

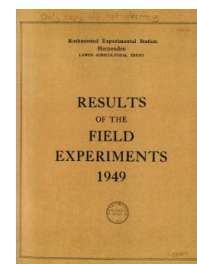
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# Yields of the Field Experiments 1949

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## Long-term

*Long-term*, Rothamsted Research (1950) Yields Of The Field Experiments 1949, pp 14 - 63

49/Ba/1.1

## 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. Spring-tined: Feb 25. Sulphate of ammonia applied: Feb 26. 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

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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.

49/Ba/1.3

Series 1: Barley

Salt applied 1948 cwt per acre	Muriate of potash applied in 1948 K <sub>2</sub> O cwt per acre			Salt applied In seed		Salt in 1949		Mean
	0.0	1.0	2.0	Winter	bed	None	Half Rate	
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	28.1	27.0	29.0	28.2	27.7	28.0
7.5	28.9	33.9	29.9	34.0	27.8	33.5	28.3	30.9
Mean	29.4	31.2	30.2	31.7	28.9	31.1	29.5	30.2

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Series 2: Sugar Beet

Salt applied 1949 cwt per acre	Muriate of potash applied in 1949 K <sub>2</sub> O cwt per acre			Salt applied In seed		Mean
	0.0	1.0	2.0	Winter	bed	

Total Sugar: cwt per acre

		(±0.96)		(±0.73)		(±0.56)
0	21.0	26.7	27.6			25.1
2.5	28.4	28.7	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	29.7	30.0	29.4	28.5
		(±0.48)		(±0.44)		

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	14.76	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	7.33	7.48	7.38	7.42
		(±0.152)		(±0.141)		

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Series 2: Sugar Beet (contd.)

Salt applied 1949 cwt per acre	Muriate of potash applied in 1949 K <sub>2</sub> O cwt per acre			Salt applied		Mean
	0.0	1.0	2.0	Winter	In seed bed	

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

49/Ba/2.1

### 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  $2\frac{1}{2}$  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. Springtime 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.

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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.



49/Ba/2.3

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
<u>Series I</u>										
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)
<u>Series II</u>										
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)
<u>Series III</u>										
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)

49/Ba/2.4

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
<u>Series I</u>										
Sugar beet										
Roots (washed)	0.75	-0.82	-1.45	0.13	-0.55	0.24	0.20	0.46	0.13	0.26
tons/acre		(±0.907)				(±0.907)				
Tops	0.43	-0.80	1.87	0.00	0.38	0.15	-1.17	0.72	-0.04	-0.08
tons/acre		(±1.103)				(±1.103)				
Sugar	-0.11	0.03	0.41	0.44	0.19	-0.16	-0.45	-0.60	0.17	-0.26
Percentage		(±0.558)				(±0.558)				
Total sugar	2.2	-4.4	-4.2	0.9	-1.3	0.5	0.0	0.5	0.6	0.4
cwt./acre		(±2.68)				(±2.68)				
Plant number	1.4	-1.8	1.0	0.2	0.2	0.4	1.6	-0.2	-1.2	0.2
thous./acre		(±2.21)				(±2.21)				
<u>Series II</u>										
Barley										
Grain	-1.5	4.1	-0.6	-2.7	-0.2	0.2	2.4	0.5	0.3	0.9
cwt./acre		(±1.52)				(±1.52)				
Straw	0.8	-0.9	0.2	-3.6	-0.9	4.8	-0.4	2.6	0.9	2.0
cwt./acre		(±2.25)				(±2.25)				
<u>Series III</u>										
Potatoes										
tons/acre	-0.50	0.90	0.44	-0.20	0.16	-0.86	-1.36	0.56	0.54	-0.28
		(±0.567)				(±0.567)				
Percentage	-6.1	2.7	5.0	2.4	1.0	-12.2	-9.1	-4.2	-4.4	-7.5
Ware		(±3.56)				(±3.56)				

49/Ba/3.1

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

Treatment	Organic fertilizers (cwt per acre)			Additional artificial fertilizers (cwt per acre)			
	Organic matter	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	N as Sulph. of amm.	P <sub>2</sub> O <sub>5</sub> as Super	K <sub>2</sub> O 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

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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. Springtime 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		Barley		Total tubers tons per acre		Percentage Ware		Resp. to N
		Grain	Straw	Grain	Straw	Additional N	Without	With	Mean	
Manure as F.Y.M.	I	23.2	41.8	29.2	34.6	2.50	3.82	3.16	1.32	5.3
	II	20.4	36.6	24.2	26.1	3.48	3.52	3.50	0.04	1.5
	III	21.7	35.6	23.6	27.9	3.77	4.43	4.10	0.66	4.4
	IV	18.9	29.4	23.2	24.3	2.51	3.53	3.02	1.02	2.5
	V	19.4	30.7	21.4	24.0	3.52	3.48	3.50	-0.04	-1.9
Manure as Adco	I	27.3	50.9	29.2	35.8	3.75	4.68	4.22	0.93	2.9
	II	23.5	39.6	26.4	29.4	2.28	3.48	2.88	1.20	3.6
	III	20.4	33.5	21.7	24.1	1.95	3.04	2.50	1.09	8.9
	IV	19.4	30.5	21.3	22.9	2.72	3.99	3.36	1.27	4.6
	V	18.9	26.8	23.5	25.2	2.95	2.98	2.96	0.03	2.3
Manure as Straw	I	20.8	31.6	26.7	30.6	2.75	4.17	3.46	1.42	9.1
	II	20.0	33.9	25.7	26.9	2.41	3.68	3.04	1.27	5.4
	III	21.9	40.0	21.6	22.7	3.60	4.51	4.06	0.91	1.0
	IV	21.4	36.4	25.2	25.6	3.42	3.23	3.32	-0.19	0.8
	V	19.7	35.2	19.7	24.7	2.40	2.73	2.56	0.33	2.4
Super-phosphate	I	23.4	39.3	29.9	32.5	3.52	3.11	3.32	-0.41	-1.3
	II	20.6	32.9	25.5	32.5	2.94	3.64	3.29	0.70	2.5
	III	23.5	40.4	26.3	31.4	3.97	4.19	4.08	0.22	0.5
	IV	22.3	34.1	26.5	32.1	3.30	4.08	3.69	0.78	0.3
	V	24.5	39.3	25.6	31.4	3.46	3.46	3.47	0.02	-0.7
Rock phosphate	I	23.7	37.1	23.4	29.8	2.53	2.40	2.46	-0.13	-1.5
	II	22.8	34.9	25.8	31.6	2.89	3.15	3.02	0.26	7.4
	III	21.9	31.5	23.9	26.5	3.59	2.76	3.18	-0.83	-5.1
	IV	21.5	32.8	25.0	30.0	2.97	2.89	2.93	-0.08	-2.1
	V	21.1	33.9	25.7	27.6	2.99	3.55	3.27	0.56	0.1

Note: The ryegrass crop failed because of drought.

49/Ba/4.1

## SIX COURSE ROTATION EXPERIMENT 1949

Seasonal effects of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O

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. Artificial fertilizers 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. Artificial fertilizers 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 artificial fertilizers 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 artificial fertilizers 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

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and ring rolled: Mar 31. Bouted: Apr 1. Artificial  
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: Squareheads Master 13/4. Previous crop: Clover.

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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. Hood: 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.



49/Ba/4.4

Mean yields per acre and increments in yield per cwt of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O

	Rothamsted		Woburn		Rothamsted		Woburn		
	Response	S.E.	Response	S.E.	Response	S.E.	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		

49/Ba/4.5

	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	

49/Bb/1.1

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.

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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 16. 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.)

49/Bb/1.3

Series I. Wheat

Residual effects of treatments applied to sugar beet in 1946

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

Series 2. Spring oats

Residual effects of treatments applied to potatoes in 1948

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

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Series 3. Sugar Beet

	Responses to treatments									
	Mean	Ploughing		Dung		Super		Potash		
		Shallow	Deep	Abs.	Fres.	Abs.	Fres.	Abs.	Fres.	
Total sugar: Mean yield 26.0 cwt per acre										
	(±1.53)								(±2.16)	
Ploughing deep	1.6	-	-	3.0	0.2	0.2	3.0	0.9	2.3	
-shallow	6.8	6.2	5.4	-	-	7.0	6.6	6.6	7.0	
Dung	-0.9	-2.3	0.5	-0.7	-1.1	-	-	-0.7	-1.1	
Superphosphate	-0.1	-0.8	0.6	-0.3	0.1	0.1	-0.3	-	-	
Potash										

Roots (washed): Mean yield 8.93 tons per acre									
Ploughing deep	0.64	-	-	1.06	0.20	0.34	0.94	0.40	0.88
-shallow	2.20	2.64	1.76	-	-	2.30	2.10	2.20	2.20
Dung	-0.37	-0.67	-0.07	-0.27	-0.47	-	-	-0.14	-0.60
Superphosphate	0.02	-0.22	0.26	0.02	0.02	0.25	-0.21	-	-
Potash									

Sugar Percentage: Mean 14.54									
Ploughing deep	-0.06	-	-	0.00	-0.12	-0.36	0.24	-0.08	-0.04
-shallow	0.17	0.23	0.11	-	-	0.15	0.19	0.02	0.32
Dung	0.09	-0.21	0.39	0.07	0.11	-	-	-0.14	0.32
Superphosphate	-0.11	-0.13	-0.09	-0.26	0.04	-0.34	0.12	-	-
Potash									

Tops: Mean yield 7.21 tons per acre										
	(±0.577)								(±0.817)	
Ploughing deep	0.04	-	-	0.65	-0.57	-0.20	0.28	0.06	0.02	
-shallow	1.02	1.63	0.41	-	-	0.95	1.09	0.81	1.23	
Dung	0.02	-0.22	0.26	-0.05	0.09	-	-	0.44	-0.40	
Superphosphate	-0.05	-0.03	-0.07	-0.26	0.16	0.37	-0.47	-	-	
Potash										

Plant Number: Mean 22.9 thousands per acre									
Ploughing deep	1.4	-	-	1.3	1.3	1.3	1.5	1.5	1.3
-shallow	0.9	0.8	1.0	-	-	2.0	-0.2	0.3	1.5
Dung	-0.7	-0.8	-0.6	0.4	-1.8	-	-	0.2	-1.6
Superphosphate	-0.7	-0.6	-0.8	-1.3	-0.1	0.2	-1.6	-	-
Potash									

Noxious Nitrogen: Mean 62.5									
Ploughing deep	-1.2	-	-	1.3	-3.7	0.0	-2.4	-1.8	-0.6
-shallow	-1.2	1.3	-3.7	-	-	-1.2	-1.2	-1.8	-0.6
Dung	0.0	1.2	-1.2	0.0	0.0	-	-	3.1	-3.1
Superphosphate									
Potash									

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Series 3. Sugar Beet

	Superphosphate			Potash			Mean
	None	Ploughed In seed in bed		None	Ploughed In seed in bed		
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	10.07
Mean	9.12	8.87	8.62	8.93	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	Total Sugar	(a)	(b)	(c)
		±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

49/Bb/1.6

Series 3. Sugar Beet

	Superphosphate			Potash			Mean
	None	Floughed in bed	In seed bed	None	Floughed in bed	In seed bed	
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

Mean	Responses to treatments							
	Floughing		Dung		Super.		Potash	
	Shallow	Deep	Abs.	Pres.	Abs.	Pres.	Abs.	Pres.

Grain: Mean yield 33.7 cwt per acre

(±0.55)

(±0.78)

Floughing deep	0.9	-	-	0.8	1.0	1.0	0.8	0.8	1.0
-shallow									
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

Floughing deep	1.9	-	-	1.9	1.9	1.7	2.1	2.4	1.4
-shallow									
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

49/Bb/1.7

Residual effects of treatments applied to sugar beet in 1947

	Mean	Ploughing		Dung		Super		Potash	
		Shallow	Deep	Abs.	Pres.	Abs.	Pres.	Abs.	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

	Mean	Ploughing		Dung		Super		Potash	
		Shallow	Deep	Abs.	Pres.	Abs.	Pres.	Abs.	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	-0.6	-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	-	-

49/Bb/1.8

Series 6. Potatoes

	None	Superphosphate		None	Potash		Mean
		Floughed in	In ridges		Floughed in	In ridges	
Ware tubers: tons per acre							
	(a)	(b) and (c)		(a)	(b) and (c)		
Shallow	5.48	6.25	5.73	5.35	6.41	5.86	5.75
Deep	5.58	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	5.93	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

Standard errors (a)  $\pm 0.224$ , (b)  $\pm 0.366$ , (c)  $\pm 0.344$ .

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

49/Bc/1.1

## 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. Discod 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: Yooman.

Hay, Cut Grass, Grazed Ley and Reseeded Pasture. Ploughed: Nov 17-19. Limed: Feb 2 and 14. Discod: Mar 22. Harrowed: Mar 26. Discod, 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 nitrochalk: 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. Discod: Mar 22. Harrowed: Mar 26. Discod, 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. Hood: 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.

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

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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 (±0.52)	15.9	15.6	24.1 (±1.03)	25.5	24.8
Foster's	22.4 (±0.60)	24.1	23.3	34.2 (±1.04)	38.3	36.2

Hay. Dry Matter. cwt per acre

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

49/Bc/1.4

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

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

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

49/Bd/1.1

## 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  $1\frac{1}{2}$  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  $1\frac{1}{2}$  cwt per acre sulphate of ammonia. Since 1944 the experiment has been a half replicate, according to the identity  $I \equiv (R + C - M - F - T)DSNA$ , 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 replanted with water: Aug 2-5. January King cabbages replanted 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.

49/Bd/1.2

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.



49/Bd/1.3

Lower Half - Cabbages

	None	Lupins	Clover	Rape	Rye-grass	Mean
Total weight: tons per acre ( $\pm 0.284$ )						( $\pm 0.127$ )
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 ( $\pm 0.201$ )	5.69	5.26	3.88	3.41	3.75	4.40

Total number: thousands per acre ( $\pm 0.21$ ) ( $\pm 0.09$ )

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	17.8	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	17.8	18.2	17.5	17.8	17.8
Mean ( $\pm 0.15$ )	17.7	17.6	17.9	17.7	17.6	17.7

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

fallow, lupins, clover	Low	High	
rape, ryegrass	0	3	cwt per acre
	$1\frac{1}{2}$	$4\frac{1}{2}$	" " "

49/E1/1.4

Lower Half - Cabbages

Differential responses

Mean	Dung		Straw		Sulph. amm. cwt per acre		Sulph. amm. to barley	
	Abs.	Pres.	Abs.	Pres.	2	4	Low	High

Total weight: tons per acre

	Dung (±0.180)		Straw (±0.257)		Sulph. amm. cwt per acre		Sulph. amm. to barley	
Dung	0.50	-	0.64	0.55	0.58	0.41	0.85	0.14
Straw	-0.26	-0.11	-	-	-0.20	-0.31	-0.23	-0.28
Sulph. amm.	0.35	0.43	0.40	0.25	-	-	0.58	0.32
Sulph. amm. to barley	-0.03	0.32	0.0	-0.05	0.0	-0.06	-	-

Total number: thousands per acre

	Dung (±0.13)		Straw (±0.19)		Sulph. amm. cwt per acre		Sulph. amm. to barley	
Dung	0.1	-	0.1	0.0	0.0	0.0	0.3	-0.1
Straw	0.0	0.0	-	-	0.0	0.0	0.2	-0.2
Sulph. amm.	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Sulph. amm. to barley	0.3	0.5	0.5	0.0	0.2	0.3	-	-

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

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

49/Bd/1.5

Upper Half - Barley

Green Manure Crops	None Lupins Clover Rape Rye-					Mean
	grass					
	Grain: cwt per acre ( $\pm 1.12$ )					( $\pm 0.50$ )
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	21.6	20.8	17.1	17.6	17.5	18.9
to cabbages 1948	18.8	20.6	17.3	17.9	19.8	18.9
Straw to cabbages						
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 ( $\pm 0.79$ )	20.2	20.7	17.2	17.8	18.6	18.9
	Straw: cwt per acre ( $\pm 1.54$ )					( $\pm 0.69$ )
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	23.7	24.3	20.6	20.6	22.0	22.2
to cabbages 1948	21.5	24.6	20.3	21.0	24.0	22.3
Straw to cabbages						
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 ( $\pm 1.09$ )	22.6	24.4	20.5	20.8	23.0	22.3

49/Bd/1.6

Upper Half - Barley

Differential responses

	Mean	Dung to Cabbages		Straw to Cabbages		Sulph. amm. to cabbages cwt		Sulph. amm. to barley cwt	
		Abs.	Pres.	Abs.	Pres.	per acre 2	per acre 4	per acre 0	per acre 1½
Grain: cwt per acre									
	(±0.71)								
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)								
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	-	-

49/Be/1.1

## 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. Springtime 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. Springtime harrowed: Mar 29. Ploughed: Mar 31-Apr 5. Harrowed and ridged: Apr 11-13. Dung applied: Apr 13. Artificial fertilizers 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.

49/Be/1.2

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), springtime 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. Springtime 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. Springtime 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. Springtime 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 reredged: 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	0.200 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	1.82 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.

49/Bo/1.3

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

49/3e/1.1

Previous Crop Rotation

	Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Block II					
Potatoes. Total tubers: tons per acre					
No Dung <sup>(1)</sup>	11.36	9.44	9.00	10.08	9.98
Dung in 1949	11.36	11.74	11.59	10.74	11.36
Mean ( $\pm 0.147$ )	11.37	10.59	10.30	10.41	10.67
Increase ( $\pm 0.514$ )	-0.02	2.30	2.59	0.66	1.38 ( $\pm 0.257$ )
Potatoes. Percentage Ware					
No Dung <sup>(1)</sup>	93.5	89.2	90.5	90.6	91.0
Dung in 1949	88.5	86.7	87.4	86.0	87.2
Mean ( $\pm 1.31$ )	91.0	87.9	89.0	88.3	89.0
Increase ( $\pm 1.39$ )	-5.0	-2.5	-3.1	-4.6	-3.8 ( $\pm 0.69$ )

Block IV

Barley. Grain: cwt per acre					
No Dung <sup>(1)</sup>	21.7	21.8	20.7	22.4	21.6
Dung in 1948	23.4	23.4	22.1	27.3	24.1
Mean ( $\pm 1.16$ )	22.6	22.6	21.4	24.9	22.8
Increase ( $\pm 1.82$ )	1.7	1.6	1.4	4.9	2.5 ( $\pm 0.91$ )
Barley. Straw: cwt per acre					
No Dung <sup>(1)</sup>	29.3	28.3	26.9	26.5	27.7
Dung in 1948	37.4	37.7	31.2	37.0	35.8
Mean ( $\pm 1.19$ )	33.3	33.0	29.1	31.7	31.8
Increase ( $\pm 1.95$ )	8.1	9.4	4.3	10.5	8.1 ( $\pm 0.97$ )

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



49/30/1.5

Block III

<u>Ley.</u>	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

49/30/1.6

Block V

<u>Ley.</u>	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	10.88	87.7
Mean	10.18	87.4
Increase	1.41	0.5
Previous Rotation:		
Ley	11.20	89.8
Lucerne	10.34	84.9
Arable with hay	9.64	86.2
Arable with sugar beet	9.52	88.8

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

49/Bf/1.1

## 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.

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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%

49/Bf/1.3

Summary of Results

Globe Beet

Organic manures	Level of manuring (tons per acre)	Sulphate of ammonia, cwt N per acre				Mean
		None	0.2	0.4	0.6.	
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	102.0			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.

49/Bf/1.4

Summary of Results

Green Peas

Organic manures	Level of manuring (tons per acre)	Sulphate of ammonia, cwt N per acre				Mean
		None	0.2	0.4	0.6	
Marketable weight: cwt per acre ( $\pm 8.81$ Means $\pm 6.23$ )						
None		40.0	64.6	71.7	37.5	52.5*
Dung	15	50.7	64.9			57.3
	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.

49/Bf/2.1

## 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 JULL--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. Hood: 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. Hood: 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. Hood: 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.

49/Bf/2.2

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

49/Bf/2.3

Leeks

Organic manures	Level of manuring (tons per acre)	Salphate of ammonia, cwt N per acre				Mean
		None	0.4	0.8	1.2	
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	66.0			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.

49/Bf/2.4

Summary of Results

Cabbages

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

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
Sludge 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.

49/Bf/2.5

Summary of Results

Cabbages

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

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.