28.2	22.3	21.9	18.6	22.3	47.1	35.8	31.7	28.7	35.8
15	26.9	15.2	13.2	16.7	18.0	55.0	33.6	27.3	49.5	41.4
16	30.9	22.9	17.4	20.9	23.0	58.4	37.5	34.9	33.4	41.0
17	21.4	7.6	6.0	6.9	10.5	40.2	12.5	11.2	12.8	19.2
18	30.1	15.5	14.2	23.1	20.7	50.7	26.6	28.6	37.4	35.8
19	29.6	18.1	17.5	19.1	21.1	51.1	40.1	31.9	35.7	39.7
20	-	15.7	16.2	-	16.0	-	30.4	22.1	-	26.2

* Includes straw, cavings and chaff

BARLEY - HOOSFIELD 1949

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: Sept 11-25. Dung applied: Sept 24. Ploughed in: Sept 25. Reploughed: Dec 20-30. Springtine harrowed: Feb 18. Thistles cut: Mar 23. Seed drilled and harrowed in: Mar 24. Ring rolled: Mar 31. Sprayed with "Denocate" to kill off weeds: May 13. Wild oats hand pulled: various days July 18-28. Harvested: Aug 11. Variety: Plumage Archer.

Plot	Total Grain cwt per acre	Total Straw* cwt per acre
1 0	10.3	10.3
2 0	15.5	13.8
3 0	12.2	12.1
4 0	18.0	14.5
5 0	13.9	12.7
1 A	14.7	13.6
2 A	22.0	20.8
3 A	14.0	13.8
4 A	21.6	18.3
5 A	13.3	15.6
1 AA	16.4	17.3
2 AA	24.0	23.3
3 AA	19.6	17.4
4 AA	26.8	24.8
1 AAS	19.9	20.0
2 AAS	23.9	25.3
3 AAS	23.4	21.5
4 AAS	26.7	24.8
1 C	19.4	20.5
2 C	24.8	22.6
3 C	19.6	18.3
4 C	24.7	21.5
6 - 1	8.7	8.0
6 - 2	11.1	12.6
7 - 1	15.2	17.7
7 - 2	27.4	37.4
1 N	17.9	20.6
2 N	23.4	17.2

* Includes straw, cavings and chaff

WHEAT AFTER FALLOW - HOOSFIELD 1949

Without manure 1851 and since

For details of treatments see 1938 report p. 109.

Cultivations, etc.:
Cropped sections: Ploughed: Sept 3-6. Harrowed twice: Oct 22. Seed drilled and harrowed in: Oct 23. Ring rolled: Apr 11. Harvested: Aug 16. Variety: Squareheads Master 13/4.
Fallow sections B3 ploughed: Sept 3. Remainder ploughed: Oct 1-2. All sections ploughed: Jan 3-13. Springtined: Mar 23 and Apr 14. Thistles cut: May 31 and June 27. Ploughed: July 5-6. Harrowed, ring rolled and harrowed: July 20.

	Produce: cwt per acre			
No. of years of Fallow	1	1	3	Mean
Section	B1	B4	B2	
Total Grain	13.5	13.0	13.5	13.3
Total Straw*	20.8	21.4	26.0	22.8

CROPS IN ROTATION - AGDELL FIELD 1949

Barley, 2nd crop of 26th course (1948-51)

Cultivations, etc.: Ploughed: Nov 26-27. Springtined: Feb 28. Harrowed, seed drilled: Mar 18. Harrowed in: Mar 19. Ring rolled: Apr 1. Harrowed and ring rolled: Apr 16. Thistles pulled: May 23-30. Harvested: Aug 4. Variety: Plumage Archer.

	Produce: cwt per acre					
Manure to Turnips only	Unmanured since 1848		Mineral Manure No Nitrogen		Complete Mineral and Nitrogenous Manure	
Rotation	Fallow	Clover	Fallow	Clover	Fallow	Clover
Plot	5	6	3	4	1	2
Total Grain	14.9	15.3	26.2	31.7	27.3	20.5
Total Straw*	17.9	19.6	28.1	34.6	28.8	31.6

* Includes straw, cavings and chaff.

MANGOLDS AND SUGAR BEET - BARNFIELD 1949

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.

Cultivations, etc.: Dung applied: Nov 20. Ploughed: Nov 23-26. Cultivated: Apr 12 and 13. Manures applied: May 4-6. Thistles cut: May 6. Harrowed, rolled, sugar beet drilled: May 9. Mangolds drilled, harrowed in: May 10. Ring rolled: May 11. Hoed: June 9-14. Singled: June 16-25. Hoed: June 23-27. Top dressings applied: June 29. Hoed: July 14-15 and 21-27, Aug 29-31. Hand weeded: Sept 14-16. Lifted both crops: Nov 3-16.

Varieties: Mangolds - Yellow Globe. Sugar Beet - Klein E.

Yields: tons per acre

Strip	Cross Dressings O	N	A	AC	C
	Mangolds: Roots				
1	10.19	13.73	11.66	15.14	13.68
2	11.34	18.20	16.24	18.94	15.14
4	4.00	(a) 11.56 (b) 11.84	12.12	17.37	14.97
5	1.52	6.70	5.81	6.72	4.52
6	2.16	8.29	9.64	12.80	9.26
7	1.83	7.55	9.93	11.58	9.07
8	1.33	2.89	2.54	4.42	3.10
9	7.57				
	Mangolds: Leaves				
1	2.32	2.86	1.86	2.35	2.76
2	3.35	3.43	3.03	4.16	3.20
4	1.37	(a) 3.77 (b) 3.45	3.08	3.94	3.13
5	0.83	2.84	2.45	3.18	2.30
6	1.03	2.96	2.76	3.57	2.89
7	0.86	2.96	2.94	3.69	3.52
8	0.71	1.66	1.42	2.10	1.83
9	2.59				

Yields: tons per acre

Strip	Cross Dressings O	N	A	AC	C
	Sugar Beet: Roots				
1	7.98	7.19	8.12	7.73	7.09
2	7.05	7.39	7.39	8.07	7.68
4	1.61	(b) 4.61	3.33	4.45	3.83
5	1.66	4.04	3.17	3.51	2.02
6	1.69	4.15	2.41	2.08	3.11
7	1.85	2.79	2.46	1.59	2.85
8	1.53	2.61	1.43	1.09	1.71
	Sugar Beet: Leaves				
1	6.56	11.00	9.00	8.02	8.17
2	8.32	9.05	6.65	7.78	8.86
4	1.86	(b) 4.70	5.24	5.72	2.01
5	1.91	6.41	3.77	6.51	3.57
6	2.01	5.68	1.57	3.77	2.59
7	1.81	4.75	2.74	2.74	5.04
8	1.52	4.11	2.25	1.66	2.94

HAY - THE PARK GRASS PLOTS, 1949

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

Cultivations etc.: Dung applied: Jan 11, 12. Minerals applied: Jan 26, 27. Chain harrowed: Jan 28. Rolled: Feb 17. Nitrogenous manures applied: 1st dressing Mar 30; 2nd dressing May 2. 1st cut: June 20-21. 2nd cut: Nov 17-18.

Yield of Hay: cwt per acre

	Not Limed			Limed		
Plot	1st Crop	2nd Crop***	Total	1st Crop	2nd Crop***	Total
1	6.1		6.1	20.3		20.3
2	8.8		8.8	11.9		11.9
3	6.7		6.7	12.2		12.2
4-1	10.8		10.8	14.4		14.4
4-2	9.9		9.9	24.4		24.4
5-1	7.0		7.0			
5-2	9.4		9.4			
6	21.8		21.8			
7	21.7		21.7	35.6		35.6
8	16.7		16.7	12.8		12.8
9	42.1	1.6	43.7	39.6		39.6
10	23.4	0.4	23.8	29.3		29.3
11-1	35.2	2.9	38.1	50.9	1.2	52.1
11-2	45.1	2.9	48.0	52.5	1.1	53.6
12	8.2		8.2			
13	27.6		27.6	44.7*		44.7*
14	50.5	1.1	51.6	45.4*	1.1*	46.5*
				35.8**	1.1**	36.9**
15	18.8		18.8	26.3		26.3
16	32.8	0.8	33.6	32.0	1.0	33.0
17	23.1	1.1	24.2	25.0	0.5	25.5
18	14.1		14.1	32.1+		32.1+
				32.6++		32.6++
19	33.5		33.5	29.4+		29.4+
				28.8++		28.8++
20	31.4		31.4	33.7+		33.7+
				39.4++		39.4++

* Sun

** Shade

*** These figures for the second crop are estimated hay yields calculated from the dry matter.

\+ Heavy liming

\++ Light liming

BARLEY - EXHAUSTION LAND HOOSFIELD 1949

For history of this land see 1949 Station Report, pp.97-8

Cultivations, etc.: Ploughed: Jan 3-10. Springtined: Mar 22. Drilled: Mar 23. Sulphate of ammonia applied, harrowed in: Mar 24. Rolled: Apr 1. Harvested: Aug 9. Variety: Plumage Archer.

Basal Manuring: 2½ cwt sulphate of ammonia per acre.

Plot	Treatment for potatoes 1876-1901	Total Grain cwt per acre	Total straw cwt per acre
1	Unmanured	7.6	8.3
2	Dung 1876 - 82	10.0	12.5
3	Superphosphate and Dung	26.8	28.9
4	Superphosphate (1) Nitrate of Soda (2) and Dung	25.9	28.8
5	Ammonium Salts	8.7	11.9
6	Nitrate of Soda	13.0	15.9
7	Minerals and Ammonium Salts	23.0	21.8
8	Minerals (as in 7) and Nitrate of Soda	27.9	25.0
9	Superphosphate	23.4	22.6
10	Minerals (as in 7)	27.0	29.7

(1) 1876-82 (2) 1876-81

Note: On plots 1, 5, 7, 10 the manuring dates back to 1856, the plots being under Wheat from 1856-74.

Rates of application of manures, per acre: Dung, 14 tons. Superphosphate, 3½ cwt. Nitrate of soda, 550 lb. Ammonium Salts, 400 lb. Minerals consist of Superphosphate, 3½ cwt; sulphate of potash, 300 lb.; sulphate of soda, 100 lb.; sulphate of magnesia, 100 lb.

WHEAT - WOBURN STACKYARD 1949

This field was under wheat from 1877-1926 and results and treatments for this period are given in the 1928 Station Report pp 103-105. From 1927-1940 no manures were applied, wheat being grown each year except 1927 and '28, 1934 and '35, when the field was fallowed. In 1941 and '42 a top dressing of 2 cwt sulphate of ammonia per acre was applied.

For the crop of 1943 a new scheme was started. The plots were divided into sets of three according to their previous manurial treatments (omitting plots 2, 5 and 8 which were so acid as to give negligible crops). The field was fallowed in 1947 and '48.

The sets were:

No minerals	plots	1, 3, 7.
Minerals	"	4, 6, 9.
Dung	"	11b divided into three subsections
Various	"	10a, 10b, 11a.

In each set of three plots one receives nitrochalk at 2 cwt per acre, another at 4 cwt, and the third at 6 cwt. On every plot the dressings rotate in cyclical order and the field is cropped yearly with wheat.

Cultivations etc.: Ploughed: Oct 6 and Nov 12. Harrowed, seed sown and harrowed again: Nov 15. Nitrochalk applied: Apr 29. Wild oats pulled: July 11-21. Harvested: Aug 10. Variety: Squarehead's Master 13/4.

Plot	Treatment 1877-1926	Nitrochalk Dressing: cwt per acre	Total grain: cwt per acre	Total straw: cwt per acre
3	Nitrate of Soda	2	8.0	15.1
1	Unmanured	4	10.9	20.7
7	Unmanured	6	10.7	20.0
6	Minerals plus Nitrate of soda	2	11.1	21.2
9	Minerals, and, in alternate years nitrate of soda	4	14.4	28.3
4	Minerals	6	15.6	32.2
11b (2)	Dung	2	12.6	25.9
11b (3)	Dung	4	16.0	33.6
11b (1)	Dung	6	18.7	30.2
11a	Sulphate of potash plus nitrate of soda	2	11.6	23.5
10a	Superphosphate plus nitrate of soda	4	10.9	23.2
10b	Rape cake	6	10.2	19.2

TWO COURSE ROTATION

Cumulative Effects of Agricultural Salt

Rothamsted 1949

Object of the experiment: To test the cumulative effects of agricultural salt and muriate of potash, and to compare two methods of application of the salt.

Rotation: Sugar beet followed by barley.

System of replication: For each crop 4 blocks of 12 plots. Second order interactions partially confounded with blocks.

Area of each plot:
Series 1, Barley: 0.02072 acre
Series 2, Sugar beet: 0.02000 acre (harvested area, 0.01733 acre).

Treatments:
All combinations of:

(1) Agricultural salt: None, $2\frac{1}{2}$, 5 and $7\frac{1}{2}$ cwt per acre applied to sugar beet.

(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 dressing of salt (approximately 2 cwt K_2O per acre), applied to sugar beet at sowing.

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

(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.

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.:
Barley. Series 1. Long Hoos VII.
Agricultural salt applied: Dec 16. Ploughed: Dec 29-30. Springtined: Feb 25. Sulphate of ammonia applied: Feb 28. Harrowed: Mar 4. Seed drilled, agricultural salt applied, harrowed in: Mar 11. Hand cut thistles: June 14, 15, 21. Harvested: Aug 8, 9. Variety: Plumage Archer. Previous crop: Sugar beet.

Sugar beet. Series 2. Long Hoos V.
Agricultural salt applied: Sept 23. Ploughed twice: Sept 24-25, Dec 28-29. Springtine harrowed: Feb 26. Cultivated: Mar 30. Harrowed: Apr 1. Ring rolled: Apr 2. Agricultural salt and muriate

of potash applied, seed drilled: Apr 11. Sulphate of ammonia applied: Apr 12. Superphosphate applied, harrowed in: Apr 13. Rolled: Apr 14. Hoed: May 17 - July 2. Singled: May 31 - June 2. Lifted: Nov 26-29. Variety: Klein E. Previous crop: Barley.

Standard errors per plot:

Barley,	grain, 2.06 cwt per acre or 7.6%	
Sugar beet,	total sugar, 1.92 cwt per acre or 6.7%	
	tops, 0.609 tons per acre or 8.2%	

All standard errors from 22 degrees of freedom.

Series 1: Barley

Salt applied 1948 cwt per acre	Muriate of potash applied in 1948 K_2O cwt per acre 0.0	1.0	2.0	Salt applied In seed bed: Winter	bed	Salt in 1949: None	Half Rate	Mean
Grain: cwt per acre								
	(±1.03)				(±0.79)			(±0.60)
0	26.0	28.2	27.1					27.1
2.5	27.0	27.6	28.4	27.8	27.5	28.3	27.1	27.7
5.0	26.2	26.4	25.1	26.1	25.7	25.9	25.9	25.9
7.5	26.6	29.7	27.4	28.1	27.7	28.7	27.1	27.9
Mean	26.4	28.0	27.0	27.3	27.0	27.6	26.7	27.1
	(±0.52)				(±0.48)			
Straw: cwt per acre								
0	29.2	30.4	30.6					30.1
2.5	31.1	32.9	32.1	34.2	29.9	31.5	32.6	32.0
5.0	28.3	27.5	26.1	27.0	29.0	28.2	27.7	28.0
7.5	28.9	33.9	29.9	34.0	27.8	33.5	26.3	30.9
Mean	29.4	31.2	30.2	31.7	28.9	31.1	29.5	30.2

Series 2: Sugar Beet

Salt applied 1949 cwt per acre	Muriate of potash applied in 1949 K_2O cwt per acre 0.0	1.0	2.0	Salt applied Winter	In seed bed	Mean
		(±0.96)		(±0.73)		(±0.56)
0	21.0	26.7	27.6			25.1
2.5	28.4	26.7	30.3	29.1	29.2	29.2
5.0	29.4	30.1	31.9	30.7	30.5	30.6
7.5	29.7	29.3	28.7	30.2	28.4	29.3
Mean	27.3	28.7 (±0.48)	29.7	30.0	29.4 (±0.44)	28.5

Total Sugar: cwt per acre

Sugar percentage

0	14.70	14.73	14.85			14.76
2.5	14.78	15.12	15.24	15.16	14.93	15.04
5.0	15.12	14.78	15.13	15.16	14.86	15.01
7.5	14.83	15.20	14.56	14.98	14.75	14.87
Mean	14.86	14.96	14.95	15.10	14.85	14.92

Roots (washed): tons per acre

0	7.14	9.05	9.29			8.50
2.5	9.63	9.48	9.94	9.60	9.76	9.68
5.0	9.89	10.17	10.55	10.13	10.29	10.21
7.5	10.02	9.66	9.86	10.07	9.63	9.85
Mean	9.17	9.59	9.91	9.93	9.89	9.56

Tops: tons per acre

		(±0.304)		(±0.233)		(±0.176)
0	7.11	7.59	7.47			7.39
2.5	8.43	7.26	7.32	7.84	7.50	7.67
5.0	7.62	7.75	7.59	7.78	7.53	7.66
7.5	7.19	6.77	6.93	6.83	7.10	6.96
Mean	7.59	7.35 (±0.152)	7.33	7.48	7.38 (±0.141)	7.42

Series 2: Sugar Beet (contd.)

Salt applied 1949 cwt per acre	Muriate of potash applied in 1949 K_2O cwt per acre 0.0	1.0	2.0	Salt applied Winter	In seed bed	Mean
Plant number: thousands per acre						
0	23.6	25.6	25.1			24.8
2.5	24.7	25.5	24.9	24.7	25.3	25.0
5.0	26.6	25.2	25.8	26.4	25.3	25.9
7.5	25.1	24.3	24.0	26.0	23.0	24.5
Mean	25.0	25.2	24.9	25.7	24.5	25.0
Noxious nitrogen: mg. per 100 gm.						
0	48.8	45.0	51.2			48.3
2.5	46.2	45.0	40.0	44.0	43.5	43.8
5.0	43.8	40.0	47.5	46.0	41.5	43.8
7.5	46.2	42.5	52.5	47.3	46.8	47.1
Mean	46.2	43.1	47.8	45.8	43.9	45.7

THREE COURSE ROTATION EXPERIMENT

Long Hoos VI, 1949

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.

Sugar beet, Series I.
Applied Adco with accompanying artificials: Dec 16.
Applied straw and accompanying artificials and ploughed in: Dec 29. Cultivated: Mar 30. Harrowed: Apr 9.
Harrowed and rolled: Apr 11. Seed drilled: Apr 12.
Applied artificials and harrowed in: Apr 13. Rolled: Apr 14.
Hoed: May 12. Singled: May 27. Hoed: June 2, 21, 29-30 and July 25. Lifted: Nov 15. Variety: Klein E.
Previous crop: Barley.

Barley, Series II.
Applied Adco with accompanying artificials: Dec 16.
Applied straw and accompanying artificials and ploughed in: Dec 29-30. Springtine harrowed: Feb 25. Applied artificials: Mar 2. Harrowed, seed drilled and harrowed in: Mar 4. Ring rolled: Apr 12. Thistles pulled: June 8-9, and 13. Harvested: Aug 6. Variety: Plumage Archer. Previous crop: Potatoes.

Potatoes, Series III.
Applied Adco with accompanying artificials: Dec 16.
Applied straw and accompanying artificials and ploughed in: Dec 29-30. Cultivated: Mar 30. Harrowed and ring rolled: Mar 31. Bouted, applied artificials: Apr 1.
Potatoes planted and covered in: Apr 4. Rolled down ridges: Apr 9. Harrowed: Apr 27. Re-ridged: May 9.
Harrowed ridges: May 16. Grubbed: June 1 and 28.
Weeded: June 29. Earthed up: July 11. Sprayed to kill off haulm: Sept 9. Lifted: Sept 22. Variety: Majestic. Previous crop: Sugar beet.

Standard errors per plot:

Sugar beet,	roots (washed),	0.740	tons per acre or 11.1%
	tops,	0.900	tons per acre or 14.8%
	sugar percentage,	0.456	
	total sugar,	2.19	cwt per acre or 10.3%
	plant number,	1.81	thousands per acre or 7.1%
Barley,	grain,	1.24	cwt per acre or 4.6%
	straw,	1.84	cwt per acre or 6.2%
Potatoes,	total tubers,	0.463	tons per acre or 12.1%
	percentage ware,	2.91	

All standard errors are based on 8 d.f.

Note: Owing to varying conditions during harvest all barley grain and straw yields have been corrected to 88% dry matter.

Summary of Results

	Treatments applied 1947/8					Treatments applied 1948/9				
	Art.	Adco	St 1	St 2	Mean	Art.	Adco	St 1	St 2	Mean
Series I										
Sugar beet Roots (washed) tons/acre	5.98	5.96 (±0.427)	6.08	6.71	6.18 (±0.214)	7.05	7.06 (±0.427)	7.11	7.21	7.11 (±0.214)
Tops tons/acre	5.41	5.31 (±0.520)	6.37	5.72	5.70 (±0.260)	6.91	6.05 (±0.520)	6.71	6.34	6.50 (±0.260)
Sugar percentage	16.01	15.91 (±0.263)	15.79	15.68	15.85 (±0.132)	15.41	16.17 (±0.263)	16.01	15.70	15.82 (±0.132)
Total sugar cwt./acre	19.1	20.1 (±1.26)	19.2	21.1	19.9 (±0.63)	21.8	22.8 (±1.26)	22.8	22.7	22.5 (±0.63)
Plant number thous./acre	25.5	24.9 (±1.04)	25.9	26.2	25.6 (±0.52)	25.9	27.0 (±1.04)	23.1	25.4	25.4 (±0.52)
Series II										
Barley Grain cwt./acre	25.4	26.4 (±0.71)	26.4	27.5	26.4 (±0.36)	30.3	25.4 (±0.71)	30.5	29.1	28.8 (±0.36)
Straw cwt./acre	26.9	27.7 (±1.06)	26.3	28.7	27.9 (±0.53)	34.8	25.9 (±1.06)	32.4	33.9	31.8 (±0.53)
Series III										
Potatoes tons/acre	2.91	3.82 (±0.267)	3.61	3.85	3.55 (±0.134)	3.93	3.85 (±0.267)	4.53	4.08	4.10 (±0.134)
Percentage Ware	70.7	76.0 (±1.68)	74.1	73.2	73.5 (±0.84)	71.8	73.4 (±1.68)	79.1	72.7	74.3 (±0.84)

Responses to Magnesium Sulphate

	Treatments applied 1947/8					Treatments applied 1948/9				
	Art.	Adco	St 1	St 2	Mean	Art.	Adco	St 1	St 2	Mean
Series I										
Sugar beet Roots (washed) tons/acre	0.75	-0.82 (±0.907)	-1.45	0.13	-0.35	0.24	0.20 (±0.907)	0.46	0.13	0.26
Tops tons/acre	0.43	-0.80 (±1.103)	1.87	0.00	0.38	0.15	-1.17 (±1.103)	0.72	-0.04	-0.08
Sugar Percentage	-0.11	0.03 (±0.558)	0.41	0.44	0.19	-0.16	-0.45 (±0.558)	-0.60	0.17	-0.26
Total sugar cwt./acre	2.2	-4.4 (±2.68)	-4.2	0.9	-1.3	0.5	0.0 (±2.68)	0.5	0.6	0.4
Plant number thous./acre	1.4	-1.8 (±2.21)	1.0	0.2	0.2	0.4	1.6 (±2.21)	-0.2	-1.2	0.2
Series II										
Barley Grain cwt./acre	-1.5	4.1 (±1.52)	-0.6	-2.7	-0.2	0.2	2.4 (±1.52)	0.5	0.3	0.9
Straw cwt./acre	0.8	-0.9 (±2.25)	0.2	-3.6	-0.9	4.8	-0.4 (±2.25)	2.6	0.9	2.0
Series III										
Potatoes tons/acre	-0.50	0.90 (±0.567)	0.44	-0.20	0.16	-0.86	-1.36 (±0.567)	0.56	0.54	-0.28
Percentage Ware	-6.1	2.7 (±3.56)	5.0	2.4	1.0	-12.2	-9.1 (±3.56)	-4.2	-4.4	-7.5

FOUR COURSE ROTATION

Hoosfield, 1949

Residual values of organic and phosphatic fertilizers

For details of the experiment, see 1932 Report, pp. 127-8.
The following alterations have been made:-

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 has been applied every year at the rate of 10 cwt per acre to the potato break after the crop has 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 1948-9

	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)	1.589	0.546	2.061	0.211	0.654	0.939
Adco	50 (as Adco)	1.371	0.718	1.273	0.429	0.482	1.727
Straw	127 (as Straw)	1.270	0.283	2.773	0.530	0.917	0.227
Super			None		0.36	1.2	0.6
Rock phosphate			None		0.36	1.2*	0.6

* As mineral phosphate

Cultivations, etc.

Barley, Series 1.
Dung and Adco with supplementary artificials applied: Dec 1. Straw and first dressing of artificials applied: Dec 16. Ploughed on various days: Dec 2-20. Second dressing of artificials to straw plots: Dec 18. Ground lime applied (10 cwt per acre): Jan 25. Springtine harrowed: Feb 25. Spring artificials including third dressing to straw plots applied: Mar 2. Harrowed, seed drilled and harrowed in: Mar 3. Ring rolled: Apr 12. Thistles hand pulled: June 7. Harvested: Aug 8. Variety: Plumage Archer. Previous crop: Potatoes.

Ryegrass, Series 2.
Dung and Adco with supplementary artificials applied, straw with first dressing of supplementary artificials applied: Sept 16. Ploughed: Sept 10-16. Rolled and harrowed both ways: Sept 30. Harrowed twice: Oct 1, 12. Autumn artificials applied: Oct 15. Seeds not sown owing to wet state of land. Second dressing of artificials to straw plots, ploughed: Dec 20. Springtined: Feb 25. Harrowed and ring rolled: Mar 24. Sulphate of ammonia applied; third dressing of artificials applied to straw plots; seed sown, harrowed and rolled in: Mar 25. Crop failed but plots had become very weedy. Cut with mower: June 25. Ploughed in: June 25-29. Variety: Western Worths. Previous crop: Barley.

Potatoes, Series 3.
Ploughed: Sept 9-10. Dung and Adco with supplementary artificials applied: Dec 3. Ploughed various days: Dec 2-20. First dressing of artificials applied to straw plots: Dec 13. Straw applied and ploughed in: Dec 18. Second dressing of artificials applied to straw plots: Dec 21. Springtined: Feb 25. Bouted: Mar 31. Spring artificials, including third dressing to straw plots, and sulphate of ammonia to half plots, applied; potatoes planted and covered in: Apr 8. Rolled down ridges: Apr 9. Chain harrowed: Apr 27. Re-ridged: May 9. Harrowed ridges: May 16. Ridged twice: June 1, 28. Weeded: June 29-30. Earthed up: July 14. Sprayed to kill off haulm: Sept 9. Lifted: Sept 21. Variety: Majestic. Previous crop: Wheat.

Wheat, Series 4.
Ploughed: July 2-7, 1948. Harrowed twice, ploughing started: Sept 13. Dung and Adco with supplementary artificials applied; straw with first dressing of artificials applied and ploughed in; ploughing finished: Sept 17. Springtined: Oct 21. Harrowed: Oct 22. Autumn artificials applied, seed drilled: Oct 23. Second dressing of artificials applied to straw plots: Dec 22. Harrowed and rolled: Apr 11. Sulphate of ammonia applied, third dressing of artificials applied to straw plots: Apr 25. Harvested: Aug 8. Variety: Squareheads Master 13/4. Previous crop: Ryegrass

A summary of the results of 14 years of this Rotation can be found in the 1946 Report, p. 82.

Summary of Results, 1949

Potatoes

Manure	Year of Cycle	Wheat cwt per acre Grain	Wheat cwt per acre Straw	Barley cwt per acre Grain	Barley cwt per acre Straw	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	23.2	41.8	29.2	34.6	2.50	3.82	3.16	1.32	78.4	83.7	81.0	5.3
	II	20.4	36.6	24.2	26.1	3.48	3.52	3.50	0.04	84.8	86.3	85.6	1.5
	III	21.7	35.6	23.8	27.9	3.77	4.43	4.10	0.66	83.2	87.6	85.4	4.4
	IV	18.9	29.4	23.2	24.3	2.51	3.53	3.02	1.02	83.2	85.7	84.4	2.5
	V	19.4	30.7	21.4	24.0	3.52	3.48	3.50	-0.04	86.6	84.7	85.6	-1.9
Manure as Adco	I	27.3	50.9	29.2	35.8	3.75	4.68	4.22	0.93	84.5	87.4	86.0	2.9
	II	23.5	39.6	26.4	29.4	2.28	3.48	2.88	1.20	81.9	85.5	83.7	3.6
	III	20.4	33.5	21.7	24.1	1.95	3.04	2.50	1.09	80.7	89.6	85.2	8.9
	IV	19.4	30.5	21.3	22.9	2.72	3.99	3.36	1.27	85.2	89.8	87.5	4.6
	V	18.9	26.8	23.5	25.2	2.95	2.98	2.96	0.03	82.0	84.3	83.2	2.3
Manure as Straw	I	20.8	31.6	26.7	30.6	2.75	4.17	3.46	1.42	76.9	86.0	81.4	9.1
	II	20.0	33.9	25.7	26.9	2.41	3.68	3.04	1.27	77.4	82.8	80.1	5.4
	III	21.9	40.0	21.6	22.7	3.60	4.51	4.06	0.91	83.8	84.8	84.3	1.0
	IV	21.4	36.4	25.2	25.6	3.42	3.23	3.32	-0.19	86.1	86.9	86.5	0.8
	V	19.7	35.2	19.7	24.7	2.40	2.73	2.56	0.33	76.2	78.6	77.4	2.4
Super-phos-phate	I	23.4	39.3	29.9	32.5	3.52	3.11	3.32	-0.41	81.0	79.7	80.4	-1.3
	II	20.8	32.9	25.5	32.5	2.94	3.64	3.29	0.70	83.6	86.1	84.8	2.5
	III	23.5	40.4	26.3	31.4	3.97	4.19	4.08	0.22	86.8	87.3	87.0	0.5
	IV	22.3	34.1	26.5	32.1	3.30	4.08	3.69	0.78	87.1	87.4	87.2	0.3
	V	24.5	39.3	25.6	31.4	3.46	3.48	3.47	0.02	85.9	85.2	85.6	-0.7
Rock phos-phate	I	23.7	37.1	23.4	29.8	2.53	2.40	2.46	-0.13	86.3	84.8	85.6	-1.5
	II	22.8	34.9	25.8	31.6	2.89	3.15	3.02	0.26	80.6	88.0	84.3	7.4
	III	21.9	31.5	23.9	26.5	3.59	2.76	3.18	-0.83	90.1	85.0	87.6	-5.1
	IV	21.5	32.8	25.0	30.0	2.97	2.89	2.93	-0.08	89.9	87.8	88.8	-2.1
	V	21.1	33.9	25.7	27.6	2.99	3.55	3.27	0.56	87.9	88.0	88.0	0.1

Note: The ryegrass crop failed because of drought.

49/Ba/3.3

SIX COURSE ROTATION EXPERIMENT 1949

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 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 2.
Ploughed: Sept 4-8. Reploughed: Jan 18-19. Harrowed: Apr 9. Harrowed, rolled, seed drilled: Apr 11. Artificials applied, harrowed and rolled in: Apr 12. Wireworm dust applied by hand (2 cwt per acre): Apr 16. Hoed: May 13 - June 28. Singled: May 30. Lifted: Nov 23. Variety: Klein E. Previous crop: Rye.

Barley. Series 3.
Sugar beet tops remaining from 1948 crop ploughed in: Nov 30 - Dec 1. Ground lime applied (10 cwt per acre): Jan 25. Springtined twice: Feb 22, 25. Artificials applied: Mar 2. Seed drilled and harrowed in: Mar 4. Ring rolled: Apr 12. Clover seed undersown: Apr 13. Rolled: Apr 14. Thistles hand pulled: June 13-14. Harvested: July 29. Variety: Plumage Archer. Previous crop: Sugar beet.

Clover. Series 4.
Seed undersown in barley: Apr 15, 1948. Harrowed and ring rolled: Apr 16. Autumn artificials applied: Dec 16. Rolled: Mar 23, 1949. Sulphate of ammonia applied: Apr 23. Cut: June 27. Variety: Late flowering Montgomery Red. Previous crop: Barley.

Wheat. Series 1.
Ploughed: July 28-29, 1948. Reploughed: Sept 22-23. Springtined twice: Oct 21, 22. Autumn artificials applied: Oct 26. Seed drilled: Oct 28. Harrowed and rolled: Apr 11, 1949. Sulphate of ammonia applied: Apr 23. Harvested: July 28. Variety: **Yeoman.** Previous crop: Clover.

Potatoes. Series 5.
Ploughed: Sept 2-3. Reploughed: Jan 20. Harrowed

and ring rolled: Mar 31. Bouted: Apr 1. Artificials applied: Apr 2. Potatoes planted and covered in: Apr 4. Ridges rolled down: Apr 9. Chain harrowed: Apr 27. Re-ridged: May 9. Ridges harrowed: May 16. Grubbed: June 1, 29. Earthed up: July 9. Sprayed to kill off haulm: Sept 8. Lifted: Sept 20. Variety: Majestic. Previous crop: Wheat.

Rye. Series 6.
Ploughed: Sept 30 - Oct 1. Ground lime applied: Oct 21-22. Harrowed: Oct 22. Autumn artificials applied: Oct 27. Seed drilled and harrowed in: Oct 28. Harrowed and rolled: Apr 11, 1949. Sulphate of ammonia applied: Apr 23. Harvested: July 26-27. Variety: King II. Previous crop: Potatoes.

Woburn, Stackyard, Series B.

Sugar beet. Series 5.
Ploughed: Sept 2. Re-ploughed: Jan 17-18. Springtined twice: Mar 22, 30. Harrowed, seed drilled, artificials applied, harrowed: Apr 5. Rolled: Apr 11. Hoed: Apr 30 - June 28. Singled: May 30 - 31. Lifted: Sept 27-28. Variety: Klein E. Previous crop: Rye.

Barley. Series 4.
Sugar beet tops remaining from 1948 crop ploughed in: Nov 10. Ploughed: Jan 31 - Feb 1. Ground lime (66%CaO) applied (15 cwt per acre): Feb 6. Springtined: Feb 19. Artificials applied: Mar 3. Seed drilled, clover seed undersown, harrowed in: Mar 18. Rolled: Mar 24. Harvested: July 26. Variety: Plumage Archer. Previous crop: Sugar beet.

Clover. Series 6.
Seeds undersown in barley: Mar 12, 1948. Harrowed: Mar 13. Phosphate and potash fertilizer applied: Nov 9. Rolled: Mar 24, 1949. Sulphate of ammonia applied: Apr 26. Cut: June 29. Variety: Late flowering Red (New Zealand). Previous crop: Barley.

Wheat. Series 3.
Ploughed, harrowed twice: July 23, 1948. Ploughed: Sept 3. Ploughed, harrowed, autumn artificials applied: Nov 8-9. Seed drilled and harrowed in: Nov 10. Harrowed, rolled: Apr 14-16, 1949. Sprayed with "D.N.O.C.": Apr 20. Sulphate of ammonia applied: Apr 26. Harvested: Aug 8. Variety: Squarehead's Master 13/4. Previous crop: Clover.

Potatoes. Series 1.
Ploughed: Sept 13-16. Re-ploughed: Jan 27-28. Springtined: Mar 24. Bouted: Apr 8. Artificials applied: Apr 11. Potatoes planted and covered in: Apr 12. Ridges harrowed, re-ridged: May 11. Grubbed: May 31. Hoed: June 18. Ridged: June 20-21. Sprayed to kill off haulm: Sept 10. Lifted: Sept 22-23. Variety: Majestic. Previous crop: Wheat.

Rye. Series 2.
Ploughed: Oct 6-8. Ground lime (66% CaO) applied (15 cwt per acre): Oct 19. Harrowed: Oct 23. Autumn artificials applied: Nov 8. Harrowed twice, seed drilled: Nov 9. Harrowed in: Nov 10. Harrowed and rolled: Apr 14-16. Sprayed with "D.N.O.C.": Apr 20. Sulphate of ammonia applied: Apr 26. Harvested: July 26. Variety: King II. Previous crop: Potatoes.

A summary of the results from the 6-course rotation for 1930-1948 will be found in the 1948 Station Report, pp. 90-94.

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 per acre				Clover, hay; dry matter cwt per acre			
Yield	8.08		7.96		44.8		37.0	
N	-0.59	0.633	-0.90	1.064	6.4	5.54	-9.0	6.61
P	-0.99	0.633	-1.15	1.064	5.2	5.54	4.1	6.61
K	0.62	0.380	2.76	0.638	-8.1	3.33	-1.1	3.97
	Sugar Beet, tops: tons per acre				Wheat, grain: cwt per acre			
Yield	6.29		4.33		28.6		18.0	
N	1.81	1.547	1.06	0.890	3.2	5.71	27.5	8.01
P	-0.05	1.547	0.69	0.890	-3.1	5.71	-13.3	8.01
K	0.43	0.928	1.10	0.534	4.5	3.43	-3.8	4.80
	Sugar Beet, sugar percentage				Wheat, straw: cwt per acre			
Yield	15.12		18.04		46.5		27.9	
N	-0.25		-0.05		7.1		46.7	
P	-1.23		1.47		-3.8		-2.9	
K	-0.48		0.35		5.1		-12.2	
	Sugar Beet, total sugar: cwt per acre				Potatoes, total tubers: tons per acre			
Yield	24.4		28.7		4.67		8.42	
N	-2.1	2.03	-3.3	4.52	2.01	0.407	3.71	0.796
P	-4.9	2.03	-2.1	4.52	-0.27	0.407	0.78	0.796
K	1.2	1.22	10.6	2.71	1.95	0.244	0.26	0.478
	Sugar Beet, plant number: thousands per acre				Potatoes, percentage ware			
Yield	25.3		23.7		78.1		90.5	
N	-1.9	2.24	-3.4	3.73	1.5		1.0	
P	-2.9	2.24	-2.4	3.73	-9.8		-1.5	
K	0.3	1.34	2.1	2.24	9.0		1.4	

	Rothamsted Response	S.E.	Woburn Response	S.E.	Rothamsted Response	S.E.	Woburn Response	S.E.
	Barley, grain: cwt per acre				Rye, grain: cwt per acre			
Yield	30.7		24.6		32.3		26.7	
N	4.7	2.46	21.5	6.76	16.5	6.35	9.5	6.50
P	1.1	2.46	-0.5	6.76	-2.5	6.35	-8.3	6.50
K	0.8	1.48	-5.8	4.06	-4.0	3.81	0.5	3.90
	Barley, straw: cwt per acre				Rye, straw: cwt per acre			
Yield	37.6		29.4		55.2		41.8	
N	27.7		38.2		21.2		5.5	
P	4.0		-0.9		-0.3		-20.9	
K	-1.3		-4.4		-6.2		7.7	

DEEP CULTIVATION ROTATION EXPERIMENT

Long Hoos I and III, 1949

Effects of deep ploughing, and of ploughing in mineral fertilizers and dung at different depths.

Rotation treatments and basal manuring as given in Results of Field Experiments, 48/Bb/1.

Area of each plot: 0.03125 acre. Areas harvested: wheat, spring oats, barley, 0.02652 acre; ley, 0.2750 acre; sugar beet, (half plot) 0.01186 acre; potatoes, (half plot), 0.01068 acre.

Cultivations, etc:

Wheat. Series 1.

Ploughed deep: Aug 3. Ploughed shallow: Aug 6. Cultivated (deep plots twice, shallow plots once): Sept 13. Rolled and cultivated: Sept 22. Ploughed: Sept 29, 30. Harrowed: Oct 22. Seed drilled and harrowed in: Oct 28. Harrowed and rolled: Apr 11. Sulphate of ammonia applied: Apr 26. Harvested July 28. Variety: Bersee. Previous crop: Ley.

Spring oats. Series 2.

Ploughed: Oct 4, 5. Springtined: Feb 18. Ploughed: Feb 23-25. Harrowed twice: Feb 25, 26. Sulphate of ammonia applied, springtined: Feb 28. Seed drilled and harrowed in: Mar 11. Ring rolled: Apr 13. Harvested: July 29. Variety: Star. Previous crop: Potatoes.

Sugar beet. Series 3.

Dung and artificials applied to deep ploughing plots, ploughed deep: Sept 20. Dung and artificials applied to shallow ploughing plots: Sept 21. Ploughed shallow (about 6 inches): Sept 22. Ploughed: Jan 18. Cultivated: Mar 29. Harrowed: Apr 1. Ring rolled: Apr 2. Artificials applied: Apr 9. Harrowed and rolled: Apr 11. Seed drilled: Apr 12. Harrowed in and rolled: Apr 13. Hoed at intervals: May 16 - June 27. Singled: May 25-27. Lifted: Nov 15. Variety: Klein E. Previous crop: Spring oats.

Barley. Series 4.

Ploughed: Jan 20. Springtined: Feb 26. Sulphate of ammonia and slag applied: Feb 28. Seed drilled and harrowed in: Mar 11. Ring rolled: Apr 13. Seeds mixture undersown, harrowed and rolled: Apr 14. Harvested: July 29. Variety: Plumage Archer. Previous crop: Sugar beet.

Ley. Series 5.

Seeds undersown in barley: Apr 15, 1948. Harrowed and ring rolled: Apr 16. Rolled: Mar 23, 1949. Cut: June 13. Seeds mixture per acre: 18 lb ryegrass (S 24), 8 lb. English late flowering red clover (Montgomery), 2 lb American Alsike-clover. Previous crop: Barley.

Potatoes. Series 6.
Dung and artificials applied and ploughed in deep: Sept 20. Dung and artificials applied to shallow plots: Sept 21. Ploughed in shallow: Sept 22. Ploughed: Jan 19. Cultivated: Mar 29. Harrowed, ring rolled, ridged: Mar 31. Artificials applied: Apr 2. Potatoes planted and covered in: Apr 4. Ridges rolled down: Apr 9. Chain harrowed: Apr 27. Re-ridged: May 9. Harrowed ridges: May 1(Hoed: June 28. Grubbed: June 29. Earthed up: July 11. Sprayed to kill off haulm: Sept 8. Lifted: Sept 19. Variety: Majestic. Previous crop: Wheat.

Standard errors per plot:
Wheat. Grain, 2.50 cwt per acre or 5.7% (4 d.f.)
Spring oats. Grain, 2.17 cwt per acre or 5.7% (4 d.f.)
Sugar beet. Total sugar, whole plot, 8.13 cwt per acre or 11.8% (4 d.f.
sub-plot, 2.48 cwt per acre or 9.5% (7 d.f.)
Tops, whole plot, 1.155 tons per acre or 16.0% (4 d.f.)
sub-plot, 0.521 tons per acre or 7.2% (7 d.f.)
Barley. Grain, 1.10 cwt per acre or 3.3% (4.d.f.)
Ley. 2.25 cwt per acre or 3.4% (4 d.f.)
Potatoes. Ware, whole plot, 0.449 tons per acre or 7.8% (4 d.f.)
sub-plot, 0.736 tons per acre or 12.9% (7 d.f.)

Series I. Wheat

Residual effects of treatments applied to sugar beet in 1946

		Responses to treatments							
	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Super Abs.	Super Pres.	Potash Abs.	Potash Pres.
	Grain: Mean yield 43.8 cwt per acre								
	(±1.25)					(±1.77)			
Ploughing deep - shallow	1.2	-	-	1.1	1.3	-0.5	2.9	2.3	0.1
Dung	1.6	1.5	1.7	-	-	1.2	2.0	-0.4	3.6
Superphosphate	0.9	-0.8	2.6	0.5	1.3	-	-	1.9	-0.1
Potash	0.7	1.8	-0.4	-1.3	2.7	1.7	-0.3	-	-
	Straw: Mean yield 63.5 cwt per acre								
Ploughing deep - shallow	1.3	-	-	0.6	2.0	-1.6	4.2	2.2	0.4
Dung	3.9	3.2	4.6	-	-	2.3	5.5	0.6	7.2
Superphosphate	0.3	-2.6	3.2	-1.3	1.9	-	-	1.9	-1.3
Potash	3.5	4.4	2.6	0.2	6.8	5.1	1.9	-	-

Series 2. Spring oats

Residual effects of treatments applied to potatoes in 1948

		Responses to treatments							
	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Super Abs.	Super Pres.	Potash Abs.	Potash Pres.
	Grain: Mean yield 38.0 cwt per acre								
	(±1.09)					(±1.54)			
Ploughing deep - shallow	-0.6	-	-	-1.1	-0.1	-0.7	-0.5	-0.9	-0.3
Dung	2.3	1.8	2.8	-	-	1.5	3.1	2.8	1.8
Superphosphate	-1.1	-1.2	-1.0	-1.9	-0.3	-	-	-1.4	-0.8
Potash	1.1	0.8	1.4	1.6	0.6	0.8	1.4	-	-
	Straw: Mean yield 50.0 cwt per acre								
Ploughing deep - shallow	-1.6	-	-	0.2	-3.4	-2.7	-0.5	-1.1	-2.1
Dung	8.3	10.1	6.5	-	-	7.9	8.7	8.4	8.2
Superphosphate	-2.0	-3.1	-0.9	-2.4	-1.6	-	-	-2.3	-1.7
Potash	2.6	3.1	2.1	2.7	2.5	2.3	2.9	-	-

Series 3. 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 26.0 cwt per acre									
	(±1.53)				(±2.16)				
Ploughing deep -shallow	1.6	-	-	3.0	0.2	0.2	3.0	0.9	2.3
Dung	6.8	8.2	5.4	-	-	7.0	6.6	6.6	7.0
Superphosphate	-0.9	-2.3	0.5	-0.7	-1.1	-	-	-0.7	-1.1
Potash	-0.1	-0.8	0.6	-0.3	0.1	0.1	-0.3	-	-
Roots (washed): Mean yield 8.93 tons per acre									
Ploughing deep -shallow	0.64	-	-	1.08	0.20	0.34	0.94	0.40	0.88
Dung	2.20	2.64	1.76	-	-	2.30	2.10	2.20	2.20
Superphosphate	-0.37	-0.67	-0.07	-0.27	-0.47	-	-	-0.14	-0.60
Potash	0.02	-0.22	0.26	0.02	0.02	0.25	-0.21	-	-
Sugar Percentage: Mean 14.54									
Ploughing deep -shallow	-0.06	-	-	0.00	-0.12	-0.36	0.24	-0.08	-0.04
Dung	0.17	0.23	0.11	-	-	0.15	0.19	0.02	0.32
Superphosphate	0.09	-0.21	0.39	0.07	0.11	-	-	-0.14	0.32
Potash	-0.11	-0.13	-0.09	-0.26	0.04	-0.34	0.12	-	-
Tops: Mean yield 7.21 tons per acre									
	(±0.577)				(±0.817)				
Ploughing deep -shallow	0.04	-	-	0.65	-0.57	-0.20	0.28	0.06	0.02
Dung	1.02	1.63	0.41	-	-	0.95	1.09	0.81	1.23
Superphosphate	0.02	-0.22	0.26	-0.05	0.09	-	-	0.44	-0.40
Potash	-0.05	-0.03	-0.07	-0.26	0.16	0.37	-0.47	-	-
Plant Number: Mean 22.9 thousands per acre									
Ploughing deep -shallow	1.4	-	-	1.3	1.5	1.3	1.5	1.5	1.3
Dung	0.9	0.8	1.0	-	-	2.0	-0.2	0.3	1.5
Superphosphate	-0.7	-0.8	-0.6	0.4	-1.8	-	-	0.2	-1.6
Potash	-0.7	-0.6	-0.8	-1.3	-0.1	0 2	-1.6	-	-
Noxious Nitrogen: Mean 62.5									
Ploughing deep -shallow	-1.2	-	-	1.3	-3.7	0.0	-2.4	-1.8	-0.6
Dung	-1.2	1.3	-3.7	-	-	-1.2	-1.2	-1.8	-0.6
Superphosphate	0.0	1.2	-1.2	0.0	0.0	-	-	3.1	-3.1
Potash	1.1	3.8	5.0	3.8	5.0	7.5	1.3		

Series 3. Sugar Beet

	Superphosphate			Potash			
	None	Ploughed	In seed bed	None	Ploughed	In seed bed	Mean
Total sugar: cwt per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	26.3	23.4	24.7	25.6	24.9	24.6	25.2
Deep	26.6	27.9	26.2	26.5	27.1	27.2	26.8
No dung	23.0	22.7	21.9	22.8	22.7	22.2	22.6
Dung	30.0	28.6	29.0	29.4	29.2	29.6	29.4
Mean	26.5	25.7	25.5	26.1	26.0	25.9	26.0
Roots (washed): tons per acre							
Shallow	8.95	8.08	8.47	8.73	8.58	8.42	8.61
Deep	9.29	9.65	8.78	9.12	9.44	9.32	9.25
No dung	7.97	7.92	7.47	7.82	8.03	7.66	7.83
Dung	10.27	9.81	9.78	10.03	9.99	10.09	10.05
Mean	9.12	8.87	8.62	8.03	9.01	8.87	8.93
Sugar Percentage							
Shallow	14.67	14.41	14.52	14.63	14.47	14.54	14.57
Deep	14.32	14.47	14.93	14.56	14.33	14.60	14.51
No dung	14.42	14.30	14.68	14.58	14.17	14.48	14.45
Dung	14.56	14.59	14.78	14.60	14.63	14.65	14.62
Mean	14.49	14.44	14.72	14.59	14.40	14.56	14.54
Tops: tons per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	7.30	7.00	7.16	7.21	7.25	7.09	7.19
Deep	7.10	7.64	7.08	7.26	7.17	7.22	7.23
No dung	6.72	6.84	6.51	6.83	6.60	6.54	6.70
Dung	7.68	7.80	7.73	7.64	7.83	7.77	7.72
Mean	7.20	7.32	7.12	7.24	7.21	7.16	7.21

Standard errors		(a)	(b)	(c)
	Total Sugar	±1.53	±1.24	±1.76
	Tops	±0.577	±0.261	±0.606

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

Series 3. Sugar Beet

	Superphosphate			Potash			
	None	Ploughed in	In seed bed	None	Ploughed in	In seed bed	Mean
	Plant Number: thousands per acre						
Shallow	22.6	20.7	22.9	22.5	21.7	22.0	22.2
Deep	23.9	23.9	22.5	23.9	23.8	22.5	23.5
No dung	22.3	22.7	22.5	23.1	22.3	21.3	22.4
Dung	24.2	21.9	22.9	23.4	23.2	23.2	23.3
Mean	23.2	22.3	22.7	23.2	22.8	22.3	22.9
	Noxious Nitrogen						
Shallow	62.5	65.0	62.5	61.2	65.0	65.0	63.1
Deep	62.5	62.5	60.0	59.4	65.0	63.8	61.9
No dung	63.1	65.0	61.2	61.2	65.0	65.0	63.1
Dung	61.9	62.5	61.2	59.4	65.0	63.8	61.9
Mean	62.5	63.8	61.2	60.3	65.0	64.4	62.5

Series 4. Barley

Residual effects of treatments applied to sugar beet in 1948

		Responses to treatments					
	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs. Pres.	Dung Abs. Pres.	Super Abs. Pres.	Potash Abs. Pres.
	Grain: Mean yield 33.7 cwt per acre						
	(±0.55)			(±0.78)			
Ploughing deep -shallow	0.9	-	-	0.8	1.0	1.0	0.8	0.8	1.0
Dung	1.5	1.4	1.6	-	-	1.2	1.8	1.9	1.1
Superphosphate	0.8	0.9	0.7	0.5	1.1	-	-	0.7	0.9
Potash	1.5	1.4	1.6	1.9	1.1	1.4	1.6	-	-
	Straw: Mean yield 33.8 cwt per acre								
Ploughing deep -shallow	1.9	-	-	1.9	1.9	1.7	2.1	2.4	1.4
Dung	2.7	2.7	2.7	-	-	1.6	3.8	3.1	2.3
Superphosphate	1.0	0.8	1.2	-0.1	2.1	-	-	0.9	1.1
Potash	1.4	1.9	0.9	1.8	1.0	1.3	1.5	-	-

Series 5. Ley

Residual effects of treatments applied to sugar beet in 1947

		Responses to treatments							
	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Super Abs.	Super Pres.	Potash Abs.	Potash Pres.
	Hay: Mean yield 65.8 cwt per acre								
	(±1.13)			(±1.59)					
Ploughing deep - shallow	1.5	-	-	3.0	0.0	0.3	2.7	-0.1	3.1
Dung	4.1	5.6	2.6	-	-	4.9	3.3	4.8	3.4
Superphosphate	1.1	-0.1	2.3	1.9	0.3	-	-	1.6	0.6
Potash	0.6	-1.0	2.2	1.3	-0.1	1.1	0.1	-	-

Series 6. Potatoes

		Responses to treatments							
	Mean	Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Super Abs.	Super Pres.	Potash Abs.	Potash Pres.
	Ware tubers: Mean yield 5.72 tons per acre								
	(±0.224)			(±0.317)					
Ploughing deep - shallow	-0.05	-	-	0.31	-0.41	0.11	-0.21	-0.23	0.13
Dung	2.36	2.72	2.00	-	-	2.22	2.50	3.17	1.55
Superphosphate	0.38	0.54	0.22	0.24	0.52	-	-	0.34	0.42
Potash	0.97	0.79	1.15	1.78	0.16	0.93	1.01	-	-
	Percentage ware: Mean 94.2								
Ploughing deep - shallow	1.5	-	-	1.3	1.7	1.9	1.1	2.1	0.9
Dung	0.2	0.0	0.4	-	-	-0.1	0.5	1.5	-1.1
Superphosphate	-0.8	-0.4	-1.2	-1.1	-0.5	-	-	-0.3	-1.3
Potash	1.0	1.6	0.4	2.3	-0.3	1.5	0.5	-	-

Series 6. 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	5.48	6.25	5.76	5.35	6.41	5.86	5.75
Deep	5.56	5.44	6.16	5.12	5.80	6.74	5.70
No dung	4.42	4.92	4.40	3.65	5.41	5.45	4.54
Dung	6.64	6.76	7.55	6.82	6.81	7.15	6.90
Mean	5.53	5.84	5.98	5.24	6.11	6.30	5.72
	Percentage ware						
Shallow	93.7	93.4	93.2	92.6	94.3	94.3	93.5
Deep	95.6	94.5	94.2	94.8	94.9	95.4	95.0
No dung	94.6	94.0	93.2	93.0	95.2	95.2	94.1
Dung	94.6	94.0	94.2	94.4	94.0	94.5	94.3
Mean	94.6	94.0	93.7	93.7	94.6	94.9	94.2

	(a)	(b)	(c)
Standard errors	±0.224	±0.366	±0.344

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

LEY AND ARABLE ROTATIONS

Highfield and Fosters Field - 1949

For details of treatments and rotations see the 1948 Station Report pp 98-99.

Cultivations, etc.:

Highfield

Wheat. Ploughed: Nov 1-8. Rolled: Block 1 -Nov 6, Block 4 - Nov 9. Disced twice, seed and basal superphosphate drilled and harrowed in: Nov 10. Wireworm powder drilled: Nov 22. Limed: Feb 2 and 14. Powdered Agroxone drilled: Mar 30 and Apr 27. Nitrochalk applied: Apr 27. Harvested: Aug 4. Variety: Yeoman.

Hay, Cut Grass, Grazed Ley and Reseeded Pasture. Ploughed: Nov 17-19. Limed: Feb 2 and 14. Disced: Mar 22. Harrowed: Mar 26. Disced, ring rolled and harrowed: Mar 28. Seeds sown, basal compound drilled: Mar 29. Nitrochalk applied: Apr 29. Hand pulled and cut thistles: June 13-15, July 16-18.

Hay: Harvested: July 27.

Cut Grass: 1st cut June 16. 2nd application of nitrochalk: June 17. 2nd cut: July 27. 3rd application of nitro-chalk: July 28.

Grazed Ley: 2nd application of nitrochalk: Aug 2. Grazed: Various periods between June 17 and Sept 11.

Reseeded Pasture: 2nd application of nitrochalk: Aug 2. Grazed: various periods between June 17 and Sept 9.

Old Pasture. Limed: Feb 2 and 14. Chain harrowed: Mar 28. Basal compound drilled: Mar 29. Flat rolled: Mar 30. 1st application of nitrochalk: Apr 29. 2nd application: Aug 2. Grazed: various periods between May 4 and June 16.

Lucerne. Ploughed: Nov 17-19. Limed: Feb 2 and 14. Disced: Mar 22. Harrowed: Mar 26. Disced, ring rolled, harrowed, basal compound drilled, rolled: Mar 29. Seed drilled: Mar 30. Ring rolled: Mar 31. Dusted with D.D.T. against flea beetle and bean weevil: Apr 22. Hoed: May 19 and June 9-10. Cut: July 27. Variety: Provence.

Fosters Field

Wheat. Ploughed: Oct 25-28. Harrowed twice: Oct 29. Seed and basal superphosphate drilled, and harrowed in: Oct 30. Harrowed and rolled: Apr 12. Nitrochalk applied: Apr 25.

Poppies pulled: June 22-30. Thistles cut: July 1 and 2.
Harvested: Aug 3. Variety: Yeoman.

Hay, Cut Grass, Grazed Ley, Reseeded Pasture. Ploughed: Nov 24-26. Springtined: Feb 23. Harrowed and ring rolled: Mar 25. Basal compound drilled, seeds sown, and harrowed in: Mar 26. Ring rolled: Mar 28. Nitrochalk applied: Apr 25. Hoed, pulled thistles and weeds: May 31-June 2 and July 4-5. Weeds cut with motor scythe: July 11.

Hay. The crop was unsufficient for cutting.

Cut Grass. Cut: June 16. Owing to poor crop, no further cuts were made. Sprayed with 10% B.O.V. to kill off weeds: Oct 7. Because of high proportion of weeds crop was ploughed in: Dec-Jan.

Grazed Ley. 2nd application of nitrochalk: Sept 15.
Sprayed with 10% B.O.V. to kill off weeds: Oct 7.
Grazed: various periods between June 10 and Sept 11.

Reseeded Pasture. 2nd application of nitrochalk: Sept 15.
Sprayed with 10% B.O.V. to kill off weeds: Oct 7.
Grazed: various periods between June 10 and Sept 9.

Lucerne. Ploughed: Nov 24-26. Springtine: Feb 23. Ring rolled: Mar 25. Basal compound drilled: Mar 26. Ring rolled: Mar 28. Seed drilled, ring rolled: Mar 31.
Dusted with D.D.T. dust against pea and bean weevil: Apr 22.
Hoed: May 16 and 19, and June 3-8. Hoed and weeded: July 7-12. Cut: July 30. Variety: Provence.

Standard errors per sub-plot.

Per $\frac{1}{4}$ plot	Wheat. Grain.	Highfield	±2.06 cwt	per acre or 13.3% (23 df.)
"		Fosters	±2.39 cwt	per acre or 10.3% (23 d.f)
"	Straw.	Highfield	±4.11 cwt	per acre or 16.6% (23 d.f.)
"		Fosters	±4.15 cwt	per acre or 11.5% (23 d.f)
"	Hay. Dry Matter	Highfield	±2.02 cwt	per acre or 24.6% (5 d.f.)
Per $\frac{1}{2}$ plot	Ley and Reseeded Pasture.	Highfield	±2.08 cwt	per acre or 8.9% (5 d.f.)
"		Fosters	±1.16 cwt	per acre or 7.9% (5 d.f.)

Wheat. cwt per acre

	cwt N per acre			cwt N per acre		
	0.3	0.6	Mean	0.3	0.6	Mean
	Grain			Straw		
Highfield	15.3	15.9 (±0.52)	15.6	24.1	25.5 (±1.03)	24.8
Foster's	22.4	24.1 (±0.60)	23.3	34.2	38.3 (±1.04)	36.2

Hay. Dry Matter. cwt per acre

	cwt N per acre		
	0.3	0.6	Mean
Highfield	9.0	7.4 (±1.01)	8.2

Cut Grass. 1st year. Dry Matter. cwt per acre.

	cwt N per acre*		
	0.15	0.3	Mean
Highfield (2 cut)	7.2	8.4	7.8
Foster's (1 cut)	4.4	2.4	3.4

Lucerne. 1st year. Dry Matter. cwt per acre

Highfield (1 cut)	18.6
Foster's (1 cut)	12.7

* Applied in early spring and after each cut.

Grazed Plots. Estimates from sample cuts of amount of Dry Matter cwt per acre, consumed by sheep.

	cwt N per acre 0.15	0.30	Mean
Old Pasture - Highfield	19.2	13.9	16.6
Ley and Reseeded Pasture - Highfield (1st year)	23.4	23.2 (±0.85)	23.3
Ley and Reseeded Pasture - Foster's (1st year)	13.2	6.2 (±0.47)	14.7

Note. For a variety of reasons the sheep weights were considered unreliable and have therefore been omitted.

Average sampling error per sample of Dry Matter Determination expressed as a percentage of a single sample (2 samples per plot).

Old Pasture	- Highfield	49%
Ley and Reseeded Pasture	- Highfield	37%
" " " "	- Foster's	18%

Mean Grazing Days per acre

	cwt N per acre 0.15	0.30	Mean
Old Pasture - Highfield	1292	1142	1217
Ley and Reseeded Pasture - Highfield (1st year)	602	628	615
" " " " - Foster's	343	360	351

GREEN MANURING EXPERIMENT

Woburn, Stackyard Series A - 1949

Treatments as given in 1936 Report, p.203, with the exceptions that from 1946 onwards lupins replaced tares, and rape replaced mustard as green manuring crops, while kale has been replaced by winter cabbages as a testing crop. From 1944 to 1948 a top dressing of 1½ cwt per acre of sulphate of ammonia has been applied to half the plots under barley and from 1946 to 1948 this dressing was repeated on the same plots to the green manuring crops. In 1949 this dressing was applied to the fallow, lupin and clover plots; the rape and ryegrass plots which had received top dressing when under barley in 1948 were dressed with 3 cwt per acre sulphate of ammonia, and those which had received no top dressing in 1948 were dressed with 1½ cwt per acre sulphate of ammonia. Since 1944 the experiment has been a half replicate, according to the identity I ≡ (R + C - M - F - T)DSNA, A representing the top dressing of sulphate of ammonia.

Cultivations, etc.:

Lower Half. Cabbages.

Dorset Marl clover and Italian Ryegrass undersown in barley: Apr 16, 1948. Harrowed in: Apr 23. Rolled: Apr 26. Ploughed (except ryegrass and clover plots): Sept 6-14. Second ploughing: Nov 22-25, Jan 17. Springtined three times (except ryegrass and clover plots) Feb 19, Mar 3, 28. Harrowed (except ryegrass and clover plots), lupin plots rolled, rape plots ring rolled, sulphate of ammonia applied: Mar 31. Lupins and rape sown on appropriate plots, rape plots harrowed, lupin, and rape plots ring rolled: Apr 1. Lupin plots hoed at intervals: Apr 19 - June 15. Rape destroyed by flea beetle. Rape plots thistle-barred: Apr 27. Rape plots harrowed: Apr 28. Rape resown, harrowed and rolled: Apr 29. Rape plots twice dusted with D.D.T. powder: May 7, 25. Fallow plots thistle-barred three times, springtined twice, and harrowed three times: Apr 19 - July 12. Ryegrass and clover cut and carted off plots: June 28, 29. Dung and straw applied to appropriate plots: July 11, 18. Green manures ploughed in, whole area harrowed (clover and ryegrass plots harrowed twice) and rolled: July 19, 20. Basal manures applied: July 21. Sulphate of ammonia applied: July 22. January King cabbages transplanted: July 21 - 29. Many cabbages killed by drought. January King cabbages re-planted with water: Aug 2-5. January King cabbages re-planted with water: Aug 8-11. Gaps filled with Savoy cabbages: Aug 25, Sept 1-2, 24. Area surrounded by wire netting against rabbits: Aug 16-25. Hoed at intervals: Aug 29 - Sept 8. Cabbages watered: Sept 9.

Sprayed with nicotine: Sept 29-30. Harvested: Jan 4, 25, Feb 8-14, 21, Mar 1. Variety: January King, filled in with Savoy. Previous crop: Barley.

Upper Half. Barley.
Ploughed: Mar 12-17. Lime at 3 cwt per acre CaO applied: Mar 21-22. Springtined: Mar 22. Sulphate of ammonia applied, harrowed, seed drilled, Broad Red Clover and Italian ryegrass undersown on appropriate plots: Mar 23. Harrowed and rolled: Mar 24. Weeded: June 2. Harvested: Aug 9. Variety: Plumage Archer. Previous crop: Cabbages.

Standard errors per plot:
Cabbages: total yield, 0.568 tons per acre or 12.9%
Barley: grain, 2.25 cwt per acre or 11.9%
straw, 3.09 cwt per acre or 13.9%

All standard errors from 9 degrees of freedom.

Lower Half - Cabbages

	None	Lupins	Clover	Rape	Rye-grass	Mean
Total weight: tons per acre (±0.284)						(±0.127)
No Dung	5.53	4.92	3.90	3.18	3.22	4.15
Dung	5.86	5.59	3.86	3.64	4.28	4.65
No Straw	5.76	5.39	4.14	3.31	4.04	4.53
Straw	5.63	5.12	3.64	3.50	3.45	4.27
Sulph. amm.						
2 cwt per acre	5.55	5.14	3.70	3.15	3.58	4.23
4 cwt per acre	5.83	5.37	4.07	3.66	3.92	4.57
Sulph. amm. to barley*						
Low	5.67	5.47	3.87	3.59	3.47	4.41
High	5.72	5.05	3.90	3.22	4.03	4.38
Mean (±0.201)	5.69	5.26	3.88	3.41	3.75	4.40

Total number: thousands per acre (±0.21)						(±0.09)
No Dung	17.7	17.6	18.0	17.5	17.3	17.6
Dung	17.7	17.6	17.8	17.9	17.8	17.8
No Straw	17.5	17.5	17.9	17.9	17.6	17.7
Straw	17.9	17.7	18.0	17.5	17.5	17.7
Sulph. amm.						
2 cwt per acre	17.8	17.6	18.1	17.8	17.1	17.7
4 cwt per acre	17.6	17.5	17.8	17.6	18.1	17.7
Sulph. amm. to barley*						
Low	17.6	17.4	17.6	17.9	17.3	17.6
High	17.9	17.6	18.2	17.5	17.8	17.8
Mean (±0.15)	17.7	17.6	17.9	17.7	17.6	17.7

*Sulphate of ammonia to barley and green manure crops, 1948.

	Low	High
fallow, lupins, clover rape, ryegrass	0	3 cwt per acre
	1½	4½ " " "

Lower Half - Cabbages

Differential responses

	Mean	Dung Abs.	Dung Pres.	Straw Abs.	Straw Pres.	Sulph. amm. cwt per acre 2	Sulph. amm. cwt per acre 4	Sulph. amm.* to barley Low	Sulph. amm.* to barley High
Total weight: tons per acre									
	(±0.180)				(±0.257)				
Dung	0.50	–	–	0.64	0.55	0.58	0.41	0.85	0.14
Straw	-0.26	-0.11	-0.40	–	–	-0.20	-0.31	-0.23	-0.28
Sulph. amm.	0.35	0.43	0.26	0.40	0.29	–	–	0.38	0.32
Sulph. amm.* to barley	-0.03	0.32	-0.38	0.0	-0.05	0.0	-0.06	–	–
Total number: thousands per acre									
	(±0.13)				(±0.19)				
Dung	0.1	–	–	0.1	0.0	0.0	0.0	0.3	-0.1
Straw	0.0	0.0	0.0	–	–	0.0	0.0	0.2	-0.2
Sulph. amm.	0.0	0.0	0.0	0.0	0.0	–	–	0.0	0.0
Sulph. amm.* to barley	0.3	0.5	0.0	0.5	0.0	0.2	0.3	–	–

* Sulphate of ammonia to barley and green manure crops, 1948

	Low	High	
fallow, lupins, clover	0	3	cwt per acre
rape, ryegrass	1½	4½	cwt per acre

Upper Half - Barley

Green Manure Crops	None	Lupins	Clover	Rape	Rye-grass	Mean
Grain:	cwt per acre (±1.12)					(±0.50)
No Dung to cabbages 1948	19.1	19.8	15.0	15.7	17.7	17.5
Dung to cabbages	21.3	21.6	19.3	19.9	19.6	20.3
No straw to cabbages 1948	21.6	20.8	17.1	17.6	17.5	18.9
Straw to cabbages	18.8	20.6	17.3	17.9	19.8	18.9
Sulph.amm.to cabbages 1948						
2 cwt per acre	21.9	19.2	16.5	17.8	17.1	18.5
4 cwt per acre	18.4	22.2	17.8	17.8	20.2	19.3
Sulph.amm.to barley						
Nil	17.1	17.8	15.7	13.7	14.6	15.8
1½ cwt per acre	23.3	23.6	18.6	21.9	22.7	22.0
Mean (±0.79)	20.2	20.7	17.2	17.8	18.6	18.9
Straw:	cwt per acre (±1.54)					(±0.69)
No Dung to cabbages 1948	20.8	22.4	19.0	17.5	22.6	20.5
Dung to cabbages	24.4	26.4	21.9	24.1	23.4	24.1
No straw to cabbages 1948	23.7	24.3	20.6	20.6	22.0	22.2
Straw to cabbages	21.5	24.6	20.3	21.0	24.0	22.3
Sulph.amm.to cabbages 1948						
2 cwt per acre	23.8	24.0	19.1	19.6	21.3	21.6
4 cwt per acre	21.5	24.9	21.8	22.0	24.7	23.0
Sulph.amm.to barley						
Nil	18.8	19.1	17.6	15.4	17.3	17.6
1½ cwt per acre	26.4	29.8	23.3	26.2	28.7	26.9
Mean (±1.09)	22.6	24.4	20.5	20.8	23.0	22.3

Upper Half - Barley

Differential responses

	Mean	Dung to Cabbages Abs.	Dung to Cabbages Pros.	Straw to Cabbages Abs.	Straw to Cabbages Pros.	Sulph. amm. to cabbages cwt per acre 2	Sulph. amm. to cabbages cwt per acre 4	Sulph. amm. to barley cwt per acre 0	Sulph. amm. to barley cwt per acre 1½
Grain: cwt per acre									
	(±0.71)					(±1.02)			
Dung to Cabbages 1948	2.9	-	-	4.5	1.2	3.9	1.8	4.2	1.5
Straw to Cabbages 1948	0.0	1.6	-1.6	-	-	0.6	-0.6	-0.2	0.2
Sulph. amm. to cabbages 1948	0.8	1.8	-0.2	1.4	0.1	-	-	1.7	-0.1
Sulph. amm. to barley	6.2	7.5	4.8	5.9	6.4	7.1	5.2	-	-
Straw: cwt per acre									
	(±0.98)					(±1.40)			
Dung to Cabbages 1948	3.6	-	-	5.1	2.0	3.4	3.7	5.4	1.7
Straw to Cabbages 1948	0.0	1.5	-1.5	-	-	0.0	0.0	-0.5	0.5
Sulph. amm. to cabbages 1948	1.4	1.2	1.5	1.3	1.4	-	-	1.6	1.1
Sulph. amm. to barley	9.2	11.0	7.3	8.6	9.7	9.4	8.9	-	-

LEY AND ARABLE ROTATIONS

Woburn - Stackyard Series D, 1949

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, and that in 1949 rye was substituted for wheat as being less subject to ravage by birds.

Cultivations, etc.:

Block I. Ley. Third year. Grazed by sheep: May 4-14, May 31-June 8, June 29-July 6, Aug 14-18, Oct 4-12, and Oct 29-Nov 1.

Lucerne. Third year. Hoed: Mar 31, Apr 25-30, and May 3-5. First cut: July 1. Second cut: Aug 17. Third cut: Oct 28.

Hay. Grass and clover mixture undersown in wheat: Apr 16 1948. Harrowed: Apr 23. Rolled: Apr 26. First dressing of nitrochalk applied: Mar 31 1949. Weeds pulled: June 2. First cut: June 27. Second dressing of nitrochalk applied: July 12. Second cut: Oct 28. Seeds mixture: L.F. Montgomery Red Clover (12 lb per acre). Perennial Ryegrass (24 lb per acre) and American Alsike Clover (3 lb per acre). Previous crop: Wheat.

Sugar beet. Ploughed: Sept 23 and Jan 28-31. Springtine harrowed twice: Mar 29-30. Harrowed, rolled, seed drilled, nitrate of soda applied, harrowed: Apr 5. Rolled: Apr 9. Dusted with DDT dust: Apr 30, and May 12. Hoed: May 12. Singled: May 25-27. Hoed: May 31 and July 7. Hoed and weeded: Aug 18. Lifted: Sept 24. Variety: Klein E. Previous crop: Wheat.

Block II. Potatoes. Ploughed: Nov 16-20 and Feb 10-12. Springtine harrowed: Mar 29. Ploughed: Mar 31-Apr 5. Harrowed and ridged: Apr 11-13. Dung applied: Apr 13. Artificials applied, potatoes planted and covered in: Apr 14. Ridges harrowed down, ridged up: May 11. Grubbed: May 31. Hoed: June 17. Sprayed with sulphuric acid to kill off haulm: Sept 7. Lifted: Sept 21-22. Variety: Majestic. Previous crop: ley, lucerne, hay, sugar beet.

Block III. Ley. Second year. Grazed by sheep: Apr 25-May 15, May 23-31, June 13-21, Aug 8-14 and Oct 15-19.

Lucerne. Second year. Hoed: Apr 19-May 16. First cut: July 1. Second cut: Aug 17. Third cut: Oct 28.

Rye. Ploughed: four plots, Oct 8-9 remainder Nov 8. Harrowed twice, seed drilled: Nov 8.

Harrowed in: Nov 9. Harrowed: Apr 1. Nitrochalk top dressing applied: Apr 26. Harvested: July 26. Variety: King II. Previous crop: ley, lucerne, potatoes.

Block IV. Barley. Ploughed: Nov 11-13 and Feb 8. Lime applied: (7.8 cwt per acre 59% CaO), springtine harrowed: Feb 17. Nitrochalk applied: Mar 17. Harrowed, seed drilled and harrowed in: Mar 18. Rolled: Mar 24. Harvested: Aug 8. Variety: Plumage Archer. Previous crop: Potatoes.

Block V. Ley. First year. Ploughed: Feb 1-2. Springtine harrowed twice: Mar 29-30. Artificials applied, rolled: Mar 31. Harrowed twice, rolled, seed sown: Apr 1. Harrowed and rolled: Apr 2. Weeded: June 13-16. Grazed by sheep: June 21-29, July 19-26, Sept 26-Oct 14. Seeds mixture: S. 23 Perennial Ryegrass (21 lb per acre), S. 143 Cocksfoot (12 lb per acre), L.F.R. Montgomery Red Clover (6 lb per acre), S. 100 White Clover (3 lb per acre). Previous crop: Barley.

Lucerne. First year. Ploughed: Sept 16-23 and Feb 1-2. Springtine harrowed twice: Mar 29-30. Artificials applied: Mar 31. Harrowed, rolled, seed sown: Apr 1. Rolled: Apr 2. Dusted with DDT: Apr 22. Hoed: May 25 and 31. Weeded and hoed: June 13-16. Hoed: June 27-July 9. First cut: June 26-27. Second cut: Sept 15. Third cut: Oct 28. Variety: Provence. Previous crop: Barley

Potatoes. Ploughed: Sept 16-23 and Feb 1-2. Springtine harrowed twice: Mar 29-30. Harrowed and rolled: Apr 2. Bouted: Apr 11. Artificials applied, potatoes planted and covered in: Apr 12-13. Harrowed down ridges and reridged: May 11. Grubbed: May 31. Hoed: June 17. Sprayed with sulphuric acid to kill off haulm: Sept 7. Lifted: Sept 20-21. Variety: Majestic. Previous crop: Barley.

Standard errors per plot:

Block II. Potatoes

Total tubers:	whole plot	0.208 tons per acre or 2.0%
	sub plot	0.514 tons per acre or 4.8%
Percentage ware:	whole plot	1.85
	sub plot	1.39

Block IV. Barley

Grain:	whole plot	1.61 cwt per acre or 7.2%
	sub plot	1.62 cwt per acre or 8.0%
Straw:	whole plot	1.69 cwt per acre or 5.3%
	sub plot	1.95 cwt per acre or 6.1%

All standard errors estimated from 4 d.f.

Block I

Ley. 3rd Year.

	Sheep days of grazing per acre	No. of sheep carried per acre for the year
Mean	1840	5.0

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

	1st Crop	2nd Crop	3rd Crop	Total
No Dung	2.70	1.38	0.26	4.34
Dung in 1945	2.38	0.90	0.60	3.88
Mean	2.54	1.14	0.43	4.11
Increase	-0.32	-0.48	0.34	-0.46
Previous Rotation:				
Lucerne	2.30	1.12	0.35	3.77
Arable with sugar beet	2.79	1.15	0.51	4.45

Hay. (85% dry matter): tons per acre

	1st Crop	2nd Crop	Total
No Dung	3.04	0.04	3.08
Dung in 1945	2.99	0.03	3.02
Mean	3.02	0.03	3.05
Increase	-0.05	-0.01	-0.06
Previous Rotation:			
Ley	3.14	0.04	3.18
Arable with hay	2.89	0.02	2.91

Sugar Beet

	Clean Beet tons per acre	Tops tons per acre	Total Sugar cwt per acre	Sugar %
No Dung	8.20	5.54	28.4	17.28
Dung in 1945	7.77	5.40	26.4	17.01
Mean	7.98	5.47	27.4	17.15
Increase	-0.43	-0.14	-2.0	-0.27
Previous Rotation:				
Lucerne	8.41	5.95	29.3	17.38
Arable with sugar beet	7.55	4.98	25.5	16.91

Previous Crop Rotation

	Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Block II					
	Potatoes. Total tubers: tons per acre				
No Dung (±0.296)(1)	11.38	9.44	9.00	10.08	9.98
Dung in 1949	11.36	11.74	11.59	10.74	11.36
Mean (±0.147)	11.37	10.59	10.30	10.41	10.67
Increase (±0.514)	-0.02	2.30	2.59	0.66	1.38(±0.257)
	Potatoes. Percentage Ware				
No Dung (±1.48)(1)	93.5	89.2	90.5	90.6	91.0
Dung in 1949	88.5	86.7	87.4	86.0	87.2
Mean (±1.31)	91.0	87.9	89.0	88.3	89.0
Increase (±1.39)	-5.0	-2.5	-3.1	-4.6	-3.8(±069)
Block IV					
	Barley. Grain: cwt per acre				
No Dung (±1.47)(1)	21.7	21.8	20.7	22.4	21.6
Dung in 1948	23.4	23.4	22.1	27.3	24.1
Mean (±1.16)	22.6	22.6	21.4	24.9	22.8
Increase (±1.62)	1.7	1.6	1.4	4.9	2.5(±0.91)
	Barley. Straw: cwt per acre				
No Dung (±1.54)(1)	29.3	28.3	26.9	26.5	27.7
Dung in 1948	37.4	37.7	31.2	37.0	35.8
Mean (±1.19)	33.3	33.0	29.1	31.7	31.8
Increase (±1.95)	8.1	9.4	4.3	10.5	8.1(±0.97)

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

Block III

Ley. 2nd Year.

	Sheep days of grazing per acre	No. of sheep carried per acre for the year
Mean	1791	4.9

Lucerne. 2nd Year.

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

	1st crop	2nd crop	3rd crop	Total
No dung	1.52	0.60	0.10	2.22
Dung in 1946	1.70	0.78	0.12	2.60
Mean	1.61	0.68	0.12	2.41
Increase	0.18	0.18	0.02	0.38
Previous Rotation:				
Lucerne	1.62	0.66	0.11	2.39
Arable with hay	1.60	0.70	0.12	2.42

Rye

	Grain: cwt per acre	Straw: cwt per acre
No dung	26.2	44.0
Dung in 1946	27.9	47.2
Mean	27.0	45.6
Increase	1.7	3.2
Previous Rotation:		
Ley	26.9	46.4
Lucerne	27.0	45.9
Arable with hay	26.9	44.0
Arable with sugar beet	26.6	46.0

Block V

Ley. 1st Year.

	Sheep days of grazing per acre	No. of sheep carried per acre for the year
Mean	1211	3.3

Potatoes.

	Total tubers tons per acre	Percentage Ware
No Dung	9.47	87.2
Dung in 1947	10.86	87.7
Mean	10.16	87.4
Increase	1.41	0.5
Previous Rotation:		
Ley	11.26	89.8
Lucerne	10.34	84.9
Arable with hay	9.64	86.2
Arable with sugar beet	9.52	86.8

Lucerne. 1st Year.

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

	1st crop	2nd crop	3rd crop	Total
No Dung	0.55	0.71	0.18	1.44
Dung in 1947	0.54	0.77	0.19	1.50
Mean	0.54	0.74	0.18	1.46
Increase	-0.01	0.06	0.01	0.06
Previous Rotation:				
Lucerne	0.59	0.81	0.20	1.60
Arable with sugar beet	0.50	0.67	0.16	1.33

WOBURN MARKET GARDEN EXPERIMENT

Globe Beet and Peas. First crops of 8th 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, 1949

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: 0.0125 acre

Treatments:
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.
Organic manures: Dung, sewage sludge compost, sewage sludge (West Middlesex), and vegetable compost, each at 15 and 30 tons per acre.

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

Cultivations, etc.:
Series B. Globe Beet.
Applied organics and ploughed in: Apr 25-26. Ground lime applied to all plots receiving sulphate of ammonia (plots having 0.4 cwt N at 42 cwt per acre, plots having 0.6 cwt N at 63 cwt per acre, other plots at 21 cwt per acre): Apr 27. Harrowed, rolled, harrowed, rolled, sulphate of ammonia applied (plots having 0.4 and 0.6 cwt N receiving only one half their total dressings), seed drilled and rolled in: Apr 28. Dusted with flea beetle dust: May 21. Thistles cut: June 4. Harrowed: June 7. Harrowed, rolled and thistles cut: June 8. Owing to crop failure redrilled seed and harrowed in: June 8. Rolled: June 9. Dressed with DDT: June 17. Hoed: June 23-24 and July 7-12. Second dressing of sulphate of ammonia applied to plots having 0.4 and 0.6 cwt N and all plots hoed: July 13. The crop was not singled. Lifted: Aug 3. Variety: Crimson Globe. Previous crop: Leeks.

Series A. Peas.
Applied organics: Mar 1-2. Ploughed in: Mar 2-3. Harrowed, rolled, applied basal manure and sulphate of ammonia (plots having 0.4 and 0.6 cwt N receiving only half their dressing): Mar 28. Harrowed twice: Mar 29. Rolled, peas drilled, rolled: Mar 30. Hoed: Apr 20 and 28. Second dressing of sulphate of ammonia applied to plots having 0.4 and 0.6 cwt N: June 8.

Harvested: July 3-6. Variety: Kelvedon Wonder.
Previous crop: Winter cabbage.

Standard errors per plot:
Globebeet, total produce: 0.831 tons per acre or 27.5%
weight of bulbs: 0.368 tons per acre or 31.6%
plant number: 16.7 thousands per acre or 17.1%
Green peas, marketable weight: 12.5 cwt per acre or 20.5%

Summary of Results

Globe Beet

Organic manures	Level of manuring (tons per acre)	Sulphate of ammonia, cwt N per acre: None	0.2	0.4	0.6.	Mean
Total produce: tons per acre (±0.588 Means ±0.416)						
None		1.81	1.51	1.14	1.17	1.66*
Dung	15	4.65	2.17			3.41
	30	4.31	4.67			4.49
Sludge compost	15	2.63	3.89			3.26
	30	4.52	3.88			4.20
Sludge	15	1.57	1.95			1.76
	30	2.32	2.02			2.17
Vegetable compost	15	4.04	4.56			4.30
	30	4.72	2.81			3.77
Weight of bulbs: tons per acre (±0.260 Means ±0.184)						
None		0.70	0.52	0.41	0.43	0.61*
Dung	15	1.81	0.84			1.32
	30	2.12	1.70			1.91
Sludge compost	15	1.02	1.09			1.05
	30	1.60	1.68			1.64
Sludge	15	0.43	0.60			0.52
	30	1.15	0.66			0.90
Vegetable compost	15	1.38	2.02			1.70
	30	1.82	1.27			1.55
Plant number: thousands per acre (±11.80 Means ±8.34)						
None		87.1	92.7	75.6	81.1	89.9*
Dung	15	110.0	78.8			94.4
	30	113.6	105.3			109.4
Sludge compost	15	92.2	110.8			101.4
	30	116.2	104.0			110.1
Sludge	15	77.2	86.2			81.7
	30	83.7	79.0			81.3
Vegetable compost	15	125.8	120.7			123.3
	30	120.0	94.8			107.4

* Mean over None and 0.2 cwt N per acre only.

Summary of Results

Green Peas

Organic manures	Level of manuring (tons per acre)	Sulphate of ammonia, cwt N per acre				
		None	0.2	0.4	0.6	Mean
Marketable weight: cwt per acre (±8.81 Means ±6.23)						
None		40.6	64.6	71.7	37.5	52.6*
Dung	15	50.7	64.9			57.8
	30	67.4	51.4			59.4
Sludge compost	15	63.2	60.3			61.7
	30	53.9	72.4			63.2
Sludge	15	71.4	70.3			70.8
	30	53.5	58.9			56.2
Vegetable compost	15	67.8	57.8			62.8
	30	59.2	78.9			69.1

*Mean over None and 0.2 cwt N per acre only.

WOBURN MARKET GARDEN EXPERIMENT

Leeks and Winter Cabbage 2nd Crops of 8th year

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

JLE and JU -- Lansome 1949-50

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: 0.0125 acre.

Treatments:
Sulphate of ammonia: None, 0.4 cwt per acre to organic manure plots. None, 0.4, 0.8, 1.2 cwt per acre to plots without organic manure.
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.

Basal manuring: None.

Cultivations, etc.:
Series A. Leeks.
Ploughed and harrowed: July 6-8. Rolled: July 20. Sulphate of ammonia applied, plots having 0.8 and 1.2 cwt N receiving only half their dressing: July 29. Leeks planted: July 30. Replanted where necessary: Various days in Aug and Sept. Hoed: Various days, Aug 27-Sept 5. Second dressing of sulphate of ammonia applied to plots having 0.8 and 1.2 cwt N: Sept 9. Weeded: Dec 1-7. Harvested: Feb 7-Mar 20. Variety: Musselburgh. Previous crop: Peas.

Series B. Winter Cabbages.
Ploughed: Aug 6-8. Harrowed, sulphate of ammonia applied, plots having 0.8 and 1.2 cwt N receiving only half dressing: Aug 9. Cabbages planted, blocks Ia and Ib: Aug 9. Replanted blocks Ia and Ib where necessary: various days Aug and Sept. Cabbages planted, blocks IIa and IIb: Aug 9. Hoed: Sept 3-5. Second dressing of sulphate of ammonia applied to plots having 0.8 and 1.2 cwt N: Sept 9. Sprayed with nicotine: Sept 27. Hoed: Oct 6-10. Weeded: Dec 8 and 16-20. Harvested: Feb 9-Mar 7. Variety: Blocks Ia and Ib - January King, blocks IIa and IIb - Savoy. Previous crop: Globe Beet.

Notes Leeks: As replanting was necessary on several plots, the total weight was corrected to allow for this.

Winter Cabbages: As most of blocks Ia and Ib had to be replanted the means for each pair of blocks are shown separately.

Standard errors per plot:
Leeks, total weight: 6.86 cwt per acre or 12.0%
plant number: 0.877 thousands per acre or 2.0%

Summary of Results

Leeks

Organic manures	Level of manuring (tons per acre)	Sulphate of ammonia, cwt N per acre				
		None	0.4	0.8	1.2	Mean
Total weight: cwt per acre (±4.85 Means ±3.43)						
None		52.0	48.9	53.0	44.6	50.4*
Dung	15	57.9	59.4			58.6
	30	70.6	69.8			70.2
Sludge compost	15	59.2	51.0			55.0
	30	59.0	62.1			60.5
Sludge	15	57.0	57.8			57.4
	30	59.4	48.4			53.9
Vegetable compost	15	53.6	58.7			56.1
	30	58.1	66.6			62.1
Plant number: thousands per acre (±0.620 Means ±0.438)						
None		43.7	42.1	43.0	42.0	42.9*
Dung	15	44.2	43.1			43.7
	30	43.6	43.3			43.4
Sludge compost	15	43.7	41.7			42.7
	30	44.7	43.3			44.0
Sludge	15	42.5	44.1			43.3
	30	44.0	43.6			43.8
Vegetable compost	15	43.4	43.2			43.3
	30	42.6	43.4			43.0

* Mean over None and 0.4 cwt N per acre only.

Summary of Results

Cabbages

Organic manures	Level of manuring (tons per acre)	Sulphate of Ammonia cwt N per acre: None	0.2	0.4	0.6	Mean

Blocks Ia and Ib: January King, Marketable weight: tons per acre

None		2.12	3.37	3.12	2.58	2.74*
Dung	15	3.32	2.63			2.97
	30	3.34	3.66			3.50
Sludge compost	15	3.72	2.78			3.25
	30	2.80	3.54			3.17
Sludge	15	2.93	3.36			3.15
	30	3.46	2.76			3.11
Vegetable compost	15	3.39	2.66			3.02
	30	2.40	2.10			2.26

Blocks IIa and IIb: Savoys, Marketable weight: tons per acre

None		2.08	2.11	2.48	2.33	2.10*
Dung	15	2.38	2.44			2.41
	30	2.67	2.38			2.53
Sluge compost	15	2.05	2.31			2.18
	30	2.18	2.16			2.17
Sludge	15	2.59	2.16			2.37
	30	2.06	1.56			1.82
Vegetable compost	15	2.54	2.41			2.47
	30	2.04	2.36			2.20

* Mean over None and 0.2 cwt N per acre only.

Summary of Results

Cabbages

Organic manures	Level of manuring (tons per acre)	Sulphate of ammonia cwt N per acre				
		None	0.2	0.4	0.6	Mean
Blocks Ia and Ib: January King. Plant number: thousands per acre						
None		16.2	18.3	16.9	16.6	17.2*
Dung	15	17.6	17.7			17.6
	30	17.7	16.4			17.0
Sludge compost	15	17.5	17.0			17.2
	30	17.8	16.9			17.4
Sludge	15	17.0	17.0			17.0
	30	17.0	17.6			17.3
Vegetable compost	15	17.4	16.6			17.0
	30	16.2	16.5			16.4
Blocks IIa and IIb: Savoys, Plant number: thousands per acre						
None		17.4	15.4	15.9	17.9	16.4*
Dung	15	17.2	17.1			17.2
	30	17.4	18.8			18.1
Sludge compost	15	15.9	17.0			16.4
	30	15.8	17.2			16.5
Sludge	15	17.1	15.7			16.4
	30	17.2	16.2			16.7
Vegetable compost	15	17.1	17.2			17.2
	30	15.6	16.1			15.8

* Means over None and 0.2 cwt N per acre only.

Control of "Eyespot"

The effects of rates and times of application of sulphate of ammonia, of rates of sowing and of spraying, with sulphuric acid.

RW - Little Knott 1949

System of replication: 4 x 3 x 3 x 2 design in 6 blocks of 12 plots each, certain three factor interactions and the effect of spraying being confounded with block differences.

Area of each plot: 0.0146 acre

Treatments:
Sulphate of ammonia: Rates, None, $1\frac{3}{4}$, $3\frac{1}{2}$, $5\frac{1}{4}$ cwt per acre (N_0,N_1,N_2,N_3).
Times of application, March, April, May, (T_0, T_1,T_2).
Rates of sowing: $1\frac{1}{2}$, $2\frac{1}{2}$, $3\frac{1}{2}$ bushels per acre (R_0,R_1,R_2).
Spraying: 3 blocks sprayed with sulphuric acid (12% by volume). B.O.V. at 100 gallons per acre in March.

Basal Manuring: 2 cwt superphosphate and $\frac{1}{2}$ cwt muriate of potash drilled across the plots.

Cultivations, etc.: Ploughed: Sept 30. Disc harrowed: Oct 11. Harrowed: Oct 12. Seed drilled: Oct 13. Basal manures drilled: Oct 15. Harrowed in: Oct 21. Sprayed 3 blocks with sulphuric acid: Mar 2. 1st application of sulphate of ammonia: Mar 5. 2nd application of sulphate of ammonia: Apr 5. Ring rolled: Apr 13. 3rd application of sulphate of ammonia: May 4. Sprayed whole experiment with Denocate to kill weeds: May 12. Harvested: Aug 3. Variety: Squarcheads Master 13/4. Previous crop: Kale.

Standard errors per plot:

Grain:	unsprayed blocks:	3.46 cwt per acre or 22.5%	(12 d.f.)
	sprayed blocks:	6.26 cwt per acre or 32.8%	(12 d.f.)
Straw:	unsprayed blocks:	6.42 cwt per acre or 18.0%	(12 d.f.)
	sprayed blocks:	10.04 cwt per acre or 29.4%	(12 d.f.)

Note: No counts of 'Eyespot' or 'Take-all' were made.

Grain: cwt per acre

	Unsprayed				Sprayed				Effect of Spraying
	R_0	R_1	R_2	Mean	R_0	R_1	R_2	Mean	
	(±1.76)			(±1.00)	(±3.18)			(±1.81)	(±2.06)(1)
T_0	14.5	14.3	15.7	14.9	22.3	16.0	21.1	19.8	4.9
T_1	19.0	15.6	15.4	16.7	21.1	22.4	19.8	21.1	4.4
T_2	14.1	15.2	14.6	14.6	14.7	16.5	17.8	16.3	1.7
Mean	15.9	15.1	15.2	15.4	19.4	18.3	19.5	19.1	
		(±1.00)				(±1.81)			

	N_0	N_1	N_2	N_3		N_0	N_1	N_2	N_3		
		(±2.00)					(±3.61)				
T_0		13.9	15.3	17.0			20.9	20.9	22.0		
T_1		16.3	17.9	20.8			17.9	23.7	22.7		
T_2		19.0	14.1	13.0			24.0	15.8	16.9		
		(±2.00)					(±3.61)				
R_0	15.7	15.8	15.5	16.5	15.9	15.4	23.3	17.3	21.6	19.4	3.5
R_1	11.8	19.1	15.0	14.4	15.1	14.5	11.5	23.1	24.0	18.3	3.2
R_2	10.1	14.3	16.7	19.9	15.2	14.0	28.1	20.2	16.0	19.5	4.3
Mean	12.6	16.4	15.7	16.9	15.4	14.6	20.9	20.2	20.6	19.1	
		(±1.15)					(±2.09)				
Effect of Spraying				(±2.38)(1)		2.0	4.5	4.5	3.7		

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

Straw: cwt per acre

	Unsprayed					Sprayed					
	R_0	R_1	R_2	Mean		R_0	R_1	R_2	Mean	Effect of Spraying
	(±3.26)			(±1.85)		(±5.10)			(±2.90)	(±3.44)(1)
T_0	32.2	35.4	38.3	35.3		39.9	32.9	40.6	37.8	2.5
T_1	37.8	33.0	35.4	35.4		38.9	42.5	39.4	40.3	4.9
T_2	29.8	31.1	34.4	31.8		25.3	29.5	31.2	28.7	-3.1
Mean	33.3	33.2	36.0	34.2		34.7	35.0	37.1	35.6	
		(±1.85)					(±2.90)			
	N_0	N_1	N_2	N_3		N_0	N_1	N_2	N_3	
		(±3.71)					(±5.80)			
T_0		32.1	38.5	41.3			39.3	42.5	42.8	
T_1		33.4	42.1	42.5			34.2	47.4	44.0	
T_2		39.5	29.6	28.7			37.3	31.1	30.6	
		(±3.71)					(±5.80)			(±2.90)
R_0	31.1	32.4	35.6	34.0	33.3	27.3	38.1	33.6	39.8	34.7	-1.4
R_1	26.2	40.4	34.1	32.0	33.2	27.2	22.2	43.4	47.1	35.0	1.8
R_2	25.1	32.1	40.4	46.4	36.0	23.3	50.5	44.1	30.4	37.1	1.3
Mean	27.5	35.0	36.7	37.5	34.2	25.9	36.9	40.4	39.1	35.6	
		(±2.14)					(±3.35)				
Effect of Spraying				(±3.97)(1)		-1.6	1.9	3.7	1.6		

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

WHEAT

The residual effects of various dungs, of additional straw to dungs, of rotted bracken.

RP - Sawyers II 1949

System of replication: Three 5x5 lattice squares.

Area of each plot: 0.0225 acre.

Treatments: Applied in 1948 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) 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 (lb/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

Basal Manuring: 2 cwt per acre sulphate of ammonia as top dressing.

Cultivations etc.: Ploughed: Oct 27. Harrowed, seed drilled and harrowed in: Oct 29. Harrowed: Apr 13. Rolled: Apr 14. Sulphate of ammonia applied: Apr 28. Harvested: July 29. Variety: Bersee. Previous crop: Potatoes.

Standard error per plot: Grain, 2.04 cwt per acre or 4.66% (24 d.f.)

Organic Manure		Grain: cwt per acre Level of organic 1	2	Mean	Straw: cwt per acre Level of organic 1	2	Mean
		(±1.18)		(±0.83)			
None				42.6(1)			49.5
Dung: Fresh (boxes) normal litter	W	43.4	47.3	45.3	53.8	61.9	57.8
Fresh (boxes) heavy litter	X	44.4	46.2	45.3	57.7	63.5	60.6
Fresh (yards) normal litter	Y	45.1	47.2	46.1	54.4	60.9	57.6
Fresh (yards) heavy litter	Z	42.8	45.4	44.1	53.7	62.5	58.1
Stored (boxes) normal litter	R	42.0	44.0	43.0	53.0	54.9	54.0
Stored (boxes) heavy litter	S	40.8	44.7	42.8	52.3	57.3	54.8
Stored (yards) normal litter	A	42.9	43.2	43.1	51.8	53.2	52.5
Stored (yards) heavy litter	K	40.7	45.0	42.8	51.7	54.1	52.9
Stored (yards) low feeding	T	43.1	43.4	43.3	54.7	55.9	55.3
As above with Sulphate of Ammonia	V	43.6	43.8	43.7	50.8	56.4	53.6
Rotted bracken	B	43.1	46.5	44.8	55.8	64.4	60.1
Mean		42.9	45.1	43.9	53.6	58.6	55.3

Standard error (1): ±0.68

WHEAT

Wireworm Experiment (1)

The residual effects of various insecticides, and their methods of application.

RW - Little Hoos 1949

System of replication: 3 randomized blocks of 9 plots each.

Area of each plot: 0.0289 acre.

Treatments - applied 1948.
None
D.D. injected 400 lb per acre
Ethylene Dibromide 41% solution, injected 15 gallons per acre
D.D.T. dust combine drilled ¾ cwt per acre
Gammexane; broadcast 2 cwt per acre, combine drilled ¾ cwt per acre, or applied as seed dusting.

Basal manuring: 2½ cwt. per acre sulphate of ammonia as top dressing, 1 cwt per acre superphosphate.

Cultivations, etc.: Ploughed: Sept 27-29. Springtined: Oct 22. Harrowed: Oct 28. Seed drilled with superphosphate, harrowed in: Oct 30. Ring rolled: Apr 19. Sulphate of ammonia applied: Apr 26. Harvested: July 28. Variety: Bersee. Previous crop: Wheat.

Standard errors per plot:
Grain, 2.30 cwt per acre or 7.19% (18 d.f.)
Straw, 2.66 cwt per acre or 7.23% (18 d.f.)

	Untreated	DD Injected	Ethylene Dibromide Injected	DDT Dust Drilled	Gammexane Broadcast	Gammexane Drilled	Gammexane Dusted seed	Mean
			Grain: cwt per acre					
Mean Yield (±1.33)	28.4(1)	31.8	34.1	36.4	39.6	37.3	24.2	32.1
Increase (±1.54)		3.4	5.7	8.0	11.2	8.9	-4.2	
			Straw: cwt per acre					
Mean Yield (±1.54)	33.5(2)	35.8	37.4	41.5	46.1	42.2	28.5	36.9
Increase (±1.77)		2.3	3.9	8.0	12.6	8.7	-5.0	

Standard errors (1) ±0.77
(2) ±0.89

WHEAT

Wireworm Experiment (2)

The direct and residual effects of treatment of seed with Gammexane, and of the residual effects of three strengths of Gammexane dust.

RW - Little Hoos 1949

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

Area of each plot: 0.0289 acre.

Treatments:
1949: None
Seed dusted with Gammexane dressing.
1948: None
Seed dusted 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: $2\frac{1}{2}$ cwt per acre sulphate of ammonia as top dressing, 1 cwt per acre superphosphate.

Cultivations etc.:
Ploughed: Sept 27-29. Springtined: Oct 22. Harrowed: Oct 28. Seed drilled with superphosphate, harrowed in: Oct 30. Ring rolled: Apr 19. Sulphate of ammonia applied: Apr 26. Harvested: July 28. Variety: Bersee.
Previous crop: Wheat.

Standard errors per plot:
Grain, 1.85 cwt per acre or 6.37% (9 d.f.)
Straw, 2.22 cwt per acre or 6.72% (9 d.f.)

Mean Yields: cwt per acre

1948	Untreated		Dusted seed		Gammexane dust per acre			Mean
					¼ cwt	½ cwt	1 cwt	
1949	Untreated	Dusted seed	Untreated	Dusted seed		Untreated		
				Grain				
		(±1.07)				(±1.37)		
	27.1	28.6	23.8	25.3	32.5	35.6	36.5	
Mean (±0.927)		26.2				34.9		29.1
				Straw				
		(±1.28)				(±1.64)		
	30.0	32.6	28.4	30.7	36.6	38.2	40.5	
Mean (±1.11)		30.4				38.4		33.1

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 - Fosters, 1949

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

Area of each sub-plot: 0.0197 acre.

Treatments:
Whole plots: Crops:- Oats (S.84), wheat (Atle and Bersee), and barley (Plumage Archer).
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: during Dec. Springtine harrowed: Feb 23. Artificials applied: Mar 5. Harrowed, seed drilled and harrowed in: Mar 14. Ring rolled: Apr 19. "Agroxone" applied to kill off weeds: June 1. Harvested: Aug 9. Previous crop: Barley.

Standard errors: (grain):
per whole plot, 1.68 cwt per acre or 8.0% (6 d.f.)
per sub-plot, 1.60 cwt per acre or 7.6% (24 d.f.).

	Grain: cwt per acre				Straw: cwt per acre			
	Oats	Wheat (Atle)	Wheat (Bersee)	Barley	Oats	Wheat (Atle)	Wheat (Bersee)	Barley
		(±0.84)						
Mean	17.2	20.2	23.2	24.0	30.2	31.0	29.0	30.6
Sulphate of ammonia		(a) and (b)						
None	14.0	18.5	20.4	21.6	24.0	25.8	23.8	24.4
0.3 cwt N per acre	17.8	21.5	24.6	25.2	29.9	32.1	30.0	30.1
0.6 cwt N per acre	17.8	21.3	23.0	24.7	31.4	33.1	29.7	33.6
0.9 cwt N per acre	19.1	19.7	24.6	24.5	35.6	32.8	32.3	34.1
Superphosphate		(±0.93)						
Absent	16.3	20.0	24.2	24.0	29.6	30.4	29.5	30.4
Present	18.0	20.4	22.1	24.0	30.9	31.5	28.4	30.7
		(±0.80)						
Response	1.7	0.4	-2.1	0.0	1.3	1.1	-1.1	0.3
Muriate of Potash		(±0.93)*						
Absent	17.2	20.1	23.0	23.6	30.5	30.9	29.1	30.3
Present	17.1	20.4	23.3	24.4	30.0	31.1	28.8	30.8
		(±0.80)						
Response	-0.1	0.3	0.3	0.8	-0.5	0.2	-0.3	0.5

Standard errors: (a) ±0.80 for vertical comparisons only
(b) ±1.09 for all other comparisons

* Standard error for use in all comparisons other than vertical.

SPRING BEANS

The effects of methods of placement of a compound fertilizer at two rates of application.

RE - Long Hoos V 1949

System of replication: 4 randomized blocks of 8 plots each, a high order interaction being confounded with block differences.

Area of each plot: 0.0173 acre. Area harvested: 0.0154 acre.

Treatments:
Levels of fertilizer: None, 3.5, 7.0 cwt per acre granulated compound fertilizer (13.1% P_2O_5 13.4% K_2O).
Methods of placement: Drilled 3" below 2" to side of seed (duplicate plots); broadcast early (after last ploughing); broadcast late (in seed bed and harrowed in); half broadcast early, half drilled beside seed; half broadcast late, half drilled beside seed.

Basal manuring: None.

Cultivations, etc: Ploughed: Sept 24-25. Applied "early" fertilizers, springtined: Feb 26. Applied "late" fertilizers, drilled seed and fertilizer: Mar 19. Harrowed in: Mar 21. Harrowed across the rows: Mar 31.
Hoed: May 11, June 1, 7 and 9. Sprayed: June 24.
Harvested: Aug 13. Previous crop: Barley.

Standard errors per plot
Yield, dry matter: 1.01 cwt per acre or 13.3% (18 d.f.)
Plant number: 2.23 tens of thousands per acre or 7.3% (18 d.f.)

Compound fertilizer cwt per acre	Drilled	Broad-cast Early	Broad-cast Late	Broad-cast Early and Drilled	Broad-cast Late and Drilled	Mean
			Yield, dry matter: cwt per acre			
None	(±0.51)		(±0.76)			7.8(±0.36)
3.5	7.7	7.6	6.6	6.8	8.3	7.5 (±0.29)
7.0	8.3	6.0	8.5	7.8	6.8	7.6
Mean (±0.51)	8.0 (1)	6.8	7.6	7.3	7.6	7.6
			Standard error (1) ±0.36			
			Plant number: tens of thousands per acre			
None	(±1.11)		(±1.67)			30.2(±0.79)
3.5	31.0	30.8	29.3	28.3	32.8	30.5 (±0.64)
7.0	31.2	29.4	32.9	31.6	29.3	30.9
Mean (±1.11)	31.1 (2)	30.1	31.1	29.9	31.1	30.6
			Standard error (2) ±0.79			

SPRING BEANS

The comparison of nine varieties of spring beans sown at three rates.

RE - Long Hoos V 1949

System of replication: 3 x 3 x 3 cubic lattice.

Area of each plot: 0.00775 acres.

Treatments:
9 varieties at 3 seed rates as under:

	Seed rates: cwt per acre		
Varieties	1	2	3
Dutch Pigeon	0.75	1.2	1.6
Dutch Horse	1.6	2.5	3.3
Dutch Broad	2.5	3.9	5.3
Dutch Sheep	1.7	2.7	3.7
Ben 33 Essex Strain	1.4	2.2	3.0
Ben 35 English Green	1.6	2.5	3.4
Ben 39 (Ex. N.I.A.B.)	1.4	2.2	3.0
Tic.	1.0	1.6	2.2
Scotch Mazagan	1.8	2.9	4.0

These three seed rates are the equivalent of about 90, 140 and 190 thousand seeds per acre.

Basal Manuring: 2 cwt nitrate of soda per acre.
3 cwt super per acre.
2 cwt muriate of potash per acre.

Cultivations etc.: Ploughed: Sept 24 and again Dec 28. Springtine harrowed: Feb 26. Basal fertilizer drilled: Mar 9. Beans ploughed in: Mar 10-12. Harrowed in: Mar 21. Ring rolled: Mar 31. Hoed: May 11, 12, June 1, 3-9. Sprayed with nicotine: June 22 and again July 11. Harvested: Aug 5. Previous crop: Barley.

Standard error per plot: Grain 1.98 cwt per acre or 19.7%
(28 d.f.)

Grain: cwt per acre

Seed Rate	Variety									
	Dutch Pigeon	Dutch Horse	Dutch Broad	Dutch Sheep	Ben 33 Essex Strain (±1.15)	Ben 35 English Green	Ben 39 (Ex NIAB)	Tic	Scotch Mazagan	Mean (±0.38)
1	4.4	7.7	10.1	7.2	10.7	7.4	9.6	7.5	10.2	8.3
2	5.3	10.5	10.5	10.3	12.4	11.9	10.2	9.0	12.0	10.2
3	6.3	12.8	11.6	11.1	14.5	11.1	13.2	11.8	12.8	11.7
Mean (±0.66)	5.3	10.3	10.7	9.5	12.5	10.1	11.0	9.4	11.7	10.1

PEAS

The effects of methods of placement of a compound fertilizer at two rates of application.

RP - Long Hoos V 1949

System of replication: 4 randomized blocks of 8 plots each, 6 high order interaction being confounded with block differences.

Area of each plot: 0.0173 acre. Area harvested: 0.0154 acre.

Treatments:
Levels of fertilizer: None, 3.5, 7.0 cwt per acre granulated compound fertilizer (13.1% P_2O_5, 13.4% K_2O).
Methods of placement: Drilled 3" below 2" to side of seed (duplicate plots), broadcast early (after last ploughing); broadcast late (in seed bed and harrowed in); half broadcast early, half drilled beside seed; half broadcast late, half drilled beside seed.

Basal manuring: None.

Cultivations, etc: Ploughed: Sept 24-25. Applied "early" fertilizers, springtined: Feb 26. Applied "late" fertilizers drilled seed and fertilizer: Mar 19. Harrowed in: Mar 21. Harrowed across the rows: Mar 31. Hoed: May 11, 30, June 3, 4 and 7. Harvested: July 26. Variety: Harrison's Glory. Previous crop: Barley.

Standard errors per plot.

Yield, dry matter:	1.60 cwt per acre or 10.9%	(18 d.f.)
Plant number:	1.28 tens of thousands per acre or 5.6%	(18 d.f.)

Compound fertilizer: cwt per acre	Drilled	Broadcast early	Broadcast late	Broadcast early and Drilled	Broadcast late and Drilled	Mean

Yield, dry matter: cwt per acre

None	(±0.80)	(±1.20)				14.3 (±0.57)
3.5	16.4	11.5	13.6	16.1	15.7	15.0 (±0.46)
7.0	15.7	13.6	14.5	14.3	15.6	14.9
Mean (±0.80)	16.0 (1)	12.6	14.1	15.2	15.7	14.8

Standard error (1) ±0.57

Plant number: tens of thousands per acre

None	(±0.64)	(±0.96)				22.8 (±0.45)
3.5	22.9	21.9	23.0	23.7	23.3	23.0 (±0.37)
7.0	23.0	22.0	21.6	23.7	24.7	23.0
Mean (±0.64)	23.0 (2)	22.0	22.3	23.7	24.0	23.0

Standard error (2) ±0.45

POTATOES

The effects of three methods of applying dung at three levels, of sulphate of ammonia, of superphosphate and of muriate of potash.

R.P. - Sawyers III 1949

System of replication: 4 randomized blocks of 12 plots each, plots being split into 2 for NPK, certain high order interactions being confounded with block differences.

Area of each sub plot: 0.021 acres. Area harvested 0.0175 acres.

Treatments:

Whole plots. Dung: None, 5, 10 or 15 cwt FYM per acre. Method of application: Ploughed in in winter (W), ploughed in in spring (S), or placed in the bouts (B).

Sub- plots. 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.

Basal Manuring: None

Cultivations etc.: Ploughed: Sept 14-15. Dung applied to "W" plots: Dec 20. Ploughed all plots: Dec 20-22. Dung applied to "S" plots: Mar 22-23. Ploughed all plots: Mar 22-24. Bouted: Apr 19. Dung applied to "B" plots: Apr 20. Artificials applied planted and covered in: Apr 21-22. Rolled down ridges: Apr 22. Chain harrowed twice: May 18. Hoed: July 1-2. Earthed up: July 13. Sprayed to kill off haulm: Sept 16. Lifted: Sept 23-24. Variety: Majestic Scotch A. Previous crop: Wheat.

Standard errors per plot: Total tubers.
Whole plot: 0.547 tons per acre or 8.64%
Sub- plot: 0.499 tons per acre or 7.88%

Total tubers: tons per acre

	Dung: tons per acre 0	5	10	15	Mean
Method of application		(±0.273)			(±0.158)
Ploughed in, in winter		5.86	6.63	6.85	6.44
" " " " spring		6.43	6.55	7.18	6.72
Placed in bouts		6.04	6.54	7.33	6.64
					(±0.072)
Sulphate of ammonia		(±0.188)*			
None	5.20	5.82	6.30	6.94	6.06
0.6 cwt per acre N	5.80	6.39	6.85	7.30	6.58
Response to N (±0.204)	0.60	0.57	0.55	0.36	0.52(1)
Superphosphate		(±0.188)*			(±0.072)
None	5.49	6.07	6.54	7.09	6.30
0.6 cwt per acre P	5.51	6.14	6.61	7.14	6.35
Response to P (±0.204)	0.02	0.07	0.07	0.05	0.05(1)
Muriate of potash		(±0.188)*			(±0.072)
None	5.01	5.78	6.37	7.04	6.05
1.0 cwt per acre K	5.98	6.43	6.78	7.20	6.60
Response to K (±0.204)	0.97	0.65	0.41	0.16	0.55(1)
Mean (±0.158)	5.50	6.11	6.57	7.12	6.32

Standard error (1)±0.102

* Standard error for comparisons other than vertical

Total tubers: tons per acre

	Method of application of dung		
	Ploughed in in winter	Ploughed in in spring	Placed in bouts
Sulphate of ammonia		±0.188*	
None	6.27	6.38	6.42
0.6 cwt per acre N	6.62	7.05	6.86
Response to N (±0.204)	0.35	0.67	0.44
Superphosphate		±0.188*	
None	6.53	6.83	6.35
0.6 cwt per acre P	6.36	6.61	6.93
Response to P (±0.204)	-0.17	-0.22	0.58
Muriate of potash		±0.188*	
None	6.20	6.53	6.46
1.0 cwt per acre K	6.69	6.91	6.81
Response to K (±0.204)	0.49	0.38	0.35

*Standard error for comparisons other than vertical

Responses to treatments (±0.168)**

Response to:	Sulphate of ammonia		Superphosphate		Muriate of potash	
	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
Sulphate of ammonia	-	-	0.56	0.48	0.20	0.84
Superphosphate	0.09	0.01	-	-	-0.37	0.47
Muriate of potash	0.23	0.87	0.13	0.97	-	-

** Standard error of horizontal difference between two responses ±0.316.

POTATOES

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

RP - Sawyers III 1949

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

Area of each plot: 0.0146 acre.

Treatments:
Time of planting: March 29th, April 20th, May 10th, May 30th.
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: Sept 14-15 and again Dec 20-22. Dung applied: Mar 22-23. Ploughed across: Mar 23-24. Sprayed with 20% B.O.V. to kill off haulm: Sept 16. Lifted: Sept 26-27.
1st planting; Bouted, artificials applied, planted, and covered in: Mar 28-29. Rolled ridges: Apr 2. Re-ridged: May 9. Harrowed twice: May 19. Grubbed: June 2. Hoed and weeded: June 14-16. Grubbed and earthed up: June 28. Hoed: July 4.
2nd planting; Bouted and artificials applied: Apr 19. Planted and covered in: Apr 20. Rolled ridges: Apr 21. Harrowed twice: May 19. Grubbed: June 29. Hoed: July 4. Earthed up: July 13.
3rd planting; Thistles cut: Apr 27. Bouted, artificials applied: May 9. Planted and covered in: May 10. Rolled ridges: May 12. Chain harrowed twice: May 18. Rolled ridges and grubbed: June 7. Grubbed: June 29. Hoed: July 5. Earthed up: July 13.
4th planting; Thistles cut: Apr 27. Bouted, artificials applied, planted and covered in: May 30. Chain harrowed: June 14. Grubbed: June 29. Hoed: July 6. Variety: Majestic. Previous crop: Wheat.

Standard error per plot: Total tubers, 0.572 tons per acre or 11.5% (35 d.f.)

Total tubers: tons per acre

	Time of Planting				
	March 29th	April 20th	May 10th	May 30th	Mean
Mean (±0.143)	5.38	5.02	5.07	4.48	4.99
No Dung (±0.202)	4.43	3.96	4.19	3.47	4.01
Dung	6.33	6.07	5.96	5.50	5.97
Response to Dung (±0.286)	1.90	2.11	1.77	2.03	1.96(1)
No Nitrogen (±0.202)	4.78	4.70	4.88	4.28	4.66
Nitrogen	5.98	5.34	5.26	4.68	5.32
Response to Nitrogen (±0.286)	1.20	0.64	0.38	0.40	0.66(1)
No Superphosphate (±0.202)	5.13	4.99	4.88	4.30	4.82
Superphosphate	5.63	5.05	5.26	4.66	5.15
Response to Superphosphate (±0.286)	0.50	0.06	0.38	0.36	0.33(1)
No Potash (±0.202)	4.99	4.79	4.86	4.31	4.74
Potash	5.77	5.25	5.29	4.65	5.24
Response to Potash (±0.286)	0.78	0.46	0.43	0.34	0.50(1)

Standard Error (1) ±0.143

Responses to Treatments (±0.202)

Response to	Dung		Sulphate of Ammonia		Super-phosphate		Muriate of Potash	
	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.
Dung	-	-	1.93	1.98	1.88	2.03	2.32	1.59
Sulphate of ammonia	0.64	0.68	-	-	0.55	0.77	0.62	0.70
Superphosphate	0.25	0.40	0.22	0.44	-	-	0.42	0.24
Muriate of Potash	0.87	0.14	0.47	0.54	0.59	0.42	-	-

Percentage Ware

	Time of Planting March 29th	April 20th	May 10th	May 30th	Mean
Mean (±0.165)	96.89	96.49	96.54	97.90	96.96
No Dung (±0.233)	96.38	95.60	95.68	97.52	96.29
Dung	97.41	97.39	97.41	98.28	97.62
Response to Dung (±0.330)	1.03	1.79	1.73	0.76	1.33(1)
No Nitrogen (±0.233)	96.56	96.53	96.51	97.78	96.84
Nitrogen	97.23	96.46	96.58	98.02	97.07
Response to Nitrogen (±0.330)	0.67	-0.07	0.07	0.24	0.23(1)
No Superphosphate (±0.233)	97.54	97.36	97.54	98.10	97.63
Superphosphate	96.25	95.63	95.55	97.70	96.28
Response to Superphosphate (±0.330)	-1.29	-1.73	-1.99	-0.40	-1.35(1)
No Potash (±0.233)	96.76	96.16	96.21	97.66	96.70
Potash	97.02	96.83	96.88	98.14	97.22
Response to Potash (±0.330)	0.26	0.67	0.67	0.48	0.52(1)
Standard error (1)(±0.165)					

Responses to Treatments (±0.233)

Response to	Dung Abs.	Dung Pres.	Sulphate of Ammonia Abs.	Sulphate of Ammonia Pres.	Super-phosphate Abs.	Super-phosphate Pres.	Muriate of Potash Abs.	Muriate of Potash Pres.
Dung	-	-	1.10	1.56	1.06	1.60	1.66	0.99
Sulphate of Ammonia	0.52	-0.07	-	-	0.04	0.41	0.28	0.18
Superphosphate	-1.62	-1.08	-1.54	-1.17	-	-	-1.39	-1.32
Muriate of Potash	0.85	0.18	0.56	0.47	0.48	0.55	-	-

POTATOES

The effects of four methods of planting and of three levels of a compound fertilizer.

RP - Great Knott III 1949

System of replication: 4 randomized blocks of 12 plots each.

Area of each plot: 0.014 acres.

Area Harvested: 0.007 acres.

Treatments:

Methods of planting: Broadcast fertilizer on the flat, ridge, plant in ridges by planting machine (A); broadcast fertilizer on the flat, plant on flat by planting machine (B); ridge, broadcast fertilizer over ridge, plant in furrow by hand (standard method) (C); plant seed and fertilizer with combined seed/fertilizer planting machine (D).

Fertilizer: 0, 8, 16 cwt per acre granular fertilizer containing 7% N, 7% P_2O_5, 10½% K_2O.

Basal Manuring: None.

Cultivations, etc.: Ploughed: Oct 4-7 and Jan 13-15. Cultivated: Mar 30-31. Harrowed and ring rolled: Apr 1-2. Harrowed: Apr 20. Applied artificials to A and B, ridged A and C plots: Apr 29. Applied artificials to C, planted A, B and C plots: Apr 30. Planted and applied artificials to D plots: May 2. Re-ridged: May 5. Grubbed: June 3, 7 and 29. Hoed: July 5-6. Earthed up: July 14. Sprayed with 20% B.O.V. solution to kill off haulm: Sept 23. Lifted: Sept 29. Variety: Majestic. Previous crop: Wheat.

Standard errors per plot:

Total tubers:	0.868 tons per acre or 16.4%	(33 d.f.)
Percentage ware:	1.12	(33 d.f.)

Granular fertilizer cwt per acre	Method of Planting A	B	C*	D	Mean
	Total tubers: tons per acre				
			(±0.434)		(±0.217)
0	5.10	5.64	4.23	4.79	4.94
8	5.53	6.05	4.33	6.13	5.51
16	5.81	5.88	5.35	4.72	5.44
Mean (±0.250)	5.48	5.86	4.64	5.21	5.30
	Percentage ware				
			(±0.56)		(±0.28)
0	94.2	94.1	94.7	94.5	94.4
8	95.0	95.4	96.4	96.4	95.8
16	94.8	95.8	97.1	97.2	96.2
Mean (±0.32)	94.6	95.1	96.1	96.0	95.5

A Broadcast fertilizer on the flat, ridge, plant in ridges by planting machines.

B Broadcast fertilizer on the flat, plant on flat by planting machine.

C Ridge, broadcast fertilizer over ridges, plant in furrows by hand (present standard method).

D Plant seed and fertilizer with combined seed/fertilizer planting machine.

* About half of each C plot suffered mechanical damage during cultivation. No correction has been made for this.

LINSEED

The effect of sulphate of ammonia and of rates and methods of application of two types of a PK compound fertilizer.

R/JL Great Knott I, 1949

System of replication: 2 replicates of 2 randomized blocks of 8 plots each, the third order interaction being confounded with block differences. To each block were added 4 plots without compound fertilizer, 2 of these receiving sulphate of ammonia and 2 being untreated.

Area of each plot: 0.0212 acre.

Treatments: All combinations of
Sulphate of ammonia: none, 0.3 cwt N per acre.
PK compound fertilizer: Granular (13% P_2O_5, 13% K_2O) or equivalent powder of superphosphate and muriate of potash. Rate 1, P_2O_5 and K_2O each 0.3 cwt per acre or Rate 2, P_2O_5 and K_2O each 0.6 cwt per acre. Broadcast or drilled.

Basal manuring: None.

Cultivations, etc.: Ploughed: Oct. Reploughed: Jan 14. Springtined: Mar 2. Thistle barred: Mar 28. Seed and fertilizer drilled: Apr 11. Sulphate of ammonia and broadcast fertilizers applied, harrowed and rolled in: Apr 12. Sprayed with "Agroxone" to kill weeds: June 2. Harvested: Aug 11.

Standard error per plot: Grain, 0.615 cwt per acre or 15.0%

Responses to Treatments

Response to	Mean	Sulphate of ammonia Abs.	Sulphate of ammonia Pres.	PK mixture Granular	PK mixture Powder	PK mixture Rate 1	PK mixture Rate 2	Broadcast	Drilled
		Grain: mean yield 4.11 cwt per acre							
	(±0.218)						(±0.308)		
Sulphate of ammonia	0.26	–	–	0.19	0.33	-0.02	0.54	0.25	0.27
Powder-Granular	0.07	0.00	0.14	–	–	0.29	-0.15	-0.02	0.16
Rate 2-Rate 1	-0.31	-0.59	-0.03	-0.09	-0.53	–	–	0.23	-0.85
Drilled-Broadcast	-0.66	-0.67	-0.65	-0.75	-0.57	-0.12	-1.20	–	–
		Straw: mean yield 6.84 cwt per acre.							
Sulphate of ammonia	0.03	–	–	-0.19	0.25	0.02	0.04	-0.01	0.07
Powder-Granular	0.46	0.24	0.68	–	–	0.71	0.21	0.63	0.29
Rate 2-Rate 1	-0.85	-0.86	-0.84	-0.60	-1.10	–	–	0.48	-2.18
Drilled-Broadcast	-1.68	-1.72	-1.64	-1.51	-1.85	-0.35	-3.01	–	–

Plots without PK mixture

Sulphate of ammonia Abs.	Sulphate of ammonia Pres.	Response	Mean
	Grain: cwt per acre	(±0.308)	
4.24	4.39	0.15	4.31
	Straw: cwt per acre		
8.31	7.64	-0.67	7.98

SUGAR BEET

The comparison of different rates and methods of irrigation and the effects of three levels of nitrogen.

Milford, Surrey - 1949

System of replication: 6 × 6 Latin Square, plots being split into 4 for the application of nitrochalk.

Area of each sub-plot: 0.0156 acre. Area harvested: 0.00663 acre.

Treatments.

Whole plots. Irrigation: None (duplicate plots); restricted, based on weather data ($6\frac{1}{2}$"); restricted at higher level ($8\frac{1}{2}$"); full, as decided by farmer (13"); full, with Chilean potash nitrate (16% N, 16% K_2O) in solution 1 in 10,000 (12").

Sub-plots. Nitrochalk: None, 0.3, 0.6, 0.9 cwt N per acre.

Basal manuring: Compound fertilizer (7% N, 7% P_2O_5, 10.5% K_2O): 6 cwt per acre.

Compound fertilizer (13% P_2O_5, 13% K_2O): 2 cwt per acre.

Salt: $5\frac{1}{2}$ cwt per acre.

Cultivations, etc.: Ploughed and subsoiled: early winter. Salt applied: Mar 16. Both compound fertilizers and nitrochalk applied: Apr 4. Seed drilled: Apr 11. Singled: May 3. Harvested: Oct 31. Variety: Klein E. Previous crop: Early potatoes, followed by autumn lettuce.

Standard errors per plot:

Total sugar	whole plot,	3.27 cwt per acre or 8.2%	
	sub-plot,	3.61 cwt per acre or 9.1%	
Roots (washed),	whole plot,	1.02 tons per acre or 6.3%	
	sub-plot,	1.34 tons per acre or 8.2%	
Sugar percentage,	whole plot,	0.324	
	sub-plot,	0.385	
Tops,	whole plot,	1.08 tons per acre or 5.1%	
	sub-plot,	1.61 tons per acre or 8.5%	
Plant number,	whole plot,	0.808 thousands per acre or 2.2%	
	sub-plot,	1.37 thousands per acre or 3.6%	
Noxious nitrogen,	whole plot,	7.98	
	sub-plot,	10.3	

All whole plot standard errors estimated from 21 d.f.
All sub-plot standard errors estimated from 93 d.f.

Cwt N per acre including basal	Irrigation: inches 0	6½	8½	13	12 plus pot.nitrate	Mean
	Total Sugar: cwt per acre					
	(1) and (2)		(3) and (4)			(±0.60)
0.4	36.0	44.3	44.2	44.1	45.1	41.6
0.7	34.6	43.9	44.5	42.7	41.0	40.2
1.0	35.6	42.7	46.2	40.4	40.5	40.2
1.3	32.1	40.8	43.0	39.2	37.5	37.5
Mean	34.6 (±0.94)	42.9	44.5	41.6 (±1.34)	41.0	39.9
	Roots (washed): tons per acre					
	(1) and (2)		(3) and (4)			(±0.223)
0.4	14.49	18.06	17.41	17.82	18.21	16.75
0.7	14.30	17.37	17.71	17.33	16.76	16.30
1.0	14.97	18.07	18.34	16.49	17.01	16.64
1.3	13.58	16.63	17.55	16.08	16.10	15.59
Mean	14.34 (±0.296)	17.53	17.75	16.93 (±0.418)	17.02	16.32

Standard errors:

	Total Sugar	Roots (washed)
1 for vertical comparisons	±1.04	±0.387
2 for all others	±1.31	±0.447
3 for vertical comparisons	±1.47	±0.547
4 for all others	±1.85	±0.632

Cwt N per acre including basal	Irrigation: inches 0	6½	8½	13	12 plus pot.nitrate	Mean
	Sugar Percentage					
	(1) and (2)	(3) and (4)				(±0.064)
0.4	12.42	12.30	12.73	12.40	12.43	12.45
0.7	12.06	12.65	12.57	12.37	12.23	12.32
1.0	11.90	11.87	12.58	12.27	11.95	12.08
1.3	11.81	12.27	12.25	12.20	11.68	12.00
Mean	12.05 (±0.094)	12.27	12.53	12.31 (±0.132)	12.08	12.21
	Tops: tons per acre					
	(1) and (2)	(3) and (4)				(±0.268)
0.4	13.45	20.08	18.14	20.43	22.49	18.01
0.7	14.18	19.61	20.85	20.08	23.04	18.66
1.0	14.87	20.09	20.95	21.82	22.51	19.18
1.3	15.19	22.28	21.35	21.45	24.28	19.96
Mean	14.42 (±0.312)	20.52	20.32	20.95 (±0.441)	23.08	18.95

Standard errors:

	Sugar Percentage	Tops
1 for vertical comparisons	±0.111	±0.463
2 for all others	±0.134	±0.508
3 for vertical comparisons	±0.157	±0.655
4 for all others	±0.190	±0.719

Cwt N per acre including basal	Irrigation: inches 0	6½	8½	13	12 plus pot. nitrate	Mean
	Plant number: thousands per acre					
	(1) and (2)	(3) and (4)				(±0.23)
0.4	37.8	39.0	37.7	37.1	37.7	37.9
0.7	38.1	38.0	37.9	37.1	37.0	37.7
1.0	37.9	37.6	37.7	35.8	37.6	37.4
1.3	37.5	37.7	36.7	35.7	35.9	36.8
Mean	37.8 (±0.23)	38.1	37.5	36.4 (±0.33)	37.1	37.5
	Noxious Nitrogen					
	(1) and (2)	(3) and (4)				(±1.72)
0.4	75.0	58.3	51.7	58.3	60.0	63.1
0.7	79.2	55.0	53.3	55.0	65.0	64.4
1.0	86.7	73.3	63.3	61.7	65.0	72.8
1.3	85.0	66.7	70.0	61.7	75.0	73.9
Mean	81.5 (±2.30)	63.3	59.6	59.2 (±3.26)	66.2	68.5

Standard errors:

		Plant number	Noxious nitrogen
1	for vertical comparisons	±0.40	±2.97
2	for all others	±0.41	±3.45
3	for vertical comparisons	±0.56	±4.20
4	for all others	±0.59	±4.89

SUGAR BEET

The comparison of three levels of irrigation and the effect on them of three levels of nitrogen.

Kesgrave, Suffolk - 1949

System of replication: 4 randomized blocks of 3 plots each, plots being split into 3 for the application of nitrogen.

Area of each sub-plot: 0.0180 acre. Area harvested: 0.0138 acre.

Treatments:
Whole plots. Irrigation: None; as decided by farmer (4"); based on weather data ($5\frac{1}{2}$").
Sub-plots. None, 0.45, 0.9 cwt N per acre applied as nitrochalk.

Basal manuring: Compound fertilizer (4% N, 10% P_2O_5, 8% K_2O): 11 cwt per acre.
Salt: $3\frac{1}{2}$ cwt per acre.

Cultivations, etc.: Ploughed: Early spring. Salt applied: Mar 8.
Compound fertilizer applied: Mar 9. Nitrochalk applied: Mar 25.
Seed drilled: Apr 5. Singled: Early May. Harvested: Oct 25.
Variety: Klein E. Previous crop: Potatoes followed by rye as autumn cover.

Standard errors per plot:

Total sugar	whole plot,	2.51 cwt per acre or 6.0%
	sub-plot,	2.51 cwt per acre or 6.0%
Roots (washed),	whole plot,	0.696 tons per acre or 4.8%
	sub-plot,	0.790 tons per acre or 5.5%
Sugar percentage,	whole plot,	0.369
	sub-plot,	0.285
Tops,	whole plot,	0.571 tons per acre or 5.6%
	sub-plot,	0.881 tons per acre or 8.7%
Plant number,	whole plot,	0.67 thousands per acre or 2.5%
	sub-plot,	1.13 thousands per acre or 4.3%
Noxious Nitrogen,	whole plot,	7.22
	sub-plot,	6.20

All whole plot standard errors estimated from 6 d.f.
All sub-plot standard errors estimated from 18 d.f.

cwt N per acre including basal	Irrigation: inches None	4	5½	Mean
	Total sugar: cwt per acre			
	(1) and (2)			(±0.72)
0.4	30.2	49.8	53.6	44.5
0.85	30.9	45.5	49.8	42.1
1.3	31.4	42.7	44.3	39.5
Mean (±1.25)	30.8	46.0	49.3	42.0
	Roots (washed): tons per acre			
	(1) and (2)			(±0.228)
0.4	10.93	15.72	17.23	14.63
0.85	11.31	15.05	16.58	14.31
1.3	11.75	15.10	15.52	14.12
Mean (±0.348)	11.33	15.29	16.45	14.36
	Sugar percentage			
	(1) and (2)			(±0.082)
0.4	13.80	15.82	15.55	15.06
0.85	13.62	15.12	15.05	14.60
1.3	13.35	14.15	14.28	13.92
Mean (±0.180)	13.59	15.03	14.96	14.53

Standard errors:

	Total Sugar	Roots (washed)	Sugar percentage
(1) for vertical comparisons	1.26	0.395	0.142
(2) for all others	1.62	0.474	0.214

cwt N per acre including basal	Irrigation: inches None	4	$5\frac{1}{2}$	Mean
	Tops: tons per acre			
	(1) and (2)			(±0.254)
0.4	8.72	8.94	10.14	9.26
0.85	9.78	9.72	11.65	10.38
1.3	9.88	10.48	12.09	10.81
Mean (±0.286)	9.46	9.71	11.29	10.15
	Plant number: thousands per acre			
	(1) and (2)			(±0.327)
0.4	28.2	27.3	27.5	27.7
0.85	27.5	27.6	26.8	27.3
1.3	25.0	24.6	24.7	24.8
Mean (±0.335)	26.9	26.5	26.4	26.6
	Noxious nitrogen			
	(1) and (2)			(±1.79)
0.4	71.5	53.2	54.0	59.6
0.85	82.0	67.0	63.8	70.9
1.3	81.5	77.5	75.8	78.2
Mean (±3.61)	78.3	65.9	64.5	69.6

Standard errors:

	Tops	Plant number	Noxious nitrogen
(1) for vertical comparisons	0.441	0.566	3.10
(2) for all others	0.459	0.571	4.41

CHEMICAL ANALYSES OF MANURES USED IN THE THREE, FOUR AND SIX COURSE ROTATIONS 1949

Three Course Rotation

Manures	% Organic matter	% N	% P_2O_5	% K_2O
Chaffed Straw	80.6	0.81	0.18	1.76
Adco	19.4	0.53	0.28	0.50
Sulphate of Ammonia		21.0		
Nitrate of Soda		15.5		
Superphosphate			17.5 (total)	
Muriate of Potash				57.4

Four Course Rotation

Manures	% Organic matter	% N	% P_2O_5	% K_2O
Chaffed Straw	80.6	0.81	0.18	1.76
Adco	19.4	0.53	0.28	0.50
Dung	20.1	0.64	0.22	0.83
Sulphate of Ammonia		21.0		
Superphosphate			17.5 (total)	
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			17.5 (total)	
Muriate of Potash				57.4

METEOROLOGICAL RECORDS, 1949

(Departure from Long period means in brackets)

Month	Total Hours of Sunshine	Mean Temperature (°F) Air[1]	Dew Point	In Ground 1 ft	In Ground 4 ft	Ground Frosts[2]	Rainfall (in) Total 1/1000 acre Gauge	Rain Days[3]	Drainage through 20 in: Soil	Wind[4] m.p.h
Jan.	55 (+ 3)	40.3 (+ 3.0)	36.4	39.6	43.9	14	1.56 (-0.99)	15	1.42	5.6
Feb.	116 (+47)	40.7 (+ 2.4)	36.1	38.6	42.2	17	1.36 (-0.52)	12	0.85	5.3
Mar.	105 (-13)	39.7 (- 1.6)	34.1	39.5	42.2	17	1.41 (-0.50)	10	0.50	6.5
Apr.	139 (+34)	49.5 (+ 3.8)	41.7	48.5	45.3	4	1.94 (-0.01)	13	0.38	6.3
May	206 (+ 8)	50.7 (- 1.2)	42.6	52.6	48.9	4	2.05 (-0.10)	9	0.34	4.5
June	224 (+21)	58.1 (+ 0.8)	50.8	60.0	52.7	0	0.64 (-1.56)	6	-	3.6
July	226 (+30)	63.4 (+ 2.7)	52.9	65.9	57.1	0	1.13 (-1.43)	7	-	3.8
Aug.	221 (+35)	62.6 (+ 2.4)	52.9	63.8	59.0	0	1.73 (-0.82)	8	-	3.9
Sept.	155 (+ 8)	62.5 (+ 6.5)	56.4	62.7	59.5	0	0.53 (-1.84)	11	-	4.0
Oct.	126 (+21)	53.0 (+ 4.2)	48.8	54.4	57.5	4	6.14 (+3.14)	19	4.35	3.5
Nov.	77 (+15)	42.7 (+ 0.3)	39.3	42.8	50.4	11	2.96 (+0.21)	20	2.51	4.7
Dec.	57 (+13)	41.3 (+ 2.7)	37.3	41.2	46.1	11	1.52 (-1.09)	19	1.04	6.1
Year	1758 (+223)	50.4 (+ 2.2)	44.1	50.8	50.4	82	22.97 (-5.50)	149	11.39	4.8

(1) Mean of Maximum and Minimum.

(2) Number of nights Grass Minimum was 30°F. or less.

(3) Number of days rainfall was 0.01 in. or more.

(4) At 2 metres above ground level.

49/7/2