ROTHAMSTED RESEARCH

Yields of the Field Experiments 1957

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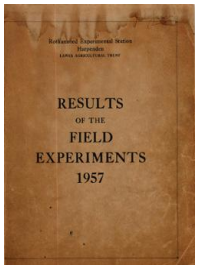

Long-term Experiments

Rothamsted Research

Rothamsted Research (1958) *Long-term Experiments ;* Yields Of The Field Experiments 1957, pp 15 - 68 **- DOI: https://doi.org/10.23637/ERADOC-1-177**

57/Ba/1.1

THREE COURSE ROTATION EXPERIMENT

6th year of revised scheme

For history, treatments, etc., see "Details of the Classical and Long Term Experiments" 1956.

Area of each plot (acres): Potatoes (sub plot), 0.0093; barley, 0.0200; sugar beet, 0.0204.

Cultivations, etc.:

Potatoes.

Straw applied, all plots ploughed: Jan 23. Fertilizers applied: Apr 11. Potatoes machine planted: Apr 13. Earthed up: July 6. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 31 and Aug 21. Sprayed with sulphuric acid, 15% BOV at 100 gallons per acre: Sept 19. Lifted: Oct 1. Variety: Majestic.

Barley.

Ground chalk applied at 20 cwt per acre: Oct 15, 1956. Straw applied, all plots ploughed: Jan 23, 1957. Fertilizers applied: Mar 16. Seed drilled at 2¾ bushels per acre: Mar 18. Sprayed with MCPA, 2 pints in 40 gallons per acre: May 29. Harvested: Aug 8. Variety: Plumage Archer.

Sugar beet.

Straw applied, all plots ploughed: Jan 23. Fertilizers applied: Apr 11. Seed drilled at 12 lb per acre: Apr 16. Sprayed with miscible DDT, 3 pints in 20 gallons per acre: May 29. Singled: June 24 - 28. Sprayed with methyl demeton, 12 oz in 80 gallons per acre: July 6. Lifted: Nov 2. Variety: Klein E.

https://doi.org/10.23637/ERADOC-1-177

Summary of Results

Potatoes

Treatments applied: 1950	1951	1953, 1955 and 1957 / 1952, 1954 & 1956	0 –	0 K	0.4N –	0.4N K	St + 0.2N –	St + 0.2N K	St + 0.6N –	St + 0.6N K	K_s –	K_s K	K_s + 0.4N –	K_s + 0.4N K
			Total tubers: tons per acre											
	Ar	0			8.80	9.56								
		0.4N	8.99	8.65										
Ar		0			9.42	9.86								
		0.4N	7.55	8.82										
	St1 St2	0			8.99	9.95			10.82	10.05			10.58	12.02
		0.4N	8.80	9.28			8.03	9.86			10.00	9.14		
St1 St2		0			9.09	10.96								
		0.4N	8.51	8.13										
		St+ 0.2N			11.11	10.87								
		St+ 0.6N	9.42	9.62										
		K_s			9.95	11.44								
		K_s + 0.4N	9.71	9.95										
	Ad	0			10.15	10.63			10.67	11.20			9.76	10.72
Ad		0.4N	8.70	9.14										
		St+ 0.6N	10.34	10.77										
		K_s + 0.4N	7.69	8.46										

57/Ba/1.2

Potatoes

Treatments applied: 1950	1951	1953, 1955 and 1957 / 1952 1954 & 1956 / 1957	0 –	0 K	0.4N –	0.4N K	St + 0.2N –	St + 0.2N K	St + 0.6N –	St + 0.6N K	K_s –	K_s K	K_s + 0.4N –	K_s + 0.4N K
			Percentage Ware ($1\frac{1}{2}$" riddle)											
	Ar	0			85.4	87.9								
		0.4N	86.0	84.4										
Ar		0			83.5	89.0								
		0.4N	82.8	89.8										
	St1 St2	0			85.1	90.9			89.6	90.3			91.2	88.1
		0.4N	88.4	89.3			87.2	91.0			89.5	77.3		
St1 St2		0			85.1	88.3								
		0.4N	85.0	82.0										
		St+ 0.2N			89.3	85.5								
		St+ 0.6N	84.4	90.1										
		K_s			85.9	89.5								
		K_s + 0.4N	91.1	89.3										
	Ad	0			84.3	88.5			90.3	89.2			81.0	93.3
Ad		0.4N	88.5	87.0										
		St+ 0.6N	86.6	83.0										
		K_s + 0.4N	83.4	88.7										

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57/Ba/1.3

Barley

Treatments applied: 1953, 1955 and 1957	1950	1951	1952, 1954 & 1956	0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
Grain (at 85% dry matter): cwt per acre									
		Ar	0		31.2				
			0.4N	24.2					
	Ar		0		31.1				
			0.4N	24.1					
		St1 St2	0		28.6		31.3		31.9
			0.4N	26.9		25.2		27.6	
St1 St2			0		30.7				
			0.4N	24.5					
			St+ 0.2N		29.6				
			St+ 0.6N	27.6					
			K_s		29.7				
			K_s + 0.4N	26.7					
		Ad	0		31.2		31.2		26.4
	Ad		0.4N	24.6					
			St+ 0.6N	26.1					
			K_s + 0.4N	30.4					
Straw (at 85% dry matter): cwt per acre									
		Ar	0		22.1				
			0.4N	14.9					
	Ar		0		20.5				
			0.4N	15.4					
		St1 St2	0		17.4		19.1		21.7
			0.4N	16.6		15.6		18.6	
St1 St2			0		19.3				
			0.4N	15.2					
			St+ 0.2N		18.1				
			St+ 0.6N	19.0					
			K_s		18.8				
			K_s + 0.4N	17.4					
		Ad	0		20.5		20.2		14.5
	Ad		0.4N	15.5					
			St+ 0.6N	16.1					
			K_s + 0.4N	21.6					

Mean dry matter % as harvested Grain: 82.5
Straw: 82.8

https://doi.org/10.23637/ERADOC-1-177

Sugar Beet

Treatments applied: 1950	1951	1953, 1955 and 1957 / 1952, 1954 & 1956	0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
Roots (washed): tons per acre								
	Ar	0		8.88				
		0.4N	8.39					
Ar		0		9.38				
		0.4N	8.40					
	St1 St2	0		10.67		10.48		10.94
		0.4N	9.65		9.74		8.64	
St1 St2		0		10.53				
		0.4N	9.33					
		St+ 0.2N		11.14				
		St+ 0.6N	7.66					
		K_s		9.23				
		K_s + 0.4N	8.43					
	Ad	0		10.69		11.17		10.57
Ad		0.4N	7.96					
		St+ 0.6N	9.76					
		K_s + 0.4N	8.74					
Sugar Percentage								
	Ar	0		18.0				
		0.4N	18.9					
Ar		0		18.5				
		0.4N	18.3					
	St1 St2	0		18.9		18.2		18.4
		0.4N	18.8		18.4		18.4	
St1 St2		0		18.8				
		0.4N	19.0					
		St+ 0.2N		18.5				
		St+ 0.6N	18.3					
		K_s		18.6				
		K_s + 0.4N	18.6					
	Ad	0		18.5		18.2		18.7
Ad		0.4N	18.9					
		St+ 0.6N	18.8					
		K_s + 0.4N	18.7					

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Sugar Beet

Treatment applied: 1950	1951	1953, 1955 and 1957 (1952, 1954 & 1956)	0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
Total sugar: cwt per acre								
	Ar	0		32.2				
		0.4N	31.7					
Ar		0		34.7				
		0.4N	30.7					
	St1 St2	0		40.3		38.1		40.3
		0.4N	36.2		35.8		31.8	
St1 St2		0		39.6				
		0.4N	35.4					
		St+ 0.2N		41.2				
		St+ 0.6N	28.0					
		K_s		34.4				
		K_s + 0.4N	31.4					
	Ad	0		39.5		40.6		39.6
Ad		0.4N	30.0					
		St+ 0.6N	36.8					
		K_s + 0.4N	32.7					
Tops: tons per acre								
	Ar	0		9.80				
		0.4N	6.21					
Ar		0		8.72				
		0.4N	7.06					
	St1 St2	0		9.46		10.86		10.14
		0.4N	8.24		8.55		7.58	
St1 St2		0		9.05				
		0.4N	7.32					
		St+ 0.2N		11.02				
		St+ 0.6N	8.57					
		K_s		8.87				
		K_s + 0.4N	7.39					
	Ad	0		10.64		11.95		9.83
Ad		0.4N	6.78					
		St+ 0.6N	8.39					
		K_s + 0.4N	7.71					

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Sugar Beet

Treatments applied: 1950	1951	1953, 1955 and 1957	0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
		1952 1954 & 1956						
		Plant number: thousands per acre						
	Ar	0		29.8				
		0.4N	29.4					
Ar		0		29.0				
		0.4N	30.5					
	St1 St2	0		29.5		30.6		30.2
		0.4N	28.5		29.3		30.5	
St1 St2		0		27.9				
		0.4N	29.4					
		St+ 0.2N		29.2				
		St+ 0.6N	31.1					
		K_s		30.5				
		K_s+ 0.4N	29.9					
	Ad	0		28.8		29.6		28.4
Ad		0.4N	30.8					
		St+ 0.6N	30.1					
		K_s+ 0.4N	28.3					

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FOUR COURSE ROTATION - CEREAL STRIPS

Incidence of Eyespot (Cercosporella herpotrichoides) after the Four Course Rotation Experiment, discontinued in 1956 - Hoosfield 1957.

Design: 5 strips of cereals, one on each of the 5 plot blocks of each of the four series of the old rotation experiment.

Area of each plot: Series I, II, III - 0.1067 acres; series IV - 0.0978 acres. Area harvested: All series - 0.0380 acres.

Treatments:

Previous rotations.

	1953	1954	1955	1956
Series I	Barley	Ryegrass	Wheat	Potatoes
II	Ryegrass	Wheat	Potatoes	Barley
III	Potatoes	Barley	Beans	Wheat
IV	Wheat	Potatoes	Barley	Beans

Cereal strips.

Winter wheat - Yeoman, Squarehead's Master 13/4 and Cappelle; barley - Proctor; oats - Sun II.

Basal dressing: 3 cwt sulphate of ammonia per acre.

Cultivations, etc.: Ploughed: Series II and III - Sept 25, 1956; series I and IV - Oct 12. Wheat sown at 3 bushels per acre: Oct 23. Sulphate of ammonia applied, oats sown at 4 bushels per acre: Mar 13, 1957. Barley sown at 2 bushels per acre: Mar 15. Sprayed with MCPA at 3 pints in 40 gallons: May 7. Combine harvested: Oats - Aug 7; barley - Aug 22; wheat - Aug 23.

Records were made of incidence of disease (Take-All and Eyespot). The incidence of Eyespot was high on series II and III and low on series I and IV.

https://doi.org/10.23637/ERADOC-1-177

Summary of Results

	Wheat			Barley	Oats
	Cappelle	S.H.Master 13/4	Yeoman	Proctor	Sun II
Seed rate: bu. per acre	4	3	3	2	4
Previous rotation 1953 54 55 56					
Grain (at 85% dry matter): cwt per acre					
B R W P	37.5	30.2	28.3	37.4	28.4
R W P B	25.9	19.9	20.6	31.7	23.0
P B Be W	25.3	19.4	19.6	28.4	23.9
W P B Be	34.7	25.6	28.0	32.0	21.7
Mean	30.8	23.8	24.1	32.4	24.2
Straw (at 85% dry matter): cwt per acre					
B R W P	30.3	36.2	30.9	19.0	14.9
R W P B	26.6	27.8	21.6	15.0	12.3
P B Be W	20.0	21.0	16.5	12.0	11.6
W P B Be	25.0	32.2	24.8	11.8	10.9
Mean	25.5	29.3	23.4	14.4	12.4

Mean dry matter % as harvested, Grain: 83.2
Straw: 86.4

B = Barley
Be = Beans
P = Potatoes
R = Ryegrass
W = Wheat

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SIX COURSE ROTATION EXPERIMENT

The 28th year

Seasonal effects of fertilizers - Rothamsted Long Hoos IV and Woburn Stackyard 1957.

For history, treatments, etc., see "Details of the Classical and Long Term Experiments" 1956.

Area of each plot: Rothamsted, 0.0250 acres; Woburn, 0.0266 acres.

Cultivations, etc.:

Rothamsted

Sugar beet.
Ploughed twice: Sept 21, 1956 and Nov 12. Fertilizers applied: Apr 13, 1957. Seed drilled at 12 lb per acre: Apr 16. Sprayed with miscible DDT, 3 pints in 20 gallons per acre: May 29. Singled: June 14 - 19. Sprayed with methyl demeton, 12 oz in 80 gallons per acre: July 9. Lifted: Nov 4 - 13. Variety: Klein E.

Barley.
Sugar beet tops spread: Dec 6, 1956. Ploughed: Jan 12, 1957. Ground chalk applied at 20 cwt per acre: Feb 21. Fertilizers applied: Mar 16. Seed drilled at $2\frac{3}{4}$ bushels per acre: Mar 18. Clover seed undersown: May 20. Harvested: Aug 8. Variety: Plumage Archer.

Clover.
Seed undersown in barley at 40 lb per acre: Apr 23, 1956. Autumn fertilizers applied: Nov 16. Sulphate of ammonia applied: Mar 30, 1957. Cut: July 9. Variety: S123 Late Flowering Red.

Wheat.
Ploughed twice: July 27, 1956 and Sept 21. Seed drilled at $2\frac{3}{4}$ bushels per acre: Oct 25. Autumn fertilizers applied: Oct 26. Sulphate of ammonia applied: Apr 24, 1957. Harvested: Aug 8. Variety: Yeoman.

Potatoes.
Ploughed 3 times: Sept 21, 1956, Nov 12, Jan 22, 1957. Ridged, fertilizers applied: May 3. Potatoes planted: May 4. Earthed up: July 6. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 31 and Aug 21. Sprayed with sulphuric acid, 15% BOV at 100 gallons per acre: Sept 19. Lifted: Sept 30. Variety: Majestic.

Rye.
Ground chalk applied at 20 cwt per acre, ploughed: Oct 15, 1956. Seed drilled at 3 bushels per acre: Oct 25. Autumn fertilizers applied: Oct 26. Sulphate of ammonia applied: Apr 24, 1957. Harvested: Aug 7. Variety: King II.

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Woburn

Sugar beet.
Ploughed twice: Sept 1, 1956 and Nov 14. Fertilizers applied: Apr 11, 1957. Seed drilled at 12 lb per acre: Apr 12. Sprayed with miscible DDT, 3 pints in 20 gallons per acre: May 22. Singled: June 12 - 13. Sprayed with methyl demeton, 12 oz in 60 gallons per acre: July 8. Lifted: Nov 12. Variety: Klein E.

Barley.
Ploughed: Nov 14, 1956. Fertilizers applied: Mar 12, 1957. Seed drilled at 2½ bushels per acre: Mar 16. Harvested: Aug 2. Variety: Herta.

Clover.
Ploughed twice: Aug 24, 1956 and Nov 13. Fertilizers applied: Mar 23, 1957. Seed broadcast at 40 lb per acre: Mar 26. Cut: July 5. Variety: Crimson clover.

Wheat.
Ploughed twice: July 24, 1956 and Sept 29. Autumn fertilizers applied: Oct 15. Seed drilled at 2½ bushels per acre: Oct 20. Sprayed with MCPP at 7 pints in 40 gallons per acre: Apr 6, 1957. Sulphate of ammonia applied: May 1. Harvested: Aug 7. Variety: Yeoman.

Potatoes.
Ploughed twice: Sept 4, 1956 and Nov 13. Ridged, fertilizers applied and potatoes planted: Apr 26, 1957. Sprayed with miscible DDT, 3 pints in 20 gallons: May 22. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: Aug 3, Aug 22 and Sept 4. Sprayed with arsenious compound, 1 gallon in 40 gallons per acre: Sept 16. Lifted: Oct 1. Variety: Majestic.

Rye.
Ploughed: Oct 6, 1956. Ground chalk applied at 20 cwt per acre: Oct 11. Seed drilled at 2½ bushels per acre: Oct 20. Sprayed with MCPP at 7 pints in 40 gallons per acre: Apr 6, 1957. Sulphate of ammonia applied: Apr 18. Harvested: Aug 7. Variety: King II.

Note: In 1957 at Woburn, the nitrogen levels were doubled on all crops except clover.

https://doi.org/10.23637/ERADOC-1-177

Summary of Results

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

	Rothamsted	Woburn	Rothamsted	Woburn
	Sugar Beet, roots (washed): tons per acre		Barley, grain: cwt per acre *	
Mean	7.71	14.15	26.7	28.4
Response to: N	+2.55	+2.27	+12.9	+9.9
P	-0.80	+0.48	-12.4	+13.6
K	-0.31	+2.75	-4.9	-1.0
Mean dry matter % as harvested:			83.3	**
	Sugar Beet, sugar percentage		Barley, straw: cwt per acre *	
Mean	16.7	17.5	16.1	24.3
Response to: N	+0.7	-0.3	+16.9	+10.6
P	+1.1	0.0	-7.2	+7.5
K	+0.8	+1.1	+7.3	+1.5
Mean dry matter % as harvested:			83.1	**
	Sugar Beet, total sugar: cwt per acre		Clover, hay, dry matter: cwt per acre	
Mean	25.7	49.8	25.1	8.9
Response to: N	+9.5	+7.1	-14.0	+14.8
P	-0.8	+1.7	+8.7	-5.7
K	+0.1	+12.9	+4.0	-2.1
Mean dry matter % as cut:			58.7	25.3
	Sugar Beet, tops: tons per acre		Wheat, grain: cwt per acre *	
Mean	9.26	10.09	32.1	10.0
Response to: N	+5.43	+6.35	+9.4	+2.3
P	+0.69	-0.19	+0.9	-17.6
K	-1.08	+0.13	-4.2	+9.3
Mean dry matter % as harvested:			83.7	**
	Sugar Beet, plant number: thousands per acre		Wheat, straw: cwt per acre *	
Mean	29.6	**	43.5	11.8
Response to: N	-1.3		+21.3	+2.2
P	-0.3		-4.4	-17.3
K	+0.3		-8.2	+4.0
Mean dry matter % as harvested:			84.9	**

*(At 85% dry matter). **Not recorded.

https://doi.org/10.23637/ERADOC-1-177

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

	Rothamsted	Woburn	Rothamsted	Woburn
	Potatoes, total tubers: tons per acre		Rye, grain: cwt per acre	
			*	
Mean	7.38	12.16	29.2	24.8
Response to: N	+0.15	+2.57	+14.9	+14.7
P	+1.15	-0.16	-2.3	+13.5
K	+0.61	+0.17	-3.5	-0.9
Mean dry matter % as harvested:			82.0	**
	Potatoes, percentage ware		Rye, straw: cwt per acre	
	(1)	(2)	*	
Mean	80.0	90.5	32.9	28.9
Response to: N	-4.4	+3.1	+7.2	+10.6
P	+8.3	+2.4	-3.1	+15.5
K	+5.6	-3.0	-5.8	-1.4
Mean dry matter % as harvested:			84.7	**

*(At 85% dry matter).

Riddle: (1) $1\frac{1}{2}$"; (2) $1\frac{5}{8}$"

https://doi.org/10.23637/ERADOC-1-177

57/Bb/1.1

DEEP CULTIVATION ROTATION EXPERIMENT

The 14th and final year

Deep ploughing, fertilizers and dung - Long Hoos I and II 1957.

For treatments etc. see "Details of the Classical and Long Term Experiments" 1956.

Area of each plot: 0.0312 acres. Area harvested: Ley, 0.0265 acres; wheat, 0.0189 acres.

Termination of Experiment. Series 5 and 6, due to carry potatoes and sugar beet in 1957, were terminated. They completed the two cycles of the 6 course rotation in 1956 and were sown with barley this year. With the completion of the ley and wheat crops in 1957, the experiment is now terminated.

Cultivations, etc.:

Ley

Seeds undersown: Apr 24, 1956. Cut: June 19, 1957. Seeds mixture 18 lb S24 perennial ryegrass, 8 lb Montgomery Late Flowering red clover, 2 lb American Alsike clover.

Wheat

"Deep" and "Shallow" plots ploughed: Aug 9, 1956. Seed drilled at 2¾ bushels per acre: Oct 25. Sulphate of ammonia applied: Apr 30, 1957. Sprayed with MCPA at 3 pints in 40 gallons per acre: May 7. Combine harvested: Aug 24. Variety: Yeoman.

Standard errors per plot.

Ley, Hay:	2.60 cwt per acre or 5.4% (4 d.f.)
Wheat, Grain (at 85% dry matter):	0.95 cwt per acre or 5.9% (4 d.f.)

https://doi.org/10.23637/ERADOC-1-177

Summary of Results

Response to	Mean	Responses to treatments to previous sugar beet: Ploughing Shallow	Ploughing Deep	Dung Abs.	Dung Pres.	Phosphate Abs.	Phosphate Pres.	Potash Abs.	Potash Pres.
Ley									
Hay: Mean yield 48.5 cwt per acre									
	(±1.30)				(±1.84)				
Ploughing deep-shallow	+0.8	-	-	-1.8	+3.4	-1.5	+3.1	+1.2	+0.4
Dung	+5.7	+3.1	+8.3	-	-	+0.8	+10.6	+5.6	+5.8
Phosphate	-0.3	-2.6	+2.0	-5.2	+4.6	-	-	-2.0	+1.4
Potash	-1.5	-1.1	-1.9	-1.6	-1.4	-3.2	+0.2	-	-
Wheat*									
Grain (at 85% dry matter): Mean yield 16.2 cwt per acre									
	(±0.47)				(±0.67)				
Ploughing deep-shallow	-4.1	-	-	-2.9	-5.3	-3.7	-4.5	-3.6	-4.6
Dung	+0.2	+1.4	-1.0	-	-	-0.7	+1.1	-0.3	+0.7
Phosphate	+0.5	+0.9	+0.1	-0.4	+1.4	-	-	+0.2	+0.8
Potash	-0.8	-0.3	-1.3	-1.3	-0.3	-1.1	-0.5	-	-

*Cultivation treatments direct to wheat, manures to previous sugar beet.

Mean dry matter % as harvested:
Wheat, grain: 81.1

https://doi.org/10.23637/ERADOC-1-177

LEY AND ARABLE ROTATIONS

Highfield and Fosters Field 1957 - the 9th year.

For details of treatments, rotations, etc. see "Details of the Classical and Long Term Experiments" 1956.

Rates of application of supplementary (corrective) potash (K_2O: cwt per acre)

Crop	Year of cycle	Rate	
Cut grass	"1st treatment"	3.0	(3 years previous cutting)
	"2nd treatment"	1.5	(received supplement in 1956)
	"3rd treatment"	1.5	(received supplement in 1956)
Lucerne	"1st treatment"	3.0	(3 years previous lucerne)
	"2nd treatment"	1.0	(received supplement in 1956)
	"3rd treatment"	1.0	(received supplement in 1956)
Permanent and reseeded grass	"1st treatment"	1.0	(1 previous hay crop taken)
Remaining plot		None	

Cultivations, etc.:

HIGHFIELD

N.B. 1959 PK rates on equivalent 1958.

1st year Treatment Crops

Cut grass. Ploughed: Oct 29, 1956. 1st dressing of supplementary K applied: Mar 28, 1957. Basal PK applied: Apr 2. 'Nitro-Chalk' applied: Apr 3. Seed sown at 33 lb per acre: Apr 4. 2nd dressing of supplementary K applied: July 12. Cut 3 times: July 11, Aug 19, Oct 25. 'Nitro-Chalk' applied after each cut except the last.

Grazed ley. Ploughed: Oct 29, 1956. Basal PK applied: Apr 2, 1957. 'Nitro-Chalk' applied: Apr 3. Seed sown at 44 lb per acre: Apr 4. 'Nitro-Chalk' applied: July 3. Grazed: 6 circuits, June 25 - Sept 28.

Lucerne. Ploughed: Oct 29, 1956. 1st dressing of supplementary K applied: Mar 28, 1957. Basal PK applied: Apr 2. Seed drilled at 28 lb per acre: Apr 3. 2nd dressing of supplementary K applied: July 12. Cut 3 times: July 11, Sept 13, Oct 25. Variety: Du Puits.

Hay. Ploughed after failure of undersown seeds: Oct 31, 1956. Basal PK and 'Nitro-Chalk' applied, seed sown at 28 lb per acre: Mar 28, 1957. Cut: June 20.

2nd year Treatment Crops

Cut grass. Basal PK applied: Dec 5, 1956. Supplementary K applied: Apr 1, 1957. 'Nitro-Chalk' applied: Apr 1 and after each cut except the last. Cut 6 times: Apr 18, May 24, June 20, July 22, Aug 20, Oct 25.

Grazed ley. Basal PK applied: Dec 5, 1956. 'Nitro-Chalk' applied: May 6, 1957 and July 3. Grazed: 8 circuits, Apr 12 - Sept 30.

Lucerne. Basal PK applied: Dec 5, 1956. Supplementary K applied: Apr 1, 1957. Cut 4 times: May 29, July 2, Aug 10, Oct 24.

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Potatoes. Ploughed 3 times: July 5, 1956, Oct 16, Jan 28, 1957. Ridged: May 2. Basal PK, sulphate of ammonia and dung applied, potatoes planted: May 3. For later cultivations see Potato Test Crop.

3rd year Treatment Crops

Cut grass. Basal PK applied: Dec 5, 1956. Supplementary K applied: Apr 1, 1957. 'Nitro-Chalk' applied: Apr 1 and after each cut except the last. Cut 6 times: Apr 26, May 29, July 2, July 22, Aug 19, Oct 11.

Grazed ley. Basal PK applied: Dec 5, 1956. 'Nitro-Chalk' applied: May 6, 1957 and July 3. Grazed: 6 circuits, Apr 16 - Sept 6.

Lucerne. Basal PK applied: Dec 5, 1956. Sprayed with TCA (Sodium trichloracetate), 20 lb in 90 gallons per acre: Jan 11, 1957. Supplementary K applied: Apr 1. Cut 4 times: May 29, July 2, Aug 10, Oct 11.

Oats. Ploughed twice: Oct 16, 1956 and Jan 29, 1957. Seed drilled at $3\frac{1}{2}$ bushels per acre with basal PK, 'Nitro-Chalk' applied: Mar 13. Combine harvested: Aug 7. Variety: Sun II.

1st Test Crop, Wheat

Ploughed after oats: Oct 4, 1956. Ploughed leys: Oct 26. Seed drilled at $2\frac{3}{4}$ bushels per acre with basal PK: Nov 2. Supplementary K applied to previous cut grass and lucerne plots: Apr 1, 1957. 'Nitro-Chalk' applied: Apr 26. Sprayed with MCPA, 3 pints in 40 gallons per acre: May 7. Combine harvested: Aug 26. Variety: Yeoman.

2nd Test Crop, Potatoes

Ploughed twice: Oct 16, 1956 and Jan 28, 1957. Ridged: May 2. Dung, sulphate of ammonia, basal PK and additional P and K applied, potatoes planted: May 3. Earthed up: July 6. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: Aug 1 and again Aug 21. Sprayed with sulphuric acid, 25% BOV at 100 gallons per acre: Sept 23. Lifted: Oct 4. Variety: Majestic.

3rd Test Crop, Barley

Ploughed twice: Oct 16, 1956 and Jan 29, 1957. Ground chalk applied to blocks 1 and 4: Dec 3, 1956. 'Nitro-Chalk' applied, seed drilled at 2 bushels per acre with basal PK: Mar 14, 1957. Combine harvested: Aug 19.

Permanent grasses. Basal PK applied to all plots: Dec 5, 1956.

7th year reseeded, 7th experimental year of permanent grass, Blocks 9-12.

Blocks 9 and 12. Supplementary K applied: Apr 1, 1957. 'Nitro-Chalk' applied: Apr 1 and June 7. Cut for hay: June 6. Grazed aftermath: 3 circuits, Aug 5 - Sept 25.

Blocks 10 and 11. 'Nitro-Chalk' applied: May 6 and July 3, 1957. Grazed: 5 circuits, Apr 28 - Sept 22.

8th year reseeded, 8th experimental year of permanent grass, Blocks 5-8.

Blocks 5 and 8. Supplementary K applied: Apr 1, 1957.

Blocks 5-8. 'Nitro-Chalk' applied: May 6, 1957 and July 3. Grazed: 5 circuits, Apr 20 - Sept 18.

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9th year reseeded, 9th experimental year of permanent grass, Blocks 1-4.
Blocks 1 and 4. Ground chalk applied: Dec 3, 1956.
Blocks 1-4. 'Nitro-Chalk' applied: May 6, 1957 and July 3.
Grazed: 6 circuits, Apr 12 - Sept 29.

FOSTERS

1st year Treatment Crops

Cut grass. Ploughed twice: Oct 2, 1956 and Jan 23, 1957. 1st dressing of supplementary K applied: Mar 29. 'Nitro-Chalk' and basal PK applied: Apr 2. Seed sown at 33 lb per acre: Apr 3. 2nd dressing of supplementary K applied: July 19. Cut 3 times: July 19, Aug 24, Oct 24. 'Nitro-Chalk' applied after each cut except the last.

Grazed ley. Ploughed twice: Oct 2, 1956 and Jan 23, 1957. 'Nitro-Chalk' and basal PK applied: Apr 2. Seed sown at 44 lb per acre: Apr 3. 'Nitro-Chalk' applied: July 3. Grazed: 3 circuits, July 25 - Sept 28.

Lucerne. Ploughed twice: Oct 2, 1956 and Jan 23, 1957. 1st dressing of supplementary K applied: Mar 29. Basal PK applied: Apr 2. Seed drilled at 28 lb per acre: Apr 3. 2nd dressing of supplementary K applied: July 12. Cut 3 times: July 12, Sept 12, Oct 24.

Hay. Seeds undersown in barley at 28 lb per acre: Apr 24, 1956. Basal PK applied: Dec 4. 'Nitro-Chalk' applied: Mar 29, 1957. Cut: June 5.

2nd year Treatment Crops

Cut grass. Basal PK applied: Dec 4, 1956. Supplementary K applied: Mar 30, 1957. 'Nitro-Chalk' applied: Mar 30 and after each cut except the last. Cut 6 times: Apr 18, May 24, June 20, July 23, Sept 12, Oct 24.

Grazed ley. Basal PK applied: Dec 4, 1956. 'Nitro-Chalk' applied: May 4, 1957 and July 3. Grazed: 6 circuits, Apr 13 - Oct 2.

Lucerne. Basal PK applied: Dec 4, 1956. Supplementary K applied: Mar 30, 1957. Cut 4 times: May 30, July 5, Aug 8, Oct 24.

Potatoes. Ploughed 3 times: July 5, 1956, Sept 28 and Jan 24, 1957. Ridged, dung, sulphate of ammonia and basal PK applied, potatoes planted: May 2. For later cultivations see Potato Test Crop.

3rd year Treatment Crops

Cut grass. Basal PK applied: Dec 4, 1956. Supplementary K applied: Mar 30, 1957. 'Nitro-Chalk' applied: Mar 30 and after each cut except the last. Cut 6 times: Apr 26, May 30, July 1, July 23, Sept 12, Oct 11.

Grazed ley. Basal PK applied: Dec 4, 1956. 'Nitro-Chalk' applied: May 4, 1957 and July 3. Grazed: 6 circuits, Apr 17 - Oct 6.

Lucerne. Basal PK applied: Dec 4, 1956. Supplementary K applied: May 30, 1957. Cut 4 times: May 30, July 5, Aug 8, Oct 11.

Oats. Ploughed twice: Oct 17, 1956 and Feb 20, 1957. 'Nitro-Chalk' applied, seed drilled at $3\frac{1}{2}$ bushels per acre with basal PK: Mar 13. Combine harvested: Aug 7. Variety: Sun II.

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1st Test Crop, Wheat

Ploughed after oats: Sept 29, 1956. Ploughed leys: Oct 26. Seed drilled at 2¾ bushels per acre with basal PK: Nov 1. Supplementary K to previous cut grass and lucerne plots: Mar 30, 1957. 'Nitro-Chalk' applied: Apr 25. Sprayed with MCPA, 3 pints in 40 gallons per acre: May 7. Combine harvested: Aug 24. Variety: Yeoman.

2nd Test Crop, Potatoes

Ploughed twice: Sept 29, 1956 and Jan 24, 1957. Ridged, dung, sulphate of ammonia, basal PK and additional P and K applied, potatoes planted: May 2. Earthed up: July 6. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: Aug 1 and again Aug 21. Sprayed with sulphuric acid, 20% BOV at 100 gallons per acre: Sept 19. Lifted: Oct 2. Variety: Majestic.

3rd Test Crop, Barley

Ploughed twice: Oct 17, 1956 and Jan 29, 1957. 'Nitro-Chalk' applied, seed drilled at 2 bushels per acre with basal PK: Mar 14. Combine harvested: Aug 19. Variety: Proctor.

Permanent grasses. Basal PK applied to all plots: Dec 4, 1956.

7th year reseeded grass, Blocks 6, 10, 11, 12.

Blocks 6 and 11. Supplementary K and 'Nitro-Chalk' applied: Mar 30, 1957. Cut for hay: June 5. 'Nitro-Chalk' applied: June 7. Grazed aftermath: 3 circuits, Aug 2 - Sept 18.

Blocks 10 and 12. 'Nitro-Chalk' applied: May 4, 1957 and July 3. Grazed: 5 circuits, Apr 29 - Sept 20.

8th year reseeded grass, Blocks 5, 7, 8, 9.

Blocks 5 and 7. Supplementary K applied: Mar 30, 1957.

Blocks 5, 7, 8, 9. 'Nitro-Chalk' applied: May 4 and July 3. Grazed: 5 circuits, Apr 21 - Sept 16.

9th year reseeded grass. Blocks 1-4.

'Nitro-Chalk' applied: May 4, 1957 and July 3. Grazed: 6 circuits, Apr 13 - Oct 6.

Standard errors per ¼ plot. Test Crops.

Wheat, grain (at 85% dry matter).		Highfield:	2.70 cwt per acre or 7.7% (14 d.f.)
		Fosters:	1.58 cwt per acre or 4.4% (14 d.f.)
Potatoes, total tubers.	Highfield	¼ plot:	0.964 tons per acre or 7.5% (14 d.f.)
		⅛ plot:	0.710 tons per acre or 5.5% (20 d.f.)
	Fosters	¼ plot:	0.712 tons per acre or 5.9% (14 d.f.)
		⅓ plot:	0.917 tons per acre or 7.7% (20 d.f.)
Barley, grain (at 85% dry matter).		Highfield:	3.08 cwt per acre or 6.8% (15 d.f.)
		Fosters:	1.48 cwt per acre or 3.5% (15 d.f.)

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Summary of Results

Wheat 1st test crop

N: cwt per acre	Treatment crops 1954-1956 Lucerne	Ley	Cut Grass	Arable with hay	Mean
Grain (at 85% dry matter): cwt per acre					
Highfield					
Mean	35.3	30.9	35.9	38.2	35.1
To test crop					
0.3	32.9	30.4	34.8	37.8	34.0
0.6	37.7	31.4	36.9	38.6	36.1
Difference (±1.91)	+4.8	+1.0	+2.1	+0.8	+2.1 (±0.96)
To treatment crops					
Single rate		30.4	35.9	37.1	34.5
Double rate		31.4	35.8	39.3	35.5
Difference (±1.91)		+1.0	-0.1	+2.2	+1.0 (±1.10)
Fosters					
Mean	40.6	33.4	33.2	35.4	35.6
To test crop					
0.3	39.3	31.9	31.2	32.9	33.8
0.6	41.9	34.9	35.2	37.9	37.5
Difference (±1.12)	+2.6	+3.0	+4.0	+5.0	+3.7 (±0.56)
To treatment crops					
Single rate		32.9	33.2	35.0	33.7
Double rate		33.9	33.2	35.8	34.3
Difference (±1.12)		+1.0	0.0	+0.8	+0.6 (±0.65)

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Wheat 1st test crop

N: cwt per acre	Excluding Lucerne: N to previous treatment crop: Single rate	Excluding Lucerne: N to previous treatment crop: Double rate	Excluding Lucerne: Mean	Arable with hay only: Dung to potatoes 1955: tons per acre: None	Arable with hay only: Dung to potatoes 1955: tons per acre: 12	Arable with hay only: Mean
Grain (at 85% dry matter): cwt per acre						
Highfield						
To test crop		(±1.10)	(±0.78)	(±1.91)		(±1.35)
0.3	33.2	35.5	34.3	38.1	37.5	37.8
0.6	35.7	35.5	35.6	38.9	38.3	38.6
Mean	34.5	35.5 (±0.78)	35.0			
To previous treatment crops				(±1.91)		(±1.35)
Single rate				37.0	37.3	37.1
Double rate				40.0	38.5	39.3
Mean				38.5 (±1.35)	37.9	38.2
Mean dry matter % as harvested: 83.0						
Fosters						
To test crop		(±0.65)	(±0.46)	(±1.12)		(±0.79)
0.3	31.5	32.5	32.0	37.2	36.3	36.8
0.6	35.9	36.1	36.0	42.2	41.3	41.8
Mean	33.7	34.3 (±0.46)	34.0			
To previous treatment crops				(±1.12)		(±0.79)
Single rate				39.6	38.2	38.9
Double rate				39.9	39.5	39.7
Mean				39.7 (±0.79)	38.8	39.3
Mean dry matter % as harvested: 83.7						

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Wheat 1st test crop

N: cwt per acre	Treatment crops 1954-1956 Lucerne	Ley	Cut Grass	Arable with hay	Mean
Straw (at 85% dry matter): cwt per acre					
Highfield					
Mean	41.5	40.6	34.0	42.6	39.7
To test crop					
0.3	38.5	41.9	34.5	42.8	39.4
0.6	44.5	39.4	33.5	42.3	39.9
Difference	+6.0	-2.5	-1.0	-0.5	+0.5
To treatment crops					
Single rate		42.1	33.0	39.9	38.3
Double rate		39.2	35.0	45.3	39.8
Difference		-2.9	+2.0	+5.4	+1.5
Fosters					
Mean	37.4	31.9	33.7	31.4	33.6
To test crop					
0.3	36.4	32.0	31.3	31.5	32.8
0.6	38.5	31.8	36.2	31.4	34.5
Difference	+2.1	-0.2	+4.9	-0.1	+1.7
To treatment crops					
Single rate		30.3	32.6	32.3	31.7
Double rate		33.5	34.8	30.6	33.0
Difference		+3.2	+2.2	-1.7	+1.3

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Wheat 1st test crop

N: cwt per acre	Excluding Lucerne: N to previous treatment crop: Single rate	Excluding Lucerne: N to previous treatment crop: Double rate	Excluding Lucerne: Mean	Arable with hay only: Dung to potatoes 1955: tons per acre: None	Arable with hay only: Dung to potatoes 1955: tons per acre: 12	Arable with hay only: Mean
Straw (at 85% dry matter): cwt per acre						
Highfield						
To test crop						
0.3	38.1	41.4	39.7	40.7	44.9	42.8
0.6	38.5	38.2	38.4	40.2	44.4	42.3
Mean	38.3	39.8	39.1			
To previous treatment crops						
Single rate				37.8	42.0	39.9
Double rate				43.1	47.4	45.3
Mean				40.4	44.7	42.6

Mean dry matter % as harvested: 85.1

Fosters

To test crop						
0.3	30.0	33.2	31.6	28.8	34.2	31.5
0.6	33.5	32.7	33.1	28.6	34.1	31.4
Mean	31.7	33.0	32.3			
To previous treatment crops						
Single rate				29.4	35.3	32.3
Double rate				28.1	33.0	30.6
Mean				28.7	34.2	31.4

Mean dry matter % as harvested: 85.0

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Potatoes 2nd test crop. Total tubers: tons per acre

	Treatment crops 1953-1955				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	13.18	14.24	12.25	11.98	12.91
N: cwt per acre					
0.5	13.22	14.20	11.91	11.49	12.70
1.0	13.14	14.28	12.60	12.47	13.12
Difference (±0.682)	-0.08	+0.08	+0.69	+0.98	+0.42 (±0.341)
Dung: tons per acre					
None	12.45	14.17	11.48	11.14	12.31
12	13.92	14.31	13.02	12.83	13.52
Difference (±0.682)	+1.47	+0.14	+1.54	+1.69	+1.21 (±0.341)
P_2O_5: cwt per acre*					
0.9	13.18	14.22	12.22	12.18	12.95
1.8	13.18	14.26	12.28	11.78	12.87
Difference (±0.355)	0.00	+0.04	+0.06	-0.40	-0.08 (±0.178)
K_2O: cwt per acre*					
0.9	12.26	13.94	11.36	11.36	12.23
1.8	14.10	14.54	13.14	12.60	13.60
Difference (±0.355)	+1.84	+0.60	+1.78	+1.24	+1.37 (±0.178)
Fosters					
Mean	12.39	11.66	11.15	12.67	11.97
N: cwt per acre					
0.5	12.85	12.28	11.29	12.38	12.20
1.0	11.93	11.04	11.02	12.95	11.74
Difference (±0.503)	-0.92	-1.24	-0.27	+0.57	-0.46 (±0.252)
Dung: tons per acre					
None	11.72	11.35	10.87	12.23	11.54
12	13.06	11.97	11.44	13.10	12.39
Difference (±0.503)	+1.34	+0.62	+0.57	+0.87	+0.85 (±0.252)
P_2O_5: cwt per acre*					
0.9	11.91	11.61	11.13	12.90	11.89
1.8	12.87	11.71	11.17	12.43	12.05
Difference (±0.459)	+0.96	+0.10	+0.04	-0.47	+0.16 (±0.229)
K_2O: cwt per acre*					
0.9	11.76	11.42	11.01	12.61	11.70
1.8	13.02	11.90	11.30	12.72	12.24
Difference (±0.459)	+1.26	+0.48	+0.29	+0.11	+0.54 (±0.229)

*Including basal dressing

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Potatoes 2nd test crop. Total tubers: tons per acre

	Dung: tons per acre		P_2O_5: cwt per acre*		K_2O: cwt per acre*	
	None	12	0.9	1.8	0.9	1.8
Highfield						
N: cwt per acre	(±0.308)		(1) and (2)		(1) and (2)	
0.5	10.84	11.98	11.27	11.55	10.65	12.17
1.0	11.36	12.33	12.06	11.63	11.32	12.37
Dung: tons per acre			(1) and (2)		(1) and (2)	
None			11.15	11.05	10.09	12.11
12			12.18	12.13	11.89	12.42

Lucerne rotation only	K_2O: cwt per acre*		
	0.9	1.8	Mean
P_2O_5: cwt per acre*	(3) and (4)		
0.9	11.14	12.76	11.95
1.8	10.98	12.74	11.86
Mean	11.06	12.75	11.90

	Dung: tons per acre		P_2O_5: cwt per acre*		K_2O: cwt per acre*	
	None	12	0.9	1.8	0.9	1.8
Fosters						
N: cwt per acre	(±0.242)		(1) and (2)		(1) and (2)	
0.5	10.63	11.43	11.06	11.01	10.87	11.19
1.0	10.15	10.95	10.38	10.72	10.20	10.89
Dung: tons per acre			(1) and (2)		(1) and (2)	
None			10.19	10.59	10.15	10.63
12			11.25	11.14	10.92	11.46

Lucerne rotation only	K_2O: cwt per acre*		
	0.9	1.8	Mean
P_2O_5: cwt per acre*	(3) and (4)		
0.9	9.62	11.79	10.70
1.8	11.47	11.68	11.57
Mean	10.55	11.73	11.14

*Including basal dressing

Highfield	Fosters	
(1) ±0.181	(1)±0.226	for use in horizontal and interaction comparisons.
(2) ±0.253	(2)±0.234	for use in all others.
(3) ±0.617	(3)±0.484	for use only in testing the PK interaction.
(4) ±0.506	(4)±0.468	for use in all other comparisons.

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Potatoes 2nd test crop. Percentage ware ($1\frac{1}{2}$" riddle)

	Treatment crops 1953-1955				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	78.1	76.8	76.2	74.6	76.4
N: cwt per acre					
0.5	79.8	77.6	77.6	74.4	77.4
1.0	76.4	76.0	74.8	74.8	75.5
Difference	-3.4	-1.6	-2.8	+0.4	-1.9
Dung: tons per acre					
None	79.2	76.7	74.5	72.3	75.6
12	77.0	77.0	77.9	76.9	77.2
Difference	-2.2	+0.3	+3.4	+4.6	+1.6
P_2O_5: cwt per acre*					
0.9	79.8	77.8	76.7	72.7	76.8
1.8	76.4	75.8	75.6	76.6	76.1
Difference	-3.4	-2.0	-1.1	+3.9	-0.7
K_2O: cwt per acre*					
0.9	77.6	76.2	78.0	75.5	76.8
1.8	78.6	77.5	74.4	73.8	76.0
Difference	+1.0	+1.3	-3.6	-1.7	-0.8
Fosters					
Mean	88.9	85.2	88.6	91.1	88.5
N: cwt per acre					
0.5	89.5	86.9	88.2	92.0	89.2
1.0	88.4	83.5	89.0	90.3	87.8
Difference	-1.1	-3.4	+0.8	-1.7	-1.4
Dung: tons per acre					
None	89.6	84.1	88.2	90.5	88.1
12	88.2	86.3	89.1	91.8	88.8
Difference	-1.4	+2.2	+0.9	+1.3	+0.7
P_2O_5: cwt per acre*					
0.9	89.6	85.8	89.3	92.2	89.2
1.8	88.2	84.6	87.9	90.1	87.7
Difference	-1.4	-1.2	-1.4	-2.1	-1.5
K_2O: cwt per acre*					
0.9	87.8	84.1	88.6	91.3	87.9
1.8	90.0	86.3	88.6	91.0	89.0
Difference	+2.2	+2.2	0.0	-0.3	+1.1

*Including basal dressing

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Potatoes 2nd test crop. Percentage ware ($1\frac{1}{2}$" riddle)

	Dung: tons per acre		P_2O_5: cwt per acre*		K_2O: cwt per acre*	
	None	12	0.9	1.8	0.9	1.8
Highfield						
N: cwt per acre						
0.5	74.2	75.3	74.3	75.3	76.7	72.9
1.0	71.7	74.0	74.0	71.7	71.6	74.1
Dung: tons per acre						
None			73.8	72.1	73.9	72.0
12			74.5	74.9	74.4	75.0

Lucerne rotation only	K_2O: cwt per acre*		
	0.9	1.8	Mean
P_2O_5: cwt per acre*			
0.9	76.9	78.6	77.8
1.8	73.4	74.2	73.8
Mean	75.2	76.4	75.8

	Dung: tons per acre		P_2O_5: cwt per acre*		K_2O: cwt per acre*	
	None	12	0.9	1.8	0.9	1.8
Fosters						
N: cwt per acre						
0.5	87.4	88.6	89.5	86.5	87.6	88.4
1.0	86.1	86.7	86.5	86.2	85.6	87.2
Dung: tons per acre						
None			87.2	86.2	85.8	87.7
12			88.8	86.5	87.4	87.8

Lucerne rotation only	K_2O: cwt per acre*		
	0.9	1.8	Mean
P_2O_5: cwt per acre*			
0.9	86.9	90.0	88.4
1.8	85.9	87.9	86.9
Mean	86.4	88.9	87.7

*Including basal dressing

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Barley 3rd test crop. Grain (at 85% dry matter): cwt per acre

	Treatment crops 1952-1954				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	45.3	44.4	46.3	45.4	45.3
N: cwt per acre					
None	45.6	46.3	46.4	45.3	45.9
0.2	44.9	42.5	46.1	45.6	44.8
Difference (±2.18)	-0.7	-3.8	-0.3	+0.3	-1.1 (±1.09)
Dung to potatoes 1956: tons per acre					
None	47.1	43.2	47.0	44.2	45.4
12	43.5	45.6	45.6	46.6	45.3
Difference (±2.18)	-3.6	+2.4	-1.4	+2.4	-0.1 (±1.09)
Fosters					
Mean	43.7	42.4	42.8	41.2	42.5
N: cwt per acre					
0.2	44.2	42.1	42.9	40.2	42.3
0.4	43.3	42.8	42.8	42.3	42.8
Difference (±1.05)	-0.9	+0.7	-0.1	+2.1	+0.5 (±0.52)
Dung to potatoes 1956: tons per acre					
None	42.6	42.4	41.8	40.7	41.8
12	44.8	42.5	43.9	41.8	43.2
Difference (±1.05)	+2.2	+0.1	+2.1	+1.1	+1.4 (±0.52)

	Highfield		Fosters	
	N: cwt per acre		N: cwt per acre	
	None	0.2	0.2	0.4
Dung to potatoes 1956: tons per acre	(±1.09)		(±0.52)	
None	44.9	45.8	41.7	42.0
12	46.9	43.8	42.9	43.5

Mean dry matter % as harvested:
Highfield: 81.4
Fosters: 82.0

https://doi.org/10.23637/ERADOC-1-177

Barley 3rd test crop. **Straw** (at 85% dry matter): cwt per acre

	Treatment crops 1952–1954				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	34.9	36.3	30.7	27.3	32.3
N: cwt per acre					
None	32.2	34.5	30.4	26.8	31.0
0.2	37.6	38.2	31.0	27.9	33.7
Difference	+5.4	+3.7	+0.6	+1.1	+2.7
Dung to potatoes 1956: tons per acre					
None	34.0	34.3	28.0	25.7	30.5
12	35.8	38.3	33.5	28.9	34.1
Difference	+1.8	+4.0	+5.5	+3.2	+3.6
Fosters					
Mean	23.9	24.3	22.2	20.5	22.7
N: cwt per acre					
0.2	24.1	23.7	22.6	19.7	22.5
0.4	23.8	24.9	21.8	21.4	23.0
Difference	-0.3	+1.2	-0.8	+1.7	+0.5
Dung to potatoes 1956: tons per acre					
None	22.7	22.7	21.4	19.7	21.6
12	25.2	26.0	23.0	21.4	23.9
Difference	+2.5	+3.3	+1.6	+1.7	+2.3

	Highfield		Fosters	
	N: cwt per acre		N: cwt per acre	
	None	0.2	0.2	0.4
Dung to potatoes 1956: tons per acre				
None	28.9	32.1	21.3	21.9
12	33.1	35.2	23.7	24.1

Mean dry matter % as harvested:
Highfield: 86.9
Fosters: 83.1

https://doi.org/10.23637/ERADOC-1-177

Treatment crops Arable and Hay rotation

(values based on mean of 2 sub plots only)

	Highfield N: cwt per acre applied in 1957			Fosters N: cwt per acre applied in 1957		
	Single rate	Double rate	Mean	Single rate	Double rate	Mean
Hay (dry matter): cwt per acre						
No dung	23.8	23.8	23.8	39.3	46.8	43.0
Dung in 1955	23.3	27.8	25.5	42.1	48.9	45.5
Mean	23.5	25.8	24.7	40.7	47.8	44.3
Potatoes, total tubers: tons per acre						
No dung	9.94	10.11	10.03	11.15	11.36	11.25
Dung in 1957	12.24	12.57	12.40	13.81	12.80	13.31
Mean	11.09	11.34	11.22	12.48	12.08	12.28
Potatoes, percentage ware (1½" riddle)						
No dung	74.8	79.3	77.0	88.8	91.2	90.0
Dung in 1957	78.2	76.1	77.1	92.6	90.6	91.6
Mean	76.5	77.7	77.1	90.7	90.9	90.8
Oats						
	None	0.2		0.2	0.4	
Grain (at 85% dry matter): cwt per acre						
No dung	35.6	36.4	36.0	34.5	33.1	33.8
Dung in 1956	34.0	36.5	35.3	34.0	36.1	35.0
Mean	34.8	36.4	35.6	34.3	34.6	34.4
Straw (at 85% dry matter): cwt per acre						
No dung	21.9	24.0	22.9	15.9	14.9	15.4
Dung in 1956	24.0	22.5	23.2	14.2	18.2	16.2
Mean	22.9	23.3	23.1	15.1	16.6	15.8

Highfield, Oats, Mean dry matter % as harvested Grain: 82.8 Straw: 84.2
Fosters, Oats, Mean dry matter % as harvested Grain: 83.0 Straw: 83.3

https://doi.org/10.23637/ERADOC-1-177

Cut grass. Dry Matter: cwt per acre

1st year	Corrective dressing of K_2O: cwt per acre 3.0	Highfield N: to previous 3 test crops Single rate	Highfield N: to previous 3 test crops Double rate	Highfield Dung to potatoes 1955: tons per acre None	Highfield Dung to potatoes 1955: tons per acre 12	Highfield Mean	Fosters N: to previous 3 test crops Single rate	Fosters N: to previous 3 test crops Double rate	Fosters Dung to potatoes 1955: tons per acre None	Fosters Dung to potatoes 1955: tons per acre 12	Fosters Mean
N (1) to cut grass (3 cuts)											
Single rate		42.7	44.0	41.6	45.1	43.4	28.5	29.3	29.6	28.2	28.9
Double rate		50.5	48.8	47.1	52.2	49.6	39.7	38.6	37.3	41.0	39.1
N to test crops											
Single rate				43.8	49.3	46.6			34.2	34.1	34.1
Double rate				44.9	48.0	46.4			32.7	35.1	33.9
Mean				44.3	48.6	46.5			33.4	34.6	34.0

		Highfield N to cut grass (1) Single rate	Highfield N to cut grass (1) Double rate	Highfield Mean	Fosters N to cut grass (1) Single rate	Fosters N to cut grass (1) Double rate	Fosters Mean
2nd year (6 cuts)	1.5	63.3	85.5	74.4	49.9	62.9	56.4
3rd year (6 cuts)	1.5	43.6	66.0	54.8	39.2	53.1	46.1

(1) 0.15 v. 0.3 cwt N as 'Nitro-Chalk' for every cut.

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Lucerne. Dry matter: cwt per acre

1st year (3 cuts)	Corrective dressing of K_2O: cwt per acre	Highfield N to 3 previous test crops Single rate	Highfield N to 3 previous test crops Double rate	Highfield Mean	Fosters N to 3 previous test crops Single rate	Fosters N to 3 previous test crops Double rate	Fosters Mean
Dung to potatoes 1955							
None		29.8	33.7	31.7	24.1	24.1	24.1
12 tons		33.5	33.5	33.5	25.3	25.3	25.3
Mean		31.7	33.6	32.6	24.7	24.7	24.7
2nd year (4 cuts)	1.0			92.6			92.6
3rd year (4 cuts)	1.0			63.0			98.4

Grazed Ley. Dry matter: cwt per acre (estimated from sample cuts)

	Highfield N: cwt per acre (yearly) 0.15	Highfield N: cwt per acre (yearly) 0.30	Highfield Mean	Fosters N: cwt per acre (yearly) 0.15	Fosters N: cwt per acre (yearly) 0.30	Fosters Mean
1st year	27.9	32.5	30.2	17.7	18.7	18.2
2nd year	34.5	42.8	38.7	39.6	36.7	38.2
3rd year	20.1	22.5	21.3	18.3	23.9	21.1

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Reseeded Grass. Dry matter: cwt per acre

	Corrective dressing of K_2O: cwt per acre	Cut for hay N Single rate	Cut for hay N Double rate	Cut for hay Mean	Grazed Estimated from sampling cuts N Single rate	Grazed Estimated from sampling cuts N Double rate	Grazed Estimated from sampling cuts Mean
Highfield							
7th exptl.year Blocks 10 and 11	1.0				39.8*	42.1*	40.9*
Blocks 9 and 12		39.0	41.8	40.4	18.0*	21.4*	19.7*
8th exptl.year Blocks 5-8	None				25.4	31.7	28.6
9th exptl.year Blocks 1-4	None				29.4	32.6	31.0
Fosters							
7th exptl.year Blocks 10 and 12	1.0				25.6*	22.8*	24.2*
Blocks 6 and 11		17.5	21.1	19.3	20.4*	23.1*	21.7*
8th exptl.year Blocks 5,7,8 and 9	None				21.8	21.1	21.4
9th exptl.year Blocks 1-4	None				28.7	25.9	27.3

Permanent Grass. Dry matter: cwt per acre

Highfield							
7th exptl.year Blocks 10 and 11	1.0				28.5*	36.4*	32.4*
Blocks 9 and 12		65.5	78.8	72.2	17.9*	23.1*	20.5*
8th exptl.year Blocks 5-8	None				23.4	29.8	26.6
9th exptl.year Blocks 1-4	None				26.9	34.2	30.6

*Aftermath grazing.

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57/Bd/1.1

GREEN MANURING EXPERIMENT

Woburn Stackyard - 1957, the 4th year of the revised scheme.

For history, treatments etc, see "Details of the Classical and Long Term Experiments" 1956.

Area of each plot: 0.0406 acres. Area harvested: Potatoes, 0.0221; barley, 0.0406 acres.

Cultivations, etc.:

Green manures after barley 1956 (for early potatoes 1957): Trefoil at 30 lb per acre, ryegrass at 40 lb per acre, undersown: Apr 23, 1956. Varieties: Trefoil-English; Ryegrass-Western Wolths.

Early potatoes: Straw applied to "fallow" plots only: Aug 29, 1956. "Fallow" plots ploughed: Aug 30 and Nov 13. Straw applied to ryegrass and trefoil plots: Sept 4. All plots ploughed: Jan 29 and Feb 19, 1957. 'Nitro-Chalk' and basal fertilizers applied: Mar 26. Potatoes mechanically planted: Mar 29. Earthed up: Apr 26. Lifted: July 9-10. Variety: Ulster Chieftain.

Green manures after early potatoes 1956 (for barley 1957): Trefoil at 30 lb per acre, ryegrass at 40 lb per acre, sown: July 31, 1956. Varieties: Trefoil-English; Ryegrass-Western Wolths.

Barley: "Fallow" and "early" green manure plots ploughed: Nov 19, 1956. "Late" green manure plots ploughed: Feb 21, 1957. Ground chalk at 20 cwt per acre applied: Feb 27. 'Nitro-Chalk' applied: Mar 14. Seed drilled at 2½ bushels per acre: Mar 18. Trefoil and ryegrass undersown: May 11. Harvested: Aug 7. Variety: Herta.

Standard errors per plot:

Potatoes. Total tubers: 0.307 tons per acre or 10.0% (18 d.f.)

Barley. Grain: 3.55 cwt per acre or 19.2% (20 d.f.)

Errata to "Results of the Field Experiments" 1955 and 1956. Pages 55/Bd/1.2 and 56/Bd/1.3. Levels of N: cwt per acre (including basal) to potatoes should be 0.6 and 1.2, not 0.23 and 0.46.

Estimates of produce (roots and tops) of green manure crops: cwt per acre

	Green manure	Ploughed in	Dry matter	Nitrogen
For early Potatoes	Trefoil		18.9	0.594
	Ryegrass		14.3	0.285
For Barley	Trefoil	Early	21.0	0.656
	Ryegrass	Early	16.0	0.273
	Trefoil	Late	8.3	0.274
	Ryegrass	Late	14.0	0.247

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57/Bd/1.2

Summary of Results

Early Potatoes, total tubers: tons per acre

	Straw: tons per acre		N: cwt per acre (including basal)		Dung to cabbages 1953: tons per acre		Mean
	None	1½	0.6	1.2	None	10	
Excluding plots fallow under old scheme							
Undersown green manures for potatoes	(±0.109)		(±0.109)		(±0.109)		(±0.077)
None	2.94	3.11	3.02	3.02	2.90	3.15	3.02
	(±0.154)		(±0.154)		(±0.154)		(±0.109)
Trefoil	3.18	3.09	3.12	3.16	2.93	3.35	3.14
Ryegrass	3.14	3.03	3.34	2.83	2.80	3.37	3.08
Straw: tons per acre			(±0.109)		(±0.109)		(±0.077)
None			3.11	2.99	2.79	3.31	3.05
1½			3.14	3.03	2.98	3.20	3.09
N: cwt per acre (including basal)							
0.6					2.97	3.29	3.13
1.2					2.80	3.22	3.01
Mean (±0.077)					2.88	3.25	3.07
Plots fallow under old scheme							
Straw: tons per acre			(±0.217)		(±0.217)		(±0.154)
None			2.96	3.33	3.23	3.05	3.14
1½			3.08	2.94	2.90	3.12	3.01
N: cwt per acre (including basal)							
0.6					2.87	3.17	3.02
1.2					3.27	3.00	3.13
Mean (±0.154)					3.07	3.09	3.08

	Undersown green manures for potatoes				
Old scheme	None Fallow	None	Trefoil	Ryegrass	Mean
		Excluding fallow			
	3.08 (±0.109)	3.02 (±0.077)	3.14	3.08 (±0.109)	3.07

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Barley, grain: cwt per acre

	Green manures: Ploughed in Early	Green manures: Ploughed in Late	Green manures: In barley for potatoes None	Green manures: In barley for potatoes Undersown	N: cwt per acre (including basal) 0.23	N: cwt per acre (including basal) 0.46	Dung to cabbages 1952: tons per acre None	Dung to cabbages 1952: tons per acre 10	Mean
Excluding plots fallow under old scheme									
Green manures after potatoes for barley	(±1.26)		(±1.26)		(±1.26)		(±1.26)		(±0.89)
Trefoil	18.8	17.4	18.9	17.3	17.5	18.7	17.7	18.5	18.1
Ryegrass	20.1	21.2	21.8	19.5	18.6	22.7	19.4	21.9	20.7
Green manures ploughed in									
Early			20.8	18.1	17.7	21.2	18.2	20.7	19.5
Late			19.9	18.6	18.4	20.2	18.9	19.7	19.3
Green manures in barley for potatoes									
None					19.6	21.1	20.0	20.7	20.4
Undersown					16.5	20.2	17.1	19.7	18.4
N: cwt per acre (including basal)									
0.23							17.6	18.5	18.1
0.46							19.5	21.9	20.7
Mean (±0.89)							18.5	20.2	19.4

Old scheme	Green manures after potatoes for barley: None Fallow	Trefoil (Excluding fallow)	Ryegrass (Excluding fallow)	Mean
	15.2	18.1	20.7	18.5
	(±1.26)	(±0.89)		

Plots fallow under old scheme

N: cwt per acre (including basal)			(±1.78)
	(±2.51)		
0.23	11.6	16.3	14.0
0.46	14.6	18.2	16.4
Mean (±1.78)	13.1	17.3	15.2

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57/Bä/1.3

Barley, straw: cwt per acre

	Green manures: Ploughed in Early	Green manures: Ploughed in Late	Green manures: In barley for potatoes None	Green manures: In barley for potatoes Undersown	N: cwt per acre (including basal) 0.23	N: cwt per acre (including basal) 0.46	Dung to cabbages 1952: tons per acre None	Dung to cabbages 1952: tons per acre 10	Mean
Excluding plots fallow under old scheme									
Green manures after potatoes for barley									
Trefoil	14.2	13.3	14.8	12.7	13.0	14.5	13.3	14.2	13.7
Ryegrass	15.2	15.9	16.7	14.3	14.1	17.0	14.6	16.5	15.5
Green manures ploughed in									
Early			16.1	13.3	13.4	16.0	13.9	15.5	14.7
Late			15.5	13.7	13.6	15.5	13.9	15.2	14.6
Green manures in barley for potatoes									
None					15.2	16.4	15.2	16.3	15.8
Undersown					11.9	15.2	12.6	14.4	13.5
N: cwt per acre (including basal)									
0.23							13.0	14.1	13.5
0.46							14.9	16.7	15.8
Mean							13.9	15.4	14.6

Old scheme	Green manures after potatoes for barley: None Fallow	Trefoil (Excluding fallow)	Ryegrass (Excluding fallow)	Mean
	11.1	13.7	15.5	13.9

Plots fallow under old scheme

N: cwt per acre (including basal)			
0.23	9.1	11.7	10.4
0.46	10.4	13.2	11.8
Mean	9.8	12.5	11.1

57/Ba/1.4

LEY AND ARABLE ROTATIONS

Woburn Stackyard 1957 - the 20th year.

For history, treatments etc., see "Details of the Classical and Long Term Experiments" 1956.

In 1957 the divided application of 'Nitro-Chalk' to 1st, 2nd and 3rd year grazed ley was changed to three equal dressings of 0.2 cwt N per acre instead of two at 0.3 cwt N per acre.

Turnips were substituted for the carrot crop which failed.

Cultivations, etc.:

Treatment crops

Ley rotations

Ley 1st year. Ploughed twice: Aug 24, 1956 and Oct 1. Basal fertilizers applied: Apr 8, 1957. Seed sown at 40 lb per acre: Apr 15. 'Nitro-Chalk' applied: 2nd dressing - July 26; 3rd dressing - Aug 30. Grazed 5 circuits: June 23 - Oct 24. Seeds mixture: 20 lb S24 Perennial Ryegrass, 11 lb S143 Cocksfoot, 6 lb Late Flowering Red Clover, 3 lb S100 White Clover.

Ley 2nd year. Basal potash applied: Mar 11. 'Nitro-Chalk' applied: Mar 11, June 1 and Sept 3. Grazed 8 circuits: Apr 5 - Oct 16.

Ley 3rd year. Basal potash applied: Mar 11. 'Nitro-Chalk' applied: Mar 11, June 7 and Aug 30. Grazed 8 circuits: Apr 17 - Oct 8.

Lucerne 1st year. Ploughed: Oct 1, 1956. Basal fertilizers applied: Apr 8, 1957. Seed sown at 25 lb per acre: Apr 15. Sprayed with dieldrin at 2½ pints in 20 gallons per acre: June 13. Cut twice: July 17 and Sept 15. Variety: Du Puits.

Lucerne 2nd year. Basal potash applied: Mar 11. Cut 3 times: June 11, July 17 and Sept 17.

Lucerne 3rd year. Basal potash applied: Mar 11. Cut 3 times: June 11, July 17 and Sept 17.

Arable rotations

Potatoes 1st course. Ploughed twice: Aug 24, 1956 and Oct 1. Basal fertilizers applied: Apr 5, 1957. Potatoes machine planted: Apr 9. Earthed up: July 3. Sprayed 3 times with copper fungicide, 5 lb in 40 gallons per acre: Aug 3, Aug 23 and Sept 4. Sprayed with arsenious compound, 1 gallon in 40 gallons per acre: Sept 16. Lifted: Oct 1. Variety: Majestic.

Rye 2nd course. Ploughed: Oct 9, 1956. Seed drilled at 2½ bushels per acre: Oct 20. 'Nitro-Chalk' applied: Apr 18, 1957. Seeds hay mixture undersown on 4 plots: May 11 and resown Aug 28. Harvested: Aug 7. Variety: King II.

Seeds hay 3rd course. Seeds undersown at 30 lb per acre in rye: Apr 20, 1956. Sulphate of ammonia and potash applied: Mar 14, 1957. 1st cut: June 11. 'Nitro-Chalk' applied: June 13. 2nd cut: Sept 2. Seeds mixture: 19 lb S24 Perennial Ryegrass, 9 lb Late Flowering Red Clover, 2 lb Alsike American.

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Turnips (after carrots failed) 3rd course. Ploughed twice: Sept 29, 1956 and Nov 17. Sulphate of ammonia and potash applied: Apr 11, 1957. Carrots sown: May 11. Turnips drilled at 5 lb per acre: July 5. Singled: July 29 - Aug 7. Harvested: Sept 26 - 30. Variety: Imperial Green Globe.

Test crops

Sugar beet 1st test crop. Dung applied: Dec 13, 1956. Ploughed: Dec 14. Basal and treatment fertilizers applied: Apr 8, 1957. Seed drilled at 12 lb per acre: Apr 12. Sprayed with miscible DDT at 3 pints in 20 gallons per acre: May 22. Singled: June 13 - 17. Sprayed with methyl demeton at 12 oz in 60 gallons per acre: July 8. Lifted: Nov 14 - 18. Variety: Klein E.

Barley 2nd test crop. Ploughed: Dec 5, 1956. Potash applied to equalize treatment dressings to 1956 sugar beet test crop: Dec 19. Ground chalk applied at 20 cwt per acre: Feb 27, 1957. 'Nitro-Chalk' applied: Mar 5. Seed drilled at 2½ bushels per acre: Mar 16. Harvested: Aug 2. Variety: Herta.

Standard errors per plot. Test crops.

Sugar beet.	Total sugar.	Whole plot:	4.88 cwt per acre or 10.0% (4 d.f.)
		½ plot:	5.53 cwt per acre or 11.4% (4 d.f.)
		⅛ plot:	2.99 cwt per acre or 6.1% (24 d.f.)
	Tops.	Whole plot:	1.965 tons per acre or 7.4% (4 d.f.)
		½ plot:	1.042 tons per acre or 7.8% (4 d.f.)
		⅛ plot:	0.940 tons per acre or 7.1% (24 d.f.)
Barley.	Grain.	Whole plot:	1.40 cwt per acre or 4.3% (4 d.f.)
		½ plot:	2.42 cwt per acre or 7.4% (4 d.f.)

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Summary of Results

Treatment crops

Ley, sheep days of grazing per acre

1st year	2nd year	3rd year
976	1994	1891

Lucerne, yield of hay (at 85% dry matter): cwt per acre

	1st crop	2nd crop	3rd crop	Total
1st year				
Dung in 1955: tons per acre				
None	0.5	9.9		10.4
15	2.5	18.6		21.1
Difference	+2.0	+8.7		+10.7
Previous rotation				
Lucerne	2.2	15.1		17.3
Arable with sugar beet	0.8	13.4		14.2
Mean	1.5	14.2		15.7
2nd year				
Dung in 1954: tons per acre				
None	16.6	15.9	17.2	49.7
15	24.0	17.7	19.3	61.0
Difference	+7.4	+1.8	+2.1	+11.3
Previous rotation				
Lucerne	22.0	17.0	19.5	58.5
Arable with hay	18.6	16.6	17.1	52.3
Mean	20.3	16.8	18.3	55.4
3rd year				
Dung in 1953: tons per acre				
None	33.4	21.8	21.7	76.9
15	40.0	22.8	24.9	87.7
Difference	+6.6	+1.0	+3.2	+10.8
Previous rotation				
Lucerne	34.6	22.9	22.4	79.9
Arable with sugar beet	38.8	21.8	24.2	84.8
Mean	36.7	22.3	23.3	82.3

https://doi.org/10.23637/ERADOC-1-177

Treatment crops

	Potatoes		Rye	
	Total tubers: tons per acre	Percentage ware	Grain: cwt per acre	Straw: cwt per acre
Dung: tons per acre				
None	13.21	91.3	33.2	38.7
15*	13.64	91.2	31.9	37.7
Difference	+0.43	-0.1	-1.3	-1.0
Previous rotation				
Ley	15.76	89.0	34.4	41.5
Lucerne	11.97	91.0	34.4	40.5
Arable with hay	13.78	92.8	27.9	31.6
Arable with sugar beet	12.19	92.3	33.4	39.2
Mean	13.43	91.2	32.5	38.2

Hay

Yield (at 85% dry matter): cwt per acre

	1st crop	2nd crop	Total
Dung in 1953: tons per acre			
None	54.0	25.7	79.7
15	56.7	26.2	82.9
Difference	+2.7	+0.5	+3.2
Previous rotation			
Ley	52.9	25.1	78.0
Arable with hay	57.8	26.8	84.6
Mean	55.4	26.0	81.4

Turnips

	Roots: tons per acre	Tops: tons per acre
Dung in 1953: tons per acre		
None	11.95	8.84
15	13.25	10.19
Difference	1.30	1.35
Previous rotation		
Lucerne	12.97	10.34
Arable with sugar beet	12.23	8.68
Mean	12.60	9.51

*Dung applied: Potatoes - for test crop potatoes in 1955.
Rye - for test crop potatoes in 1954.

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1st Test crop
Sugar beet
Previous rotation

	Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Roots (washed): tons per acre					
Mean	16.42	14.54	12.86	13.81	14.41
Dung: tons per acre					
None	15.41	13.66	11.93	12.76	13.44
15	17.44	15.41	13.80	14.87	15.38
Difference	+2.03	+1.75	+1.87	+2.11	+1.94
Response to additional 0.72 cwt N per acre					
No dung	-0.08	-0.03	-0.11	+0.86	+0.16
Dung 15 tons per acre	+1.14	+1.06	+1.13	+0.18	+0.88
Response to additional 0.9 cwt K_2O per acre					
No dung	+0.39	-0.21	-0.21	+0.76	+0.18
Dung 15 tons per acre	+0.04	+1.49	+0.18	-0.08	+0.40
Sugar percentage					
Mean	16.6	16.7	17.1	17.4	16.9
Dung: tons per acre					
None	16.7	16.8	17.2	17.4	17.0
15	16.5	16.6	17.0	17.3	16.8
Difference	-0.2	-0.2	-0.2	-0.1	-0.2
Response to additional 0.72 cwt N per acre					
No dung	-0.7	-0.4	-0.5	-0.3	-0.5
Dung 15 tons per acre	-1.1	-0.6	-1.0	-0.6	-0.8
Response to additional 0.9 cwt K_2O per acre					
No dung	+0.3	+0.1	+0.4	+0.1	+0.3
Dung 15 tons per acre	+0.2	+0.3	0.0	-0.6	0.0

https://doi.org/10.23637/ERADOC-1-177

1st Test crop

Sugar beet

	Previous rotation				
	Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Total sugar: cwt per acre					
Mean (±3.45)	54.4	48.4	44.0	48.0	48.7
Dung: tons per acre					
None	51.4	45.8	41.1	44.5	45.7
15 (±2.80)	57.4	51.0	46.8	51.4	51.7
Difference (±5.53)	+6.0	+5.2	+5.7	+6.9	+6.0 (±2.76)
Response to additional 0.72 cwt N per acre		(±2.11)			(±1.06)
No dung	-2.3	-1.2	-1.5	+2.4	-0.6
Dung 15 tons per acre	-0.1	+1.8	+1.3	-1.1	+0.5
Response to additional 0.9 cwt K_2O per acre		(±2.11)			(±1.06)
No dung	+2.4	-0.4	+0.3	+2.8	+1.3
Dung 15 tons per acre	+0.8	+5.6	+0.6	-2.0	+1.2
Tops: tons per acre					
Mean (±0.695)	14.62	13.42	13.61	11.54	13.30
Dung: tons per acre					
None	14.61	13.46	13.45	10.68	13.05
15 (±0.556)	14.63	13.37	13.76	12.41	13.54
Difference (±1.042)	+0.02	-0.09	+0.31	+1.73	+0.49 (±0.521)
Response to additional 0.72 cwt N per acre		(±0.665)			(±0.332)
No dung	+1.83	+2.40	+2.78	+3.73	+2.69
Dung 15 tons per acre	+2.48	+2.26	+3.57	+3.81	+3.03
Response to additional 0.9 cwt K_2O per acre		(±0.665)			(±0.332)
No dung	-0.02	-1.27	-0.81	-0.46	-0.64
Dung 15 tons per acre	+0.58	-1.37	-0.47	+0.02	+0.05

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1st Test crop
Sugar beet

Plots receiving no additional N or K

Dung: tons per acre		Previous rotation: Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
Roots (washed): tons per acre						
Mean		16.26	13.94	12.89	13.43	14.13
None		15.50	13.91	12.55	12.10	13.52
15		17.02	13.98	13.23	14.76	14.75
Difference		+1.52	+0.07	+0.68	+2.66	+1.23
Sugar percentage						
Mean		17.0	16.8	17.5	17.8	17.3
None		16.8	17.0	17.3	17.6	17.2
15		17.2	16.6	17.6	18.0	17.4
Difference		+0.4	-0.4	+0.3	+0.4	+0.2
Total sugar: cwt per acre						
Mean	(±2.37)	55.2	46.9	45.0	47.8	48.7
None	(±3.35)*	52.0	47.2	43.4	42.6	46.3
15	(±3.35)*	58.4	46.6	46.6	52.9	51.1
Difference	(±3.79)	+6.4	-0.6	+3.2	+10.3	+4.8
Tops: tons per acre						
Mean	(±0.566)	13.61	12.16	12.52	9.54	11.96
None	(±0.800)*	14.04	12.70	12.46	8.83	12.01
15	(±0.800)*	13.19	11.62	12.58	10.24	11.91
Difference	(±0.967)	-0.85	-1.08	+0.12	+1.41	-0.10

*For use in comparisons other than vertical.

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2nd Test crop

Barley

Dung in 1956: tons per acre		Previous rotation: Ley	Lucerne	Arable with hay	Arable with sugar beet	Mean
		Grain: cwt per acre				
None	(±1.56)*	32.1	31.2	29.8	27.3	30.1
15		35.5	35.5	36.2	33.3	35.1
Mean	(±0.98)	33.8	33.3	33.0	30.3	32.5
Difference	(±2.42)	+3.4	+4.3	+6.4	+6.0	+5.0 (±1.21)
		Straw: cwt per acre				
None		28.0	25.4	22.8	24.4	25.1
15		33.1	32.6	31.6	31.6	32.2
Mean		30.5	29.0	27.2	28.0	28.6
Difference		+5.1	+7.2	+8.8	+7.2	+7.1

*For use in comparisons other than vertical.

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WOBURN MARKET GARDEN EXPERIMENT

Organic manures and nitrogen - Lansome 1957, the 16th year.

For treatments etc., see "Details of the Classical and Long Term Experiments" 1956.

Note: The results for the 1957-58 leeks will be included in the 1958 report.

Area of each plot: 0.0125 acres. Area harvested: Leeks and globe beet - 0.0104 acres; early potatoes - 0.0085 acres.

Cultivations, etc.:

Leeks 1956-57. Organic manures applied: July 27, 1956. Ploughed: July 28 - 30. 'Nitro-Chalk' and basal fertilizers applied: July 31. Planted: Aug 1 - 4. Second dressing of 'Nitro-Chalk' applied: Nov 12. Harvested: Mar 28, 1957 - May 2. Variety: Musselburgh.

Early potatoes. Organic manures applied, all plots ploughed: Jan 15, 1957. Fertilizers applied on the flat: Mar 29. Machine planted: Apr 1. Earthed up: Apr 26. Sprayed with dieldrin at 2½ pints in 20 gallons per acre: June 14 (to act as bird deterrent). Lifted: July 15. Variety: Arran Pilot.

Globe beet. Ploughed: Aug 31, 1956. Organic manures applied, all plots ploughed: May 13, 1957. Ground chalk at 20 cwt per acre, 'Nitro-Chalk' and basal fertilizers applied: May 14. Seed drilled at 14 lb per acre: May 15. Sprayed with miscible DDT at 3 pints in 20 gallons per acre: June 6. Singled: June 24 - July 6. Second dressing of 'Nitro-Chalk' applied: July 10. Harvested: July 31 - Sept 5. Variety: Detroit.

Standard errors per plot:

Leeks 1956-57.	Saleable produce:	1.36 tons per acre or 30.5%	(17 d.f.)
Early potatoes.	Total tubers:	0.425 tons per acre or 9.2%	(17 d.f.)
Globe beet.	Saleable bulbs:	1.08 tons per acre or 12.9%	(17 d.f.)

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Summary of Results

Leeks 1956-57

Organic manures	Level of manuring: tons per acre	N: cwt per acre None	0.3	0.6	0.9	Mean
Saleable produce: tons per acre						
		(±0.961)				(±0.679)
None		3.37	4.19	4.91	2.41	3.78*
Dung	10	2.38	5.43			3.91
	20	4.29	4.09			4.19
Sludge compost	10	5.38	4.57			4.97
	20	3.69	4.37			4.03
Sludge	10	5.50	5.01			5.25
	20	5.52	4.56			5.04
Vegetable compost	10	5.51	4.29			4.90
	20	5.25	4.47			4.86
Mean (±0.340)		4.69+	4.60+			4.46
Percentage saleable (by number)						
None		95.1	88.9	97.5	88.2	92.0*
Dung	10	90.6	98.3			94.5
	20	96.7	95.9			96.3
Sludge compost	10	100.0	97.9			99.0
	20	97.1	99.4			98.2
Sludge	10	98.2	99.6			98.9
	20	99.8	98.0			98.9
Vegetable compost	10	99.2	96.9			98.1
	20	98.5	96.5			97.5
Mean		97.5+	97.8+			96.6

Early potatoes

Total tubers: tons per acre

		(±0.300)				(±0.212)
None		2.21	3.24	4.26	3.15	2.72*
Dung	10	4.13	5.29			4.71
	20	5.81	5.70			5.76
Sludge compost	10	3.93	4.71			4.32
	20	5.06	5.32			5.19
Sludge	10	4.29	3.54			3.92
	20	4.51	5.50			5.00
Vegetable compost	10	4.81	4.77			4.79
	20	5.19	6.58			5.88
Mean (±0.106)		4.72+	5.18+			4.60

*Mean over None and 0.3 cwt N per acre only.
+Excluding 'no organics'.

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Globe beet

Organic manures	Level of manuring: tons per acre	N: cwt per acre None	0.3	0.6	0.9	Mean
		Saleable bulbs: tons per acre (±0.762)				(±0.539)
None		2.26	3.33	5.57	6.08	2.80*
Dung	10	8.52	8.75			8.64
	20	11.38	13.76			12.57
Sludge compost	10	7.37	9.31			8.34
	20	10.95	11.78			11.36
Sludge	10	5.91	6.83			6.37
	20	7.99	7.37			7.68
Vegetable compost	10	8.06	10.60			9.33
	20	10.21	11.30			10.76
Mean (±0.270)		8.80+	9.96+			8.37
		Total produce (whole plants): tons per acre				
None		5.00	6.39	10.06	11.39	5.69*
Dung	10	13.43	14.32			13.88
	20	17.96	21.05			19.51
Sludge compost	10	12.55	15.83			14.19
	20	18.93	20.24			19.59
Sludge	10	11.00	12.46			11.73
	20	14.15	13.53			13.84
Vegetable compost	10	12.54	16.50			14.52
	20	15.34	17.20			16.27
Mean		14.49+	16.39+			13.99
		Plant number: thousands per acre				
None		84.8	81.5	91.4	85.1	83.1*
Dung	10	99.9	95.1			97.5
	20	91.9	92.2			92.0
Sludge compost	10	89.1	87.4			88.2
	20	92.4	100.3			96.3
Sludge	10	85.9	87.0			86.4
	20	89.1	82.7			85.9
Vegetable compost	10	92.0	84.9			88.5
	20	91.7	95.9			93.8
Mean		91.5+	90.7+			90.0

*Mean over None and 0.3 cwt N per acre only.
+Excluding 'no organics'.

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57/Bg/1.1

IRRIGATION EXPERIMENT

Revised 1957 (the 7th year)

The effects of irrigation and nitrogen - Woburn Butt Close 1957.

For details of previous cropping, treatments etc. see "Details of the Classical and Long Term Experiments" 1956.

The revised cropping comprises four series; three of these in turn carry the crops of a 3-course rotation:

1st year: Spring beans
2nd year: Sugar beet
3rd year: Spring wheat

The fourth series remains in long term cocksfoot ley for cutting.

Area of each sub plot (acres): Cut grass, 0.0264; remainder, 0.0278.
Area harvested (acres): Sugar beet, 0.0176; spring wheat, 0.0089; spring beans, 0.0082; cut grass, 0.0165.

Design: 3 randomized blocks of 4 plots each, plots being split into two for the application of nitrogen. In the case of the spring beans there is no test of nitrogen, but the plots are split at right angles to the old nitrogen split, in order to test the effect of dung.

Treatments. All combinations of:-

Whole plots. Irrigation and insecticide:

Sugar beet: nil (0); 3 levels of irrigation.
Spring wheat: nil (0); 1 level of irrigation.
Spring beans: (nil (0); irrigation) x (nil; insecticide spray).
Grass: nil (0); 3 levels of irrigation.

The insecticide spray was Metasystox, 60 gallons (12 oz. 50% active Metasystox) per acre.

Sub plots. Nitrogen applied to all crops except spring beans at 2 levels as under:

Dung (applied to spring beans only): None; 12 tons per acre.

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Rainfall and Irrigation: inches

Week ending	Rain-fall	Cut grass A	Cut grass B	Cut grass C	Sugar beet A	Sugar beet B	Sugar beet C	Wheat A & C	Beans C
May 6	.02			.50					.50
13	.79		.64	.64				.50	
20	.52								
27	.20								
June 3	-			.50				.50	.50
10	.82		.53	.50	.50		.50	.50	.50
17	-	.54	.50	.75	.75		.75		
24	.01	.96		.50				.75	.75
July 1	1.15	.17	.50	1.00	.75		.75		1.25
8	.26		.50	.50	.75		.75	.50	
15	.73				early	.28	.28	.50	.50
22	1.10			.48					irrigated
29	.56								
Aug 5	-								
12	1.65					.52	.52		
19	1.08					late			
26	.45								
Sept 2	.51								
9	.36								
16	.77								
23	.13								
30	1.25								
Total	12.36	1.67	2.67	5.37	2.75	.80	3.55	3.25	4.00

Note: On wheat 0 = B, A = C.

Levels of nitrogen (in addition to N in basal dressing): cwt N per acre

Sugar beet: None; 0.6 applied as 'Nitro-Chalk'.

Spring wheat: None; 0.4 applied as 'Nitro-Chalk'.

Spring beans: No test of nitrogen; residual effect of nitrogen to previous crop not measured.

Grass: 0.3; 0.6 applied as 'Nitro-Chalk' in spring and again after each cut, except the last.

Basal dressing (per acre): Sugar beet, 8½ cwt compound fertilizer (7% N, 7% P_2O_5, 10.5% K_2O), 5 cwt salt. Spring wheat, 6 cwt compound fertilizer (7% N, 7% P_2O_5, 10.5% K_2O). Spring beans, 4 cwt compound fertilizer (10% P_2O_5, 20% K_2O). Cut grass, 6 cwt compound fertilizer (10% P_2O_5, 20% K_2O).

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Cultivations, etc.:

Sugar beet. Ploughed: Nov 10, 1956. Ground chalk applied: Feb 27, 1957. Salt applied: Mar 4. Fertilizers applied: Apr 9. Seed drilled at 12 lb per acre: Apr 11. Singled: June 7 - 11. Lifted: Nov 1. Variety: Klein E.

Spring wheat. Ploughed: Dec 20, 1956. Fertilizers applied: Mar 15, 1957. Seed drilled at 3 bushels per acre: Mar 16. Combine harvested: Aug 21. Variety: Peko.

Spring beans. Ploughed: Nov 10, 1956 and Dec 20 - 21. Dung applied: Dec 20. Fertilizers applied: Mar 14, 1957. Seed drilled at 200 lb per acre: Mar 14. Sprayed with Metasystox: June 12. Combine harvested: Aug 21. Variety: Garton's Spring Tick.

Grass. Basal fertilizers applied: Autumn. 'Nitro-Chalk' applied: Mar 7, 1957. Cut 8 times (all plots): Apr 23, May 24, June 19, July 12, Aug 16, Sept 10, Nov 5. 'Nitro-Chalk' applied after each cut except the last. Variety: Cocksfoot S37.

Standard errors per plot.

Sugar beet.	Total sugar,	whole plot:	1.27 cwt per acre or 2.1% (6 d.f.)
		sub plot:	4.42 cwt per acre or 7.4% (8 d.f.)
	Tops,	whole plot:	.705 tons per acre or 4.5% (6 d.f.)
		sub plot:	.982 tons per acre or 6.2% (8 d.f.)
Spring wheat.	Grain (at 85% D.M.),	whole plot:	4.55 cwt per acre or 16.2% (8 d.f.)
		sub plot:	3.21 cwt per acre or 11.4% (10 d.f.)
Spring beans.	Grain (at 85% D.M.),	whole plot:	1.62 cwt per acre or 7.2% (6 d.f.)
		sub plot:	1.48 cwt per acre or 6.5% (8 d.f.)
Cut grass.	Dry matter,	whole plot:	5.10 cwt per acre or 6.2% (6 d.f.)
		sub plot:	2.11 cwt per acre or 2.6% (8 d.f.)

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Summary of Results

Sugar beet

N: cwt per acre including basal	Irrigation 0	A	B	C	Mean
Roots (washed): tons per acre					
		(±0.531)*			
0.6	16.64	15.70	16.74	16.23	16.33
1.2	17.83	17.92	16.76	17.21	17.43
Mean (±0.192)	17.23	16.81	16.75	16.72	16.87
Diff. (±0.990)	+1.19	+2.22	+0.02	+0.98	+1.10 (±0.495)
Sugar percentage					
		(±0.23)*			
0.6	18.0	17.7	17.9	18.3	18.0
1.2	17.8	17.7	17.3	17.5	17.6
Mean (±0.16)	17.9	17.7	17.6	17.9	17.7
Diff. (±0.34)	-0.2	0.0	-0.6	-0.8	-0.4 (±0.17)
Total sugar: cwt per acre					
		(±1.95)*			
0.6	59.9	55.6	59.7	59.3	58.6
1.2	63.6	63.4	58.1	60.1	61.3
Mean (±0.73)	61.7	59.5	58.9	59.7	59.9
Diff. (±3.61)	+3.7	+7.8	-1.6	+0.8	+2.7 (±1.80)
Tops: tons per acre					
		(±0.571)*			
0.6	12.86	12.85	13.04	10.21	12.24
1.2	18.72	19.33	19.66	19.96	19.42
Mean (±0.406)	15.79	16.09	16.35	15.08	15.82
Diff. (±0.802)	+5.86	+6.48	+6.62	+9.75	+7.18 (±0.401)

*For use in comparisons other than vertical.

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Spring wheat

Grain (at 85% dry matter): cwt per acre

N: cwt per acre including basal	Irrigation 0 & B	A & C	Mean
	(±2.08)*		
0.4	25.4	28.0	26.7
0.8	25.8	33.0	29.4
Mean (±1.86)	25.6	30.5	28.1
Diff. (±1.85)	0.4	5.0	2.7 (±1.31)

*For use in comparisons other than vertical.

Mean dry matter % as harvested: 81.9

Spring beans

Grain (at 85% dry matter): cwt per acre

Dung: tons per acre	Irrigation 0	C	OS	CS	Mean
		(±1.11)*			
None	13.1	30.7	14.6	30.3	22.2
12	16.4	29.7	16.3	30.6	23.3
Mean (±0.93)	14.8	30.2	15.5	30.4	22.7
Diff. (±1.21)	+3.3	-1.0	+1.7	+0.3	+1.1 (±0.60)

*For use in comparisons other than vertical.

Mean dry matter % as harvested: 74.7

C = Irrigation
S = Metasystox spray.

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Cut grass

Dry matter: cwt per acre

(Total of 8 cuts)

N: cwt per acre including basal	Irrigation 0	A	B	C	Mean
		(±3.06)*			
0.3	63.0	69.7	70.0	81.5	71.0
0.6	84.3	92.6	94.7	101.1	93.2
Mean (±2.93)	73.6	81.1	82.3	91.3	82.1
Diff. (±1.72)	21.3	22.9	24.7	19.6	22.2 (±0.86)

*For use in comparisons other than vertical.

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