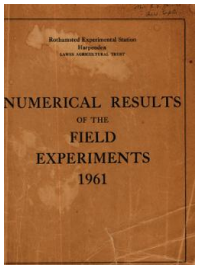
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ROTHAMSTED RESEARCH

Yields of the Field Experiments 1961

Full Table of Content



Yields of the Field Experiments 1961 - Numerical Results

Rothamsted Research

Rothamsted Research (1962) *Yields of the Field Experiments 1961 - Numerical Results ;* Yields Of The Field Experiments 1961, pp 1 - 146 **- DOI: https://doi.org/10.23637/ERADOC-1-182**

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LAWES AGRICULTURAL TRUST

NUMERICAL RESULTS OF THE FIELD EXPERIMENTS 1961

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Rothamsted Experimental Station

Harpenden

Lawes Agricultural Trust

NUMERICAL RESULTS

of the

FIELD

EXPERIMENTS

1961

The summaries given in this report are similar to those contained in the appendices to the Annual Reports of the Station before the war. This year's report includes only experiments conducted at Rothamsted and Woburn. The design and supervision of these experiments are the responsibility of the Field Plots Committee (present members: F. Yates (Chairman), G. V. Dyke, (Secretary), G. W. Cooke, H. V. Garner, P. H. Gregory, J. R. Moffatt, C. A. Thorold, R. C. Warren, D. J. Watson).

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Index 1961

Classical Experiments*

Broadbalk	Wheat	A/1
Hoosfield	Barley	A/2
Hoosfield	Wheat after fallow	A/3
Agdell	Grass and multiple crops	A/4
Park Grass	Hay	A/5
Hoosfield Exhaustion Land	Barley	A/6
Rothamsted Garden	Clover	A/7
Stackyard Woburn	Wheat and barley and microplots	A/8

Rotation Experiments

Ley and arable rotations	Rothamsted	B/1
Reference plots	Rothamsted and Woburn	B/2
Green manuring	Woburn	B/3
Ley and arable rotations	Woburn	B/4
Market Garden Soil	Woburn	B/5
Irrigation	Woburn	B/6
Concentrated fertiliser rotation	Rothamsted	B/7
Residual phosphate rotation	Rothamsted	B/8
N levels and residues rotation	Rothamsted	B/9
Weedkiller-cultivation rotation	Rothamsted	B/10
Weedkiller-cultivation rotation	Woburn	B/11

Crop Sequence Experiments

	Crops in 1961	
Cereal-bean rotations	Wheat and barley (test crops)	C/1
One year leys for wheat	Ryegrass ley	C/2
Grass species testing N and K	Spring wheat (test crop)	C/3
Straw and ryegrass green manure	Barley (test crop)	C/4
Trefoil and ryegrass green manures Woburn	Barley (test crop)	C/5
Trefoil and ryegrass green manures Woburn	Sugar beet (test crop)	C/6
Effect of K, Mg and Ca Rothamsted and Woburn	Ryegrass, 3rd year	C/7
Intensive barley growing	Cereals and beans	C/8

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Annual Experiments*

Winter wheat	Weedkillers on Take-All	Da/1
Winter wheat	Varieties and N	Da/2
Spring wheat	Combine drilling of N - Woburn	Da/3
Wheat	Sowing dates, seed rates and N (after non-cereal crop)	Da/4
Wheat	Sowing dates, seed rates and N (after cereal crop)	Da/5
Barley	Forms and application of N	Db/1
Barley	Levels and application of P	Db/2
Barley	Control of wild oats - Rothamsted and Woburn	Db/3
Spring oats	Frit fly study (sowing dates)	Dc/1
Spring beans	Levels of chalk	Dd/1
Spring beans	Control of weeds	Dd/2
Spring beans	Varietal susceptibility to virus	Dd/3
Spring beans	Control of aphids (insecticides)	Dd/4
Potatoes	Forms and levels of K	De/1
Potatoes	Time of burning off haulm	De/2
Potatoes	Azotobacter inoculation	De/3
Potatoes	Control of weeds - Rothamsted and Woburn	De/4
Sugar beet	Control of virus spread (insecticides)	Df/1
Grass	Levels of N and K - 4th year	Dg/1
Lucerne	Control of weeds - Simazine and row spacing - Woburn	Dh/1
Carrots	Motley dwarf virus	Di/1

Miscellaneous Data

Meteorological records	Rothamsted and Woburn	E/1

*At Rothamsted unless otherwise stated.

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61/A/1.1

WHEAT - BROADBALK 1961

The 118th year

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

Cultivations, etc.:

Cropped sections. Ground chalk applied: Oct 1, 1960. Ploughed: Oct 4. Dung applied and ploughed in: Oct 10. Autumn fertilisers applied: Jan 17, 1961. Seed drilled at 3 bushels per acre: Jan 18. Spring fertilisers applied: Apr 17. Second dressing of nitrate of soda applied to plot 16: May 3. Section IA sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 5. Combined: Sept 1. Variety: Squarehead's Master 13/4.

Fallow section. (Ib) Ploughed: Oct 4, 1960; June 12, 1961; July 17.

Broadbalk Wilderness. N.

Cultivations, etc.: Shrubs grubbed out: Nov 18 - Dec 6, 1960. Part grazed: Dec 30 - Jan 2, 1961; Apr 12 - May 1; May 23 - 30; June 20 - 23; Aug 10 - 15; Sept 24 - 28. The grass was topped after each grazing except the first and the last.

Summary of Results

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

Section	III	IV	VA	VB	II	IA	
Years after fallow	1	2	unlimed 3	limed 3	4	10	Mean
2A	27.7	21.6	19.0	14.8	17.9	15.8	20.6
2B	28.2	22.1	7.6	17.0	21.8	17.0	20.7
3	15.8	10.1	11.5	11.1	12.7	11.4	12.4
5	20.2	13.5	11.6	10.8	14.0	11.8	14.5
6	24.4	16.1	10.1	11.6	16.3	15.1	16.8
7	22.8	16.4	9.6	11.1	18.6	17.6	17.0
8	19.9	13.4	6.8	11.8	23.7	14.9	16.4
9	19.2	15.3	12.7	11.6	17.2	13.1	15.8
10	13.6	19.1	17.8	19.9	20.8	15.9	18.0
11	16.5	16.4	11.6	10.2	16.5	11.6	14.8
12	16.7	15.5	10.5	9.9	16.4	15.7	14.7
13	21.9	10.7	6.8	8.7	19.5	16.5	15.0
14	20.2	10.9	9.0	10.8	14.2	16.8	13.9
15	29.0	11.9	6.8	11.9	16.0	17.2	16.5
16	23.5	15.8	14.6	15.0	21.3	13.7	18.5
17	17.4	9.6	9.0	7.9	10.0	8.9	11.2
18	20.8	18.4	15.8	14.3	21.0	12.7	18.4
19	14.0	6.5	8.5	11.6	14.6	13.3	11.4
20					13.9	13.0	13.6

Mean dry matter % as harvested: 84.4

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61/A/1.2

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

Section	III	IV	VA	VB	II	IA	
Years after fallow	1	2	unlimed 3	limed 3	4	10	Mean
2A	37.4	21.4	25.3	24.3	22.7	21.1	26.1
2B	39.1	26.0	26.6	28.7	29.1	19.6	29.7
3	20.2	8.1	9.5	10.9	10.5	9.6	12.1
5	25.4	13.7	15.8	16.4	18.1	12.7	18.0
6	31.0	19.5	17.5	19.5	19.6	20.7	22.0
7	32.9	24.4	20.6	24.0	26.3	23.4	26.3
8	42.9	29.6	27.8	33.1	37.3	29.3	34.7
9	29.3	21.1	20.7	20.7	19.4	23.2	22.6
10	19.8	21.0	18.8	23.3	21.8	16.9	20.7
11	25.3	20.2	17.8	16.4	18.0	16.7	19.9
12	25.5	23.1	18.6	17.5	20.9	18.9	21.7
13	37.0	20.7	18.0	25.3	29.4	26.6	27.1
14	31.1	21.0	17.3	17.0	19.5	22.8	22.2
15	40.8	17.0	12.8	23.0	23.1	25.0	24.6
16	40.6	29.6	32.9	32.7	32.9	27.1	33.6
17	22.0	9.6	14.6	16.1	12.2	10.3	14.5
18	33.5	26.3	29.4	29.2	28.9	25.2	29.2
19	23.5	10.0	36.3	22.1	17.8	21.5	20.3
20					18.3	19.1	18.5

Mean dry matter % as harvested: 81.5

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61/A/2.1

BARLEY - HOOSFIELD 1961

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

In 1961 all strips drilled for combining were taken for grain yields, except on plots 1N, 2N, 5-0 and 5A where one of the inner two strips only was taken.

For straw yields one of the inner two strips was taken on each plot, except on plots 6-1 and 6-2 where the centre strip of the three, and on plots 7-1 and 7-2 where the northern one of the two, was taken.

Cultivations, etc.: Sprayed with dalapon at 10 lb in 40 gallons per acre: Sept 24, 1960; and again at 5 lb in 40 gallons per acre: Oct 11. Dung applied: Dec 12. Ploughed: Dec 13. Minerals applied: Mar 28, 1961. Nitrogen fertilisers applied: Apr 4. Seed drilled at $2\frac{3}{4}$ bushels per acre: Apr 12. Strips 1, 2 and 3 sprayed with MCPA at $6\frac{1}{2}$ pints in 40 gallons per acre; and strips 4, 6 and 7 sprayed with CMPP at 6 pints in 40 gallons per acre: May 19. Combined: Aug 28. Variety: Plumage Archer.

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61/A/2.2

Summary of Results

Plot	Grain (at 85% dry matter): cwt per acre	Straw (at 85% dry matter): cwt per acre
1 0	10.4	5.6
2 0	13.6	6.6
3 0	9.9	4.6
4 0	14.0	7.3
5 0	10.8	4.4
1 A	12.2	8.3
2 A	20.2	12.9
3 A	14.6	10.1
4 A	24.3	16.0
5 A	18.4	15.9
1 AA	13.7	10.5
2 AA	24.1	15.1
3 AA	14.7	9.5
4 AA	24.6	16.5
1 AAS	20.1	11.9
2 AAS	25.9	15.0
3 AAS	19.4	12.3
4 AAS	26.3	15.1
1 C	21.9	12.2
2 C	25.0	14.0
3 C	21.5	13.9
4 C	27.3	16.2
7 - 1	12.8	6.3
7 - 2	26.4	15.8
6 - 1	9.2	5.1
6 - 2	11.1	5.9
1 N	11.6	8.1
2 N	17.6	10.8
Mean dry matter % as harvested:	85.2	87.2

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61/A/3

WHEAT AFTER FALLOW - HOOSFIELD 1961

Without manure 1851 and since

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

Area harvested: 0.0331 acres.

Cultivations, etc.:
Cropped plots. Ploughed: Sept 21, 1960. Seed sown at 3 bushels per acre: Jan 17, 1961. Combine harvested: Sept 1. Variety: Squarehead's Master 13/4.
Fallowed plots. Ploughed three times: Sept 21, 1960; June 14, 1961; July 18.

Note: Counts of straw number and estimates of Eyespot (Cercosporella herpotrichoides) and Take-all (Ophiobolus graminis) were made.

Summary of Results

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

Plot	B_2	B_3	B_4	Mean
No. of years of fallow	1	1	3	
	10.0	8.9	10.0	9.6

Mean dry matter % as harvested: 82.7

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61/A/4.1

GRASS AND MULTIPLE CROPPING AND DIRECT AND RESIDUAL P

AGDELL 1961

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

Multiple cropping 1961

In order to investigate further the residues of past treatments by testing methods of incorporating P fertiliser in the soil, the crop strips on 3 of the old rotation plots (numbers 1, 3 and 5) were split lengthways to give two sub plots for each of the three 1959 treatments. The new sub plots carry the treatments described below. The areas carrying strip crops in 1960 on plots numbers 2, 4 and 6 were bare fallowed. Yields were taken from the cocksfoot ley sown in 1960.

Rotation (commencing 1959): barley, potatoes, sugar beet.

Area of each sub plot (acres): 0.0050. Area harvested: 0.0035.

Treatments per acre: None; 0.75; 1.50 cwt P_2O_5 either ploughed in or applied in seedbed; also 0.75 cwt P_2O_5 ploughed in plus 0.75 cwt P_2O_5 in seedbed; 1.5 cwt P_2O_5 ploughed in plus 1.5 cwt P_2O_5 in seedbed. P_2O_5 as superphosphate; for potatoes "seedbed" P was applied in bouts.

Basal dressings per acre. To grass: as 1959.
To barley: 0.3 cwt K_2O ploughed in, and 0.6 cwt N, 0.6 cwt K_2O broadcast in seedbed as compound fertiliser, 16% N, 16% K_2O.
To potatoes: 0.6 cwt K_2O ploughed in, 0.6 cwt K_2O after ploughing, 1.2 cwt N and 1.2 cwt K_2O as compound fertiliser, 16% N, 16% K_2O applied to ridged land before planting.
To sugar beet: 1.0 cwt K_2O ploughed in, 1.0 cwt K_2O after ploughing, 1.0 cwt N and 1.0 cwt K_2O as compound fertiliser, 16% N, 16% K_2O broadcast in seedbed.

Note: Apart from the NK compound fertiliser, K_2O was applied as sulphate of potash.

Cultivations, etc.:
Grass. 'Nitro-Chalk' applied: Mar 9, 1961. Cut 3 times: May 17, July 18, Sept 15. 'Nitro-Chalk' applied after 2nd cut.
Fallow areas. Ploughed: Jan 17, 1961. Rotary cultivated: May 11, June 3.
Microplots. Fertilisers applied for ploughing in: Dec 5, 1960. Ploughed: Jan 17, 1961.
Barley: Seedbed fertilisers applied, seed drilled at 3 bushels per acre: Mar 16, 1961. Harvested: Aug 9. Variety: Proctor.
Potatoes: K applied after ploughing: Mar 7, 1961. Rotary cultivated and ridged, fertilisers applied in the bouts: Apr 25. Potatoes planted: May 1.

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Sprayed 3 times with demeton methyl at 12 fluid oz in 40 gallons per acre: June 7 and 16, July 11. Sprayed twice with copper fungicide at 5 lb in 40 gallons per acre: Aug 15, Sept 1. Lifted: Sept 25. Variety: Majestic (chitted).

Sugar beet. K applied after ploughing: Mar 7, 1961. Seedbed fertilisers applied, seed drilled at 20 lb per acre: Mar 23. Singled: May 29. Sprayed 3 times with demeton methyl at 12 fluid oz in 40 gallons per acre: June 7 and 16, July 11. Lifted: Oct 10. Variety: Klein E.

Summary of Results

Manure to turnips until 1948	None since 1848		Mineral manure* no nitrogen		Mineral* and nitrogeneous manure+		
Plot	5	6	3	4	1	2	
Rotation	Fallow	Clover	Fallow	Clover	Fallow	Clover	Mean
Grass dry matter: cwt per acre							
1st cut	17.2	13.2	31.5	31.4	34.3	26.9	25.8
2nd cut	11.3	12.5	16.7	17.8	19.1	17.8	15.9
3rd cut	9.1	7.8	14.6	13.4	17.8	14.9	13.0
Total of 3 cuts	37.7	33.6	62.8	62.6	71.3	59.6	54.6

Mean dry matter % as cut:

1st cut	22.8
2nd cut	27.0
3rd cut	25.2
Total of 3 cuts	25.0

*P, K, Na, Mg.

+Rape dust (or castor meal + ammonium sulphate).

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Fallow rotation only

Manure to turnips until 1948 Plot	None since 1848 5	Mineral* manure no nitrogen 3	Mineral* and nitrogenous+ manure 1	Mean
Barley, Grain (at 85% dry matter): cwt per acre				
P_2O_5 cwt per acre				
None	19.0	27.7	13.7	20.1
Ploughed in				
0.75	16.4	30.9	7.8	18.4
1.50	24.1	23.4	32.4	26.6
Broadcast				
0.75	25.5	32.5	27.9	28.6
1.50	18.7	32.6	22.6	24.6
½ Ploughed in ½ Broadcast				
1.50	22.5	31.8	24.5	26.3
3.00	31.2	29.6	31.8	30.9
Mean	22.0	29.5	21.8	24.5
Barley, Straw (at 85% dry matter): cwt per acre				
P_2O_5 cwt per acre				
None	33.8	46.5	32.8	37.7
Ploughed in				
0.75	31.8	55.7	28.8	38.8
1.50	40.1	49.6	57.3	49.0
Broadcast				
0.75	42.7	62.7	48.6	51.3
1.50	38.4	57.7	42.3	46.1
½ Ploughed in ½ Broadcast				
1.50	44.5	54.2	45.8	48.2
3.00	51.4	53.5	56.9	53.9
Mean	39.6	53.3	43.2	45.3

Mean dry matter % as harvested: Grain 78.7
Straw 52.9

*P, K, Na, Mg.

+Rape dust (or castor meal + ammonium sulphate).

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Fallow rotation only

Manure to turnips until 1948 Plot	None since 1848 5	Mineral* manure no nitrogen 3	Mineral* and nitrogeneous manure 1	Mean
Potatoes, total tubers: tons per acre				
P_2O_5 cwt per acre				
None	8.26	12.04	8.76	9.69
Ploughed in				
0.75	9.71	11.05	11.03	10.60
1.50	9.23	12.58	11.79	11.20
Broadcast				
0.75	9.54	11.36	11.79	10.90
1.50	9.47	11.86	12.21	11.18
½ Ploughed in ½ Broadcast				
1.50	9.93	12.96	10.48	11.12
3.00	9.90	12.02	12.48	11.47
Mean	9.29	11.99	10.91	10.73
Sugar beet, Roots (washed): tons per acre				
P_2O_5 cwt per acre				
None	15.14	19.64	17.06	17.28
Ploughed in				
0.75	17.32	25.03	15.43	19.26
1.50	15.46	20.47	15.66	17.20
Broadcast				
0.75	15.19	17.91	16.24	16.45
1.50	17.53	20.32	18.47	18.78
½ Ploughed in ½ Broadcast				
1.50	18.17	21.80	20.08	20.02
3.00	17.66	24.63	20.72	21.00
Mean	16.45	21.18	17.59	18.41
Sugar beet, Sugar percentage				
P_2O_5 cwt per acre				
None	15.7	15.9	15.9	15.8
Ploughed in				
0.75	16.4	15.4	15.8	15.9
1.50	16.1	16.0	16.2	16.1
Broadcast				
0.75	15.7	16.2	15.7	15.9
1.50	15.3	16.4	15.7	15.8
½ Ploughed in ½ Broadcast				
1.50	15.8	16.4	16.0	16.1
3.00	16.2	16.5	16.1	16.3
Mean	15.9	16.1	15.9	16.0

*P, K, Na, Mg.

+Rape dust (or castor meal + ammonium sulphate).

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Fallow rotation only

Manure to turnips until 1948 Plot	None since 1848 5	Mineral* manure no nitrogen 3	Mineral* and nitrogeneous manure 1	Mean
Sugar beet, Total sugar: cwt per acre				
P_2O_5 cwt per acre None	46.9	62.0	53.8	54.2
Ploughed in 0.75	56.0	76.4	48.0	60.1
1.50	49.4	64.2	49.5	54.4
Broadcast 0.75	46.8	57.5	49.9	51.4
1.50	53.6	66.0	57.0	58.9
½ Ploughed in ½ Broadcast 1.50	57.1	70.7	63.2	63.7
3.00	56.5	80.7	65.7	67.7
Mean	51.7	67.5	55.1	58.1
Sugar beet, Tops: tons per acre				
P_2O_5 cwt per acre None	11.48	12.72	12.64	12.28
Ploughed in 0.75	11.35	16.74	10.66	12.92
1.50	10.55	12.28	11.05	11.29
Broadcast 0.75	10.80	11.23	14.11	12.05
1.50	13.70	15.43	14.17	14.44
½ Ploughed in ½ Broadcast 1.50	13.29	11.99	13.06	12.78
3.00	13.16	16.68	14.47	14.77
Mean	11.98	13.73	12.85	12.85

*P, K, Na, Mg.

+Rape dust (or castor meal + ammonium sulphate).

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61/A/5

HAY - THE PARK GRASS PLOTS 1961

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

Cultivations, etc.: Mineral fertilisers applied: Dec 9, 1960. Dung applied to appropriate plots: Dec 12. Nitrogenous fertilisers applied: 1st dressing - Mar 28, 1961; 2nd dressing - Apr 26. Cut twice: June 20 and Sept 21.

Summary of Results

Dry matter: cwt per acre

Plot	Not limed 1st crop	Not limed 2nd crop	Not limed Total	Limed 1st crop	Limed 2nd crop	Limed Total
1	9.2	3.5	12.7	25.4	6.4	31.8
2	14.1	5.0	19.1	23.6	6.4	30.0
3	11.1	3.5	14.6	22.6	5.2	27.8
4-1	20.0	5.4	25.4	23.3	5.3	28.6
4-2	20.9	5.9	26.8	30.0	5.9	35.9
5-1	11.0	4.5	15.5			
5-2	21.1	9.4	30.5			
6	28.0	8.9	36.9			
7	29.9	7.3	37.2	48.4	16.9	65.3
8	21.2	5.2	26.4	24.5	7.0	31.5
9	43.4	7.3	50.7	50.4	7.4	57.8
10	27.8	7.8	35.6	38.1	6.6	44.7
11-1	55.9	14.5	70.4	53.4	14.1	67.5
11-2	57.1	17.9	75.0	57.1	19.3	76.4
12	14.5	6.2	20.7			
13	42.0	11.5	53.5	44.1	19.2	63.3
14	43.5	10.1	53.6	50.0	8.5	58.5
15	31.4	7.5	38.9	42.4	11.6	54.0
16	35.8	7.4	43.2	45.5	12.0	57.5
17	23.8	4.1	27.9	30.2*	4.7*	34.9*
18	16.5	3.1	19.6	26.4+	4.1+	30.5+
				26.1*	4.3*	30.4*
19	41.3	9.6	50.9	49.0*	11.7+	60.7+
				43.7+	12.5*	56.2*
20	46.2	12.1	58.3	48.8*	12.2+	61.0+
				41.1+	13.5+	54.6+

*Heavy liming. +Light liming.

Mean dry matter % as cut: 1st crop 27.7; 2nd crop 28.4

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BARLEY - EXHAUSTION LAND HOOSFIELD 1961

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

Basal dressing: 0.5 cwt N per acre as 'Nitro-Chalk'.

Cultivations, etc.: Sprayed with dalapon at 10 lb in 40 gallons per acre: Oct 12, 1960; and again at 5 lb in 40 gallons per acre: Nov 14. Ploughed: Dec 16. 'Nitro-Chalk' applied: Mar 29, 1961. Seed drilled at 2¾ bushels per acre: Apr 12. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 19. Combine harvested: Aug 29. Variety: Plumage Archer.

Summary of Results

Barley

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

Plots not cross cropped in 1957 and 1958

Plot.	Manuring to potatoes 1876 - 1901*	Grain	Straw
2	Unmanured after dung 1876 - 81	15.8	10.0
4	Dung	25.5	15.4
6	Nitrate of soda	15.6	10.0
8	Nitrate of soda and complete minerals	21.8	12.8
10	Complete minerals	23.6	12.2

Plots cross cropped in 1957 and 1958

Plot.	Manuring to potatoes 1876 - 1901*	Grain	Straw
1	Unmanured	17.5	11.0
3	Dung	23.9	14.7
5	Ammonium salts	17.0	10.2
7	Ammonium salts and complete minerals	21.5	13.4
9	Superphosphate	22.4	13.2
Mean dry matter % as harvested (all plots):		86.3	89.9

*For certain changes see history.

Erratum: "Results of the Field Experiments" 1960 p. 60/A/6. In the Summary of Results delete the words 'and combine harvested in 1959' from both headings.

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61/A/7

CLOVER - ROTHAMSTED GARDEN 1961

The 108th year

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

Molybdenum test 1961: The two plots were sub-divided as in 1960 for a test of molybdenum:-

None; 1 lb sodium molybdate per acre, applied by adding the appropriate quantity in solution in water to dry sand, broadcasting and raking in.

Cultivations, etc.: Muriate of potash applied at 2 cwt per acre: Nov 16, 1960. Ground chalk applied at 30 cwt per acre, plots dug and old clover plants removed: Mar 16, 1961. Second dressing of muriate of potash at 2 cwt per acre and ground chalk at 30 cwt per acre applied: Mar 17. Sodium molybdate applied and seed sown at 40 lb per acre: Apr 13. Cut twice: Sept 4 and Nov 1. Variety: Late Flowering Red S123.

Note: Germination on the perimeter of the area of the plots was poor. This was still noticeable at the time of the 1st cut; but the plant had evened out at the time of the second cut.

Summary of Results

Dry matter: cwt per acre

Muriate of potash: cwt per acre	Spray: None	Spray: Sodium molybdate	Mean
1st cut			
None	6.7	1.4	4.0
4	21.2	12.9	17.0
Mean	14.0	7.2	10.6
2nd cut			
None	2.4	0.4	1.4
4	7.4	8.2	7.8
Mean	4.9	4.3	4.6
Total of 2 cuts			
None	9.1	1.8	5.4
4	28.6	21.1	24.8
Mean	18.8	11.4	15.2

Mean dry matter % as harvested:

1st cut	17.2
2nd cut	17.0
Total of 2 cuts	17.1

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61/A/8.1

WHEAT AND BARLEY, AND BARLEY, POTATO AND SUGAR BEET MICROPLOTS - WOBURN STACKYARD 1961

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

Strip cropping and microplots 1961: Wheat and barley were sown in strips as in 1960. The microplots were continued with crops interchanged, and were extended to include a strip of sugar beet along their south eastern edge, following wheat in 1960. Plots 7, 8 and 9 of the Continuous Wheat experiment were bare fallowed.

Area of each main plot (acres):		Area harvested (acres):	
10a - 11b	0.0274	10	0.0200
		11 Wheat -	0.0100,
		Barley -	0.0200
Remainder	0.0411	Variable	0.0070 - 0.0240

Area of each microplot (acres):		Area harvested (acres):	
11a and 11b	0.0034	Barley	0.0019
		Potatoes	0.0014
		Sugar beet	0.0017
Remainder	0.0026	Barley	0.0013
		Potatoes	0.0010
		Sugar beet	0.0012

Treatments to microplots only, either ploughed in or applied in seedbed (on flat before planting potatoes):

P test. None; 0.25 (P_1); 1.0 (P_4) cwt P_2O_5 per acre (barley, potatoes and sugar beet). Basal dressing: K at highest rate tested on each crop, ploughed in.

K test. None; 0.15 (K_1); 0.60 (K_4) cwt K_2O per acre (barley).
None; 0.45 (K_3); 1.80 (K_{12}) cwt K_2O per acre (potatoes).
None; 0.9 (K_6); 3.6 (K_{24}) cwt K_2O per acre (sugar beet).
Basal dressing: 1.0 cwt P_2O_5 per acre ploughed in.
P as superphosphate, K as sulphate of potash.

Note: A measurement of the residues of 1960 treatments P_4, K_4 and K_8 was made and the plots concerned received basal N and P or K at appropriate rates.

Basal dressings per acre (N as 'Nitro-Chalk'):-
To wheat and barley: 0.9 cwt N.
To microplots (P test and K test):-
Potatoes: 1.2 cwt N.
Barley: 0.6 cwt N.
Sugar beet: 1.0 cwt N.

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Cultivations, etc.:

Wheat: Ploughed: Sept 26, 1960. Seed drilled at 3 bushels per acre: Jan 17, 1961. Winter wheat ploughed in owing to bird damage: Mar 21. 'Nitro-Chalk' applied, seed drilled at 3 bushels per acre: Mar 22. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 9. Combine harvested: Aug 28. Variety: Jufy I.

Barley: Ploughed twice: Sept 27, 1960 and Feb 10, 1961. 'Nitro-Chalk' applied, seed drilled at 3 bushels per acre: Mar 9. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 9. Combine harvested: Aug 28. Variety: Plumage Archer.

Microplots. Basal PK and ploughed in treatment fertilisers applied: Jan 24, 1961. Plots ploughed: Jan 25.

Potatoes: Basal N and broadcast treatment fertilisers applied on the flat, chitted seed planted by machine: Mar 22, 1961. Sprayed twice with demeton methyl at 12 fluid oz in 40 gallons per acre: June 6 and July 11. Sprayed twice with copper fungicide at 5 lb in 40 gallons per acre: Aug 18 and Aug 31. Lifted: Sept 21. Variety: Majestic.

Barley: Basal N and broadcast treatment fertilisers applied, seed drilled at 2¾ bushels per acre: Mar 9, 1961. Harvested: Aug 10. Variety: Plumage Archer.

Sugar beet: Basal N and broadcast treatment fertilisers applied, seed drilled at 12 lb per acre: Apr 12, 1961. Lifted: Oct 16. Variety: Klein E.

Erratum to "Results of the Field Experiments" 1960.

Page 60/A/8.1 the 4th line should read "strips as in 1959 ... "

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61/A/8.3

Summary of Results

Main plots

Crop in 1961 / Crop in old scheme	Spring wheat: Continuous wheat	Spring wheat: Continuous barley	Barley: Continuous wheat	Barley: Continuous barley
Grain (at 85% dry matter): cwt per acre				
Plot 1	4.1	8.8	14.9	8.9
2	5.6	8.6	10.1	12.3
3	10.0	10.5	12.7	10.8
4	5.5	10.7	21.7	15.7
5	9.3	15.3	18.9	15.3
6	16.2	20.9	21.5	19.6
7	13.0	11.7		
8	11.2	12.7		
9	16.3	14.9		
10 ax	14.1	12.8	13.6	14.5
10 bx	15.0	15.0	14.1	9.7
10 ay	14.2	14.7		
10 by	18.4	20.2		
11 ay			20.0	18.0
11 by			23.3	19.1
11 az	15.2	9.8		
11 bz	14.2	12.5		
Straw (at 85% dry matter): cwt per acre				
Plot 1	10.4	12.3	9.1	5.1
2	7.1	7.9	5.5	4.5
3	10.0	9.2	5.6	5.5
4	14.8	11.0	13.2	7.1
5	9.7	11.4	8.7	7.0
6	11.5	18.8	11.1	10.5
7	11.9	11.4		
8	13.2	21.5		
9	15.4	21.9		
10 ax	9.3	12.0	4.7	6.3
10 bx	10.6	11.4	5.3	4.8
10 ay	9.1	14.6		
10 by	11.1	13.3		
11 ay			8.1	6.5
11 by			12.7	9.8
11 az	17.6	13.9		
11 bz	26.5	19.4		

Mean dry matter % as harvested:	Grain	84.4	85.2
	Straw	89.7	90.8

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Microplots

Crop in old scheme	Continuous wheat	Barley		Continuous barley	
Treatment	11a & 11b	11a 11b	9	8	7
P K	Grain (at 85% dry matter): cwt per acre				
0 4		20.9	25.3	25.1	22.2
1 4		21.9	25.7	24.4	23.7
4 4		25.8	24.9	27.2	25.5
(4)4		24.7	25.4	24.1	19.2
0 4*		26.1	25.4	23.4	17.9
1 4*		27.2	26.6	26.4	20.6
4 4*		24.7	27.9	23.8	21.2
(4)4*		28.1	23.6	23.9	17.9
4 0	26.0		22.1	22.8	25.6
4 1	26.5		25.4	25.9	27.6
4 4	24.5		26.3	24.6	27.0
4(8)	25.1		25.7	27.4	27.9
4 0*	23.5		28.1	25.4	25.9
4 1*	24.5		27.2	27.9	25.6
4 4*	26.0		25.7	25.7	26.2
4(8)*	23.4		28.4	24.2	25.8

Mean dry matter % as harvested: 84.3

P K	Straw (at 85% dry matter): cwt per acre				
0 4		24.8	32.2	22.8	25.4
1 4		29.4	27.1	29.5	25.3
4 4		35.2	36.4	30.2	31.9
(4)4		32.3	33.1	27.9	23.7
0 4*		31.7	32.5	30.2	20.8
1 4*		32.1	32.5	30.2	22.8
4 4*		36.4	36.7	35.2	24.0
(4)4*		25.3	25.8	29.5	21.0
4 0	36.0		34.9	26.7	29.2
4 1	30.4		32.0	30.9	31.0
4 4	39.4		32.7	27.9	31.7
4(8)	35.4		30.9	31.1	32.1
4 0*	32.6		33.1	33.3	30.1
4 1*	34.9		30.4	31.4	29.1
4 4*	33.8		29.6	33.5	31.8
4(8)*	25.6		32.7	30.7	32.2

Mean dry matter % as harvested: 82.4

( ) Indicates applied in 1960. * Indicates applied to seedbed, remainder ploughed in.

All values based on 1 microplot only.

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Microplots

Crop in old scheme	Continuous wheat	Potatoes	Continuous barley		
Treatment	11a & 11b	11a & 11b	9	8	7
P K	Total tubers: tons per acre				
0 4		14.43	12.27	13.66	11.58
1 4		15.06	15.28	14.58	12.50
4 4		13.78	14.12	13.20	12.96
(4)4		16.51	14.12	13.66	13.20
0 4*		13.78	13.66	12.73	10.88
1 4*		15.06	12.50	11.81	11.34
4 4*		16.19	14.12	13.43	12.73
(4)4*		16.03	13.66	14.12	11.11
4 0	9.62		12.96	12.04	8.33
4 3	8.81		12.50	13.20	11.11
4 12	9.78		14.58	15.51	12.73
4(4)	10.10		13.66	12.04	8.33
4 0*	10.90		12.04	13.89	8.57
4 3*	11.54		11.81	11.58	10.42
4 12*	12.82		15.05	13.43	10.65
4(4)*	11.22		12.04	10.88	10.42
P K	Percentage ware ($1\frac{5}{8}$ inch riddle)				
0 4		100.0	96.2	93.2	96.0
1 4		95.7	97.0	96.8	96.3
4 4		94.2	98.4	94.7	94.6
(4)4		93.2	95.1	94.9	94.7
0 4*		96.5	94.9	94.5	91.5
1 4*		94.7	98.1	98.0	95.9
4 4*		94.1	93.4	94.8	92.7
(4)4*		96.0	93.2	93.4	95.8
4 0	91.7		94.6	92.3	94.4
4 3	90.9		94.4	94.7	91.7
4 12	91.8		95.2	94.0	94.5
4(4)	92.1		93.2	90.4	91.7
4 0*	95.6		94.2	91.7	94.6
4 3*	95.8		96.1	90.0	91.1
4 12*	95.0		96.9	93.1	95.7
4(4)*	92.9		94.2	93.6	95.6

( ) Indicates applied in 1960. * Indicates applied to seedbed, remainder ploughed in.

All values based on 1 microplot only.

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Microplots

Crop in old scheme	Continuous wheat	Sugar beet	Continuous barley		
Treatment	11a & 11b	11a & 11b	9	8	7
P K	Roots (washed): tons per acre				
0 24	15.52		12.56	11.58	11.42
1 24	16.00		14.56	11.90	13.28
4 24	15.06		13.41	12.16	12.33
0 *24	13.94		13.60	12.86	10.84
1 *24	13.92		11.37	10.72	11.64
4 *24	13.57		13.87	10.32	11.11
4 0		12.81	9.16	11.91	6.11
4 6		13.11	13.46	10.90	11.16
4 12		15.51	11.32	11.92	10.90
4 24		15.34	14.27	12.44	11.00
4 0*		14.07	10.45	9.75	8.61
4 6*		14.46	11.22	9.72	9.59
4 12*		12.76	12.56	14.23	12.98
4 24*		14.29	13.30	13.10	13.97
P K	Sugar percentage				
0 24	16.2		15.8	15.4	15.0
1 24	16.0		15.8	14.9	15.6
4 24	16.4		15.5	15.5	15.2
0 *24	15.8		15.8	15.0	14.8
1 *24	14.9		15.2	15.6	14.9
4 *24	16.2		15.7	15.3	15.6
4 0		16.0	15.9	14.9	14.9
4 6		15.9	15.6	15.4	15.3
4 12		15.9	16.2	15.4	15.2
4 24		15.5	15.3	15.1	15.0
4 0*		16.2	15.0	15.1	14.8
4 6*		16.2	15.7	15.1	15.5
4 12*		16.2	15.8	15.6	15.2
4 24*		16.2	16.4	15.6	15.0

All values based on 1 microplot only except $\frac{P\ K}{0\ 24}$ which are based on 2.

*Indicates applied to seedbed, remainder ploughed in.

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Microplots

Crop in old scheme	Continuous wheat	Sugar beet	Continuous barley		
Treatment	11a & 11b	11a & 11b	9	8	7
P K	Total sugar: cwt per acre				
0 24	50.3		39.6	35.6	34.2
1 24	51.0		46.1	35.4	41.4
4 24	49.5		41.6	37.7	37.5
0 24*	44.0		43.0	38.5	32.1
1 24*	41.5		34.5	33.5	34.7
4 24*	43.9		43.6	31.6	34.6
4 0		40.9	29.1	35.6	18.2
4 6		41.6	42.0	33.5	34.1
4 12		49.2	36.6	36.8	33.1
4 24		47.4	43.6	37.5	33.0
4 0*		45.6	31.3	29.4	25.5
4 6*		46.9	35.2	29.3	29.7
4 12*		41.3	39.6	44.4	39.3
4 24*		46.2	43.7	40.9	41.8

All values based on 1 microplot only except $\frac{P\ K}{0\ 24}$ which are based on 2.

*Indicates applied to seedbed, remainder ploughed in.

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LEY AND ARABLE ROTATIONS

Highfield and Fosters Field 1961 - the 13th year.

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

Treatment crops, reseeded and permanent grasses: Each crop is manured uniformly, the sub plot tests of N and dung being discontinued.

Test crops: For new sub plot treatments see below.

Arable rotation: 2 cuts are now taken from the hay crop. The treatment potato crop is replaced by sugar beet.

Corrective K: 3 cwt per acre K_2O as sulphate of potash was applied to all phases of the arable rotation.

Revised basal fertiliser applications:

Basal dressings in cwt per acre

Crop	N	P_2O_5	K_2O	Fertiliser*	Time of application
Cut grass:					
1st year	0.225	0.5625	0.5625	6/15/15	in seedbed.
	0.225			'Nitro-Chalk'	after each cut, except the last.
2nd and 3rd years		1.2	1.2	0/20/20	winter.
	0.225		0.225	16/0/16	for each cut.
Grazed ley:					
1st year		0.6	0.6	0/20/20	in seedbed.
	0.1125			'Nitro-Chalk'	in seedbed.
	0.1125			'Nitro-Chalk'	mid season.
2nd and 3rd years		0.6	1.2	0/14/28	winter
	0.1125			'Nitro-Chalk'	spring.
	0.1125			'Nitro-Chalk'	mid season.
Lucerne:					
1st year		0.6	0.6	0/20/20	in seedbed.
2nd and 3rd years		0.9	1.8	0/14/28	winter.
Arable rotation:					
Hay	0.6	0.6	0.6	8/8/8	winter.
	0.6		0.6	16/0/16	after 1st cut.
Sugar beet			1.4	Muriate of potash	on plough furrow.
	1.0	1.0	1.0	8/8/8	in seedbed.
Oats		0.3	0.6	0/14/28	combine drilled.
(Highfield)	0.2			'Nitro-Chalk'	in seedbed.
(Fosters)	0.4			'Nitro-Chalk'	in seedbed.

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Basal dressings in cwt per acre

Crop	N	P_2O_5	K_2O	Fertiliser*	Time of application
Reseeded and permanent Grass "Silage" years		0.6	1.2	0/14/28	winter.
	0.3			'Nitro-Chalk'	spring.
	0.3			'Nitro-Chalk'	after silage cut.
"All-grazing" years		0.3	0.6	0/14/28	winter.
	0.1125			'Nitro-Chalk'	spring.
	0.1125			'Nitro-Chalk'	mid season.
Wheat		0.3	0.6	0/14/28	combine drilled.
Potatoes (Highfield)	0.75			Sulphate of ammonia	in ridges.
(Fosters)	1.00			Sulphate of ammonia	in ridges.
Barley		0.3	0.6	0/14/28	combine drilled.

Sub plot treatments to Test Crops (cwt per acre, except where stated):-

Wheat: (treatments applied to $\frac{1}{8}$th plots as 'Nitro-Chalk' in spring):

Highfield: 0.0; 0.3; 0.6; 0.9N.

Fosters: 0.0; 0.4; 0.8; 1.2N

Potatoes:

PK v Dung (treatments applied to $\frac{1}{4}$ plots):

0.6 P_2O_5 and 0.9 K_2O applied as superphosphate and muriate of potash before ridging; dung at 12 tons per acre applied in the bouts.

Nitrogen (treatments applied to $\frac{1}{8}$th plots):

0.0; 0.5 N as sulphate of ammonia, broadcast before ridging.

P and K (applied in the ridges to 1/16th plots): All combinations of:-

Phosphate: 0.9; 1.8 P_2O_5 as superphosphate.

Potash: 0.9; 1.8 K_2O as muriate of potash.

Barley:

Nitrogen (applied to $\frac{1}{4}$ plots as 'Nitro-Chalk' in seedbed):

Highfield: 0.0; 0.2 N (all rotations)

Fosters: 0.2; 0.4N (after cut grass, grazed ley, lucerne)

0.3; 0.6N (arable rotation)

P and K in winter to $\frac{1}{8}$th plots to balance dressings to potatoes:

Phosphate: 0.9; 0.0 P_2O_5 as superphosphate.

Potash: 0.9; 0.0 K_2O as muriate of potash.

*Granular compound fertilisers are described thus - 8/8/8; 0/14/28; 6/15/15; 16/0/16; etc. to show percentages of N, P_2O_5 and K_2O in order.

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Cultivations, etc.:

HIGHFIELD

1st year Treatment Crops

Cut grass. Ploughed twice: Aug 23 and Dec 14, 1960. Basal NPK compound applied: Apr 6, 1961. Seed sown at 33 lb per acre: Apr 19. Sprayed with MCPB at 4 pints in 40 gallons per acre: May 23. Cut twice: Aug 29 and Oct 30. 'Nitro-Chalk' applied after first cut.

Grazed ley. Ploughed twice: Aug 23 and Dec 14, 1960. 'Nitro-Chalk' and basal PK compound applied: Apr 6, 1961. Seed sown at 44 lb per acre: Apr 19. Sprayed with MCPB at 4 pints in 40 gallons per acre: May 23. 'Nitro-Chalk' applied: Aug 4. Grazed: 5 circuits, June 27 - Oct 18.

Lucerne. Ploughed twice: Aug 23 and Dec 14, 1960. Basal PK compound applied: Apr 6, 1961. Seed drilled at 20 lb per acre: Apr 19. Cut twice: Aug 3 and Sept 26. Variety: Du Puits.

Hay. Seeds undersown in barley: Apr 22, 1960. Corrective sulphate of potash applied: Jan 24, 1961. Basal PK compound applied: Feb 21. 'Nitro-Chalk' applied: Apr 17. Cut twice: May 26 and Aug 4. Nitrogen and potash applied as compound fertiliser (16% N, 16% K_2O) after 1st cut.

2nd year Treatment Crops

Cut grass. Basal PK compound applied: Feb 21, 1961. Nitrogen and potash applied as compound fertiliser (16% N, 16% K_2O): Apr 5 and after every cut except the last. Cut 4 times: May 17, July 3, Aug 28, Oct 30.

Grazed ley. Basal PK compound applied: Feb 18, 1961. Nitrogen and potash as for cut grass applied in error to plots 127 and 128 as compound fertiliser (16% N, 16% K_2O): Apr 5. 'Nitro-Chalk' applied: Apr 9 (plots 115 and 116 only) and Aug 4. Grazed: 7 circuits, Apr 26 - Oct 22.

Lucerne. Basal PK compound applied: Feb 17, 1961. Cut 4 times: May 30, July 5, Sept 14, Nov 21.

Sugar beet. Ploughed 3 times: June 30, Aug 26 and Dec 15, 1960. Corrective sulphate of potash applied: Jan 24, 1961. Muriate of potash applied: Mar 18. Basal NPK compound (8% N, 8% P_2O_5, 8% K_2O) applied: Mar 21. Seed drilled at $8\frac{1}{2}$ lb per acre: Mar 22. Singled: May 17. Sprayed with demeton methyl at 12 fluid oz in 60 gallons per acre: June 14. Lifted: Nov 3. Variety: Klein E (rubbed and graded seed).

3rd year Treatment Crops

Cut grass. Basal PK compound applied: Feb 21, 1961. Nitrogen and potash applied as compound fertiliser (16% N, 16% K_2O): Apr 5 and after every cut except the last. Cut 4 times: May 17, July 3, Aug 28, Oct 3.

Grazed ley. Basal PK compound applied: Feb 18. 'Nitro-Chalk' applied: May 9 and Aug 4. Grazed: 6 circuits, Apr 30 - Oct 2.

Lucerne. Basal PK compound applied: Feb 17, 1961. Cut 4 times: May 30, July 5, Sept 14, Oct 3.

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Oats. Ploughed: Dec 13, 1960. Corrective sulphate of potash applied: Jan 24, 1961. Seed combine drilled at 3½ bushels per acre with basal PK compound, 'Nitro-Chalk' applied: Mar 13. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 10. Combine harvested: Aug 18. Variety: Sun II.

1st Test Crop, Wheat

Plots following arable rotation ploughed twice: Aug 23 and Oct 7, 1960. Remaining plots ploughed: Oct 7. Seed combine drilled at 3 bushels per acre with basal PK compound: Jan 19, 1961. Corrective sulphate of potash applied to plots of arable rotation: Jan 24. 'Nitro-Chalk' applied: Apr 14. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 10. Combine harvested: Aug 30. Variety: Cappelle.

2nd Test Crop, Potatoes

Ploughed twice: Aug 26 and Dec 15, 1960. Corrective sulphate of potash applied to plots of arable rotation: Jan 24, 1961. Sulphate of ammonia and PK applied on the flat: May 1. Ridged: May 8. Basal sulphate of ammonia, PK dressings and dung applied in the bouts: May 10. Potatoes planted: May 11. Earthed up: July 12. Lifted: Sept 20. Variety: Majestic.

3rd Test Crop, Barley

Ground chalk applied to blocks 5 and 8: Dec 8, 1960. Ploughed: Dec 13. Additional P and K applied: Jan 5, 1961. Corrective sulphate of potash applied to plots of arable rotation: Jan 24. Seed combine drilled at 2 bushels per acre with basal PK compound, 'Nitro-Chalk' applied: Mar 8. Sprayed with CMPP at 6 pints in 40 gallons per acre (except undersown plots): May 10. Undersown plots sprayed with MCPB at 4 pints in 40 gallons per acre: May 23. Combine harvested: Aug 18. Variety: Proctor.

Permanent and reseeded grasses. Basal PK compound applied to all plots: Feb 18, 1961.

11th year reseeded, 11th experimental year of permanent grass, Blocks 9 - 12.

Blocks 10 and 12. 'Nitro-Chalk' applied: Apr 5, 1961. Cut for silage: May 25. 2nd dressing of 'Nitro-Chalk' applied: May 29. Grazed: 3 circuits, June 23 - Oct 26.

Blocks 9 and 11. 'Nitro-Chalk' applied twice: May 23 and Aug 4, 1961. Grazed: 5 circuits, May 4 to Oct 26.

12th year reseeded, 12th experimental year of permanent grass, Blocks 5 - 8.

Blocks 7 and 8. Ground chalk applied to block 8: Dec 8, 1960. 'Nitro-Chalk' applied: Apr 5, 1961. Cut for silage: May 25. 2nd dressing of 'Nitro-Chalk' applied: May 29. Grazed: 3 circuits, June 19 - Oct 15.

Blocks 5 and 6. Ground chalk applied to block 5: Dec 8, 1960. 'Nitro-Chalk' applied twice: May 16 and Aug 4, 1961. Grazed: Permanent grass 5 circuits, reseeded 6 circuits, Apr 30 - Oct 19.

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13th year reseeded, 13th experimental year of permanent grass, Blocks 1 - 4.

Blocks 1 and 3. 'Nitro-Chalk' applied: Apr 5, 1961. Cut for silage: May 25. 2nd dressing of 'Nitro-Chalk' applied: May 29. Grazed: 3 circuits, June 19 - Oct 11.

Blocks 2 and 4. 'Nitro-Chalk' applied twice: May 9 and Aug 4, 1961. Grazed: 6 circuits, Apr 26 - Oct 7.

FOSTERS

1st year Treatment Crops

Cut grass. Ploughed twice: Aug 22 and Oct 18, 1960. Basal NPK compound applied: Apr 6, 1961. Seeds sown at 33 lb per acre: Apr 18. Sprayed with MCPB at 4 pints in 40 gallons per acre: May 23. Cut twice: Aug 28 and Oct 30. 'Nitro-Chalk' applied after 1st cut.

Grazed ley. Ploughed twice: Aug 22 and Oct 18, 1960. Basal PK compound and 'Nitro-Chalk' applied: Apr 6, 1961. Seeds sown at 44 lb per acre: Apr 18. Sprayed with MCPB at 4 pints in 40 gallons per acre: May 23. 2nd dressing of 'Nitro-Chalk' applied: Aug 3. Grazed: 4 circuits, June 22 - Oct 21.

Lucerne. Ploughed twice: Aug 22 and Oct 18, 1960. Basal PK compound applied: Apr 6, 1961. Seeds sown at 20 lb per acre: Apr 19. Cut twice: Aug 3 and Sept 26. Variety: Du Puits.

Hay. Seeds undersown in barley: Apr 22, 1960. Corrective sulphate of potash applied: Jan 24, 1961. Basal PK compound applied: Feb 21. 'Nitro-Chalk' applied: Apr 17. Cut twice: May 26 and Aug 4. Nitrogen and potash applied as compound fertiliser (16% N, 16% K_2O) after 1st cut.

2nd year Treatment Crops

Cut grass. Basal PK compound applied: Feb 21, 1961. Nitrogen and potash applied as compound fertiliser (16% N, 16% K_2O): Apr 5 and after every cut except the last. Cut 4 times: May 17, July 3, Aug 28, Oct 30.

Grazed ley. Basal PK compound applied: Feb 17, 1961. 'Nitro-Chalk' applied: May 9 and Aug 3. Grazed: 6 circuits, Apr 25 - Oct 10.

Lucerne. Basal PK compound applied: Feb 17, 1961. Cut 4 times: May 29, July 4, Sept 14, Nov 21.

Sugar beet. Ploughed: June 30 and Oct 18, 1960. Corrective sulphate of potash applied: Jan 24, 1961. Ploughed 3rd time: Feb 20. Muriate of potash applied: Mar 18. Basal NPK compound (8% N, 8% P_2O_5, 8% K_2O) applied: Mar 21. Seed drilled at $8\frac{1}{2}$ lb per acre: Mar 22. Singled: May 19. Sprayed with demeton methyl at 12 fluid oz in 60 gallons per acre: June 14. Lifted: Nov 3. Variety: Klein E (rubbed and graded seed).

3rd year Treatment Crops

Cut grass. Basal PK compound applied: Feb 21, 1961. Nitrogen and potash applied as compound fertiliser (16% N, 16% K_2O): Apr 5 and after every cut except the last. Cut 4 times: May 17, July 3, Aug 28, Oct 3.

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Grazed ley. Basal PK compound applied: Feb 17, 1961. 'Nitro-Chalk' applied twice: May 8 and Aug 3. Grazed: 6 circuits, Apr 29 - Oct 2.

Lucerne. Basal PK compound applied: Feb 17, 1961. Cut 4 times: May 29, July 4, Sept 14, Oct 3.

Oats. Ploughed: Dec 12, 1960. Corrective sulphate of potash applied: Jan 24, 1961. Seed drilled at 3½ bushels per acre with basal PK compound, 'Nitro-Chalk' applied: Mar 13. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 12. Combine harvested: Aug 18. Variety: Sun II.

1st Test Crop, Wheat

Ploughed - Plots of arable roation: Aug 22, 1960; plots following grazed ley: Sept 20; plots following lucerne: Oct 8; plots following cut grass: Oct 17; plots of arable rotation (second time): Oct 17. Seed drilled at 3 bushels per acre with basal PK compound: Jan 19, 1961. Corrective sulphate of potash applied to plots of arable rotation: Jan 24. 'Nitro-Chalk' applied: Apr 14. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 11. Combine harvested: Aug 30. Variety: Cappelle.

2nd Test Crop, Potatoes

Ploughed twice: Aug 31 and Oct 18, 1960. Corrective sulphate of potash applied to plots of arable rotation: Jan 24, 1961. Sulphate of ammonia and PK applied on the flat: May 1. Ridged: May 8. Basal sulphate of ammonia and PK dressings applied in the bouts: May 10. Dung applied: May 11. Potatoes planted: May 12. Earthed up: July 11. Lifted: Sept 18. Variety: Majestic.

3rd Test Crop, Barley

Ploughed: Dec 12, 1960. Part of additional P and K applied: Dec 29, remainder: Jan 5, 1961. Corrective sulphate of potash applied to plots following arable rotation: Jan 24. Seed combine drilled at 2 bushels per acre with basal PK compound, 'Nitro-Chalk' applied: Mar 5. Sprayed with CMPP at 6 pints in 40 gallons per acre (except undersown plots): May 12. Undersown plots sprayed with MCPB at 4 pints in 40 gallons per acre: May 23. Combine harvested: Aug 17. Variety: Proctor.

Permanent grasses Basal PK compound applied to all plots: Feb 17, 1960.

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

Blocks 6 and 10. 'Nitro-Chalk' applied: Apr 6, 1961. Cut for silage: May 25. 2nd dressing of 'Nitro-Chalk' applied: May 29. Grazed: 3 circuits, June 24 - Oct 18.

Blocks 11 and 12. 'Nitro-Chalk' applied: May 19 and Aug 3, 1961. Grazed: 5 circuits, Apr 29 - Oct 14.

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12th year reseeded grass, Blocks 5, 7, 8, 9.
Blocks 5 and 9. 'Nitro-Chalk' applied: Apr 6, 1961. Cut for silage: May 25. 2nd dressing of 'Nitro-Chalk' applied: May 29. Grazed: 3 circuits, June 24 - Oct 6.
Blocks 7 and 8. 'Nitro-Chalk' applied: May 11 and Aug 3, 1961. Grazed: 6 circuits, Apr 25 - Oct 14.

13th year reseeded grass, Blocks 1 - 4.
Blocks 1 and 2. 'Nitro-Chalk' applied: Apr 6, 1961. Cut for silage: May 25. 2nd dressing of 'Nitro-Chalk' applied: May 29. Grazed: 3 circuits, June 28 - Oct 18.
Blocks 3 and 4. 'Nitro-Chalk applied: May 16 and Aug 3, 1961. Grazed: 5 circuits, May 3 - Oct 10.

Standard errors per plot.		Test crops.	
Wheat, grain (at 85% dry matter).		Highfield:	5.78 cwt per acre or 14.2% (36 d.f.)
		Fosters:	2.28 cwt per acre or 5.9% (36 d.f.)
Potatoes, total tubers.	Highfield	$\frac{1}{4}$ plot:	0.915 tons per acre or 6.6% (4 d.f.)
		$\frac{1}{16}$ plot:	1.294 tons per acre or 9.3% (23 d.f.)
	Fosters	$\frac{1}{4}$ plot:	0.371 tons per acre or 3.5% (4 d.f.)
		$\frac{1}{8}$ plot:	0.526 tons per acre or 4.9% (8 d.f.)
		$\frac{1}{16}$ plot:	1.063 tons per acre or 9.9% (48d.f.)
Barley, grain (at 85% dry matter).	Highfield:		1.86 cwt per acre or 4.4% (13 d.f.)*
	Fosters:		1.39 cwt per acre or 3.1% (15 d.f.)

*2 missing values.

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Summary of Results

Wheat 1st test crop

N: cwt per acre	Treatment crops 1958 - 1960 Lucerne	Ley	Cut grass	Arable with hay	Mean
Grain (at 85% dry matter): cwt per acre					
Highfield					
Mean	40.0	41.1 (±2.89)*	38.9	42.8	40.7
To test crop					
None	39.0	29.2	28.7	33.2	32.5
0.3	38.8	42.9	38.9	36.5	39.3
0.6	42.5	47.2	42.1	50.9	45.7
0.9	39.7	44.9	46.0	50.7	45.3
To treatment crops					
Single rate		41.2	37.4	42.7	40.4
Double rate		41.0	40.5	42.9	41.4
Difference (±2.89)		-0.2	+3.1	+0.2	+1.0 (±1.67)
Fosters					
Mean	48.5	31.0 (±1.14)*	34.0	40.0	38.4
To test crop					
None	43.1	22.0	24.0	28.6	29.4
0.4	51.7	30.2	34.7	37.7	38.6
0.8	50.8	34.0	37.5	46.8	42.3
1.2	48.2	37.6	40.0	47.0	43.2
To treatment crops					
Single rate		32.5	32.7	39.5	34.9
Double rate		29.5	35.4	40.5	35.1
Difference (±1.14)		-3.0	+2.7	+1.0	+0.2 (±0.66)

*For use in vertical and interaction comparisons only.

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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 1959: tons per acre: None	Arable with hay only: Dung to potatoes 1959: tons per acre: 12	Arable with hay only: Mean
Grain (at 85% dry matter): cwt per acre						
Highfield						
To test crop	(±2.36)		(±1.67)	(±4.09)		(±2.89)
None	30.7	30.0	30.4	31.2	35.2	33.2
0.3	38.4	40.5	39.4	33.0	40.0	36.5
0.6	45.2	48.3	46.7	50.3	51.4	50.8
0.9	47.4	47.0	47.2	51.6	49.8	50.7
Mean	40.4	41.4	40.9			
	(±1.18)					
To previous treatment crops				(±2.89)		(±2.04)
Single rate				42.8	42.7	42.7
Double rate				40.3	45.4	42.9
Mean				41.5	44.1	42.8
				(±2.04)		
Mean dry matter % as harvested: 85.7						
Fosters						
To test crop	(±0.93)		(±0.66)	(±1.61)		(±1.14)
None	25.3	24.4	24.9	27.7	29.4	28.6
0.4	33.8	34.5	34.2	36.0	39.4	37.7
0.8	39.9	39.0	39.4	46.6	47.0	46.8
1.2	40.5	42.5	41.5	47.8	46.2	47.0
Mean	34.9	35.1	35.0			
	(±0.46)					
To previous treatment crops				(±1.14)		(±0.80)
Single rate				38.5	40.6	39.5
Double rate				40.5	40.4	40.5
Mean				39.5	40.5	40.0
				(±0.80)		
Mean dry matter % as harvested: 85.9						

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Wheat 1st test crop

N: cwt per acre	Treatment crops 1958 - 1960 Lucerne	Ley	Cut grass	Arable with hay	Mean
Straw (at 85% dry matter): cwt per acre					
Highfield					
Mean	49.1	47.9	36.9	41.9	44.0
To test crop					
None	39.4	32.4	22.1	27.2	30.3
0.3	50.1	47.2	34.6	35.8	41.9
0.6	52.2	57.9	44.3	50.8	51.3
0.9	54.9	54.2	46.7	53.9	52.4
To treatment crop					
Single rate		46.4	35.8	41.5	41.3
Double rate		49.4	38.0	42.3	43.2
Difference		+3.0	+2.2	+0.8	+1.9
Fosters					
Mean	48.1	28.8	31.3	36.6	36.2
To test crop					
None	37.8	13.0	10.3	14.2	18.8
0.4	49.4	29.1	33.6	35.9	37.0
0.8	52.3	34.4	38.7	46.4	42.9
1.2	52.9	38.5	42.5	49.8	45.9
To treatment crop					
Single rate		29.6	30.7	37.3	32.5
Double rate		27.9	31.8	35.8	31.9
Difference		-1.7	+1.1	-1.5	-0.6

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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 1959: tons per acre: None	Arable with hay only: Dung to potatoes 1959: tons per acre: 12	Arable with hay only: Mean
Straw (at 85% dry matter): cwt per acre						
Highfield						
To test crop						
None	26.2	28.2	27.2	26.4	28.0	27.2
0.3	39.0	39.4	39.2	34.0	37.7	35.8
0.6	48.4	53.6	51.0	49.2	52.4	50.8
0.9	51.5	51.7	51.6	53.4	54.4	53.9
Mean	41.3	43.2	42.2			
To previous treatment crop						
Single rate				41.1	42.0	41.5
Double rate				40.4	44.3	42.3
Mean				40.7	43.1	41.9
Mean dry matter % as harvested: 82.1						
Fosters						
To test crop						
None	12.4	12.6	12.5	15.0	13.4	14.2
0.4	33.5	32.3	32.9	34.3	37.6	35.9
0.8	41.2	38.4	39.8	46.4	46.4	46.4
1.2	43.1	44.1	43.6	48.8	50.7	49.8
Mean	32.5	31.9	32.2			
To previous treatment crop						
Single rate				35.6	39.1	37.3
Double rate				36.7	35.0	35.8
Mean				36.1	37.0	36.6
Mean dry matter % as harvested: 80.3						

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61/B/1.12

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

	Treatment crops 1957-1959				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield (no dung plots only)					
Mean	13.67	14.30	13.83	13.89	13.93
N: cwt per acre					
0.5	13.69	15.16	13.85	13.72	14.10
1.0	13.66	13.45	13.81	14.07	13.75
Difference (±0.915)	-0.03	-1.71	-0.04	+0.35	-0.35 (±0.458)
P_2O_5: cwt per acre*					
0.9	12.97	14.14	13.87	14.13	13.78
1.8	14.38	14.46	13.79	13.66	14.07
Difference (±0.647)	+1.41	+0.32	-0.08	-0.47	+0.29 (±0.323)
K_2O: cwt per acre*					
0.9	13.82	14.29	13.55	13.68	13.84
1.8	13.53	14.32	14.11	14.11	14.01
Difference (±0.647)	-0.29	+0.03	+0.56	+0.43	+0.17 (±0.323)
Fosters					
Mean	10.86	10.13	10.88	10.89	10.69
N: cwt per acre					
0.5	11.14	10.57	10.86	11.06	10.90
1.0	10.57	9.69	10.91	10.73	10.48
Difference (±0.372)	-0.57	-0.88	+0.05	-0.33	-0.42 (±0.186)
PK	10.93	10.35	10.67	11.05	10.75
Dung	10.78	9.90	11.10	10.74	10.63
Difference (±0.371)	-0.15	-0.45	+0.43	-0.31	-0.12 (±0.185)
P_2O_5: cwt per acre*					
0.9	11.00	10.82	10.65	10.86	10.83
1.8	10.71	9.44	11.12	10.93	10.55
Difference (±0.376)	-0.29	-1.38	+0.47	+0.07	-0.28 (±0.188)
K_2O: cwt per acre*					
0.9	10.76	10.41	11.07	10.90	10.79
1.8	10.96	9.84	10.70	10.88	10.59
Difference (±0.376)	+0.20	-0.57	-0.37	-0.02	-0.20 (±0.188)

*Including basal dressing

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61/B/1.13

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

Highfield (no dung plots only)

N: cwt per acre	P_2O_5: cwt per acre* 0.9	P_2O_5: cwt per acre* 1.8	K_2O: cwt per acre* 0.9	K_2O: cwt per acre* 1.8
0.5	14.16	14.05	13.81	14.39
1.0	13.40	14.09	13.86	13.63
	(3) and (4)		(3) and (4)	
			(±0.323)	
P_2O_5: cwt per acre*				
0.9			13.86	13.70
1.8			13.81	14.33

Fosters

N: cwt per acre	PK	Dung	P_2O_5: cwt per acre* 0.9	P_2O_5: cwt per acre* 1.8	K_2O: cwt per acre* 0.9	K_2O: cwt per acre* 1.8
0.5	(1) and (2)		(5) and (6)		(5) and (6)	
1.0	10.97	10.84	10.95	10.85	10.94	10.87
	10.53	10.42	10.71	10.24	10.63	10.32
			(3) and (4)		(3) and (4)	
PK			10.98	10.52	10.81	10.69
Dung			10.68	10.57	10.76	10.50
					(±0.188)	
P_2O_5: cwt per acre*						
0.9					10.91	10.75
1.8					10.66	10.43

*Including basal dressing

Highfield	Fosters	
	(1)	±0.186 For use in vertical and interaction comparisons.
	(2)	±0.186 For use in horizontal and diagonal comparisons.
(3) ±0.323	(3)	±0.188 For use in horizontal and diagonal comparisons.
(4) ±0.396	(4)	±0.187 For use in vertical and interaction comparisons.
	(5)	±0.188 For use in vertical and interaction comparisons.
	(6)	±0.187 For use in horizontal and diagonal comparisons.

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

	Treatment crops 1957-1959				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield (no dung plots only)					
Mean	96.4	96.6	96.7	96.5	96.5
N: cwt per acre					
0.5	96.5	97.1	96.6	96.3	96.6
1.0	96.3	96.1	96.7	96.7	96.5
Difference	-0.2	-1.0	+0.1	+0.4	-0.1
P_2O_5: cwt per acre*					
0.9	96.2	96.7	96.4	96.5	96.5
1.8	96.6	96.5	96.9	96.4	96.6
Difference	+0.4	-0.2	+0.5	-0.1	+0.1
K_2O: cwt per acre*					
0.9	96.7	96.5	97.0	96.2	96.6
1.8	96.1	96.7	96.4	96.8	96.5
Difference	-0.6	+0.2	-0.6	+0.6	-0.1
Fosters					
Mean	94,5	93.2	94.0	94.2	94.0
N: cwt per acre					
0.5	94.6	93.8	94.4	94.5	94.3
1.0	94.3	92.5	93.7	93.9	93.6
Difference	-0.3	-1.3	-0.7	-0.6	-0.7
PK	95.5	95.2	95.8	95.9	95.6
Dung	93.5	91.2	92.3	92.5	92.4
Difference	-2.0	-4.0	-3.5	-3.4	-3.2
P_2O_5: cwt per acre*					
0.9	95.4	93.6	93.7	94.2	94.2
1.8	93.6	92.8	94.4	94.2	93.7
Difference	-1.8	-0.8	+0.7	0.0	-0.5
K_2O: cwt per acre*					
0.9	94.7	93.6	93.9	94.1	94.1
1.8	94.3	92.8	94.2	94.3	93.9
Difference	-0.4	-0.8	+0.3	+0.2	-0.2

*Including basal dressing.

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61/B/1.15

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

	P_2O_5: cwt per acre*		K_2O: cwt per acre*	
	0.9	1.8	0.9	1.8
Highfield (no dung plots only)				
N: cwt per acre				
0.5	96.8	96.5	96.8	96.5
1.0	96.2	96.7	96.5	96.5
P_2O_5: cwt per acre*				
0.9			96.6	96.3
1.8			96.6	96.7

			P_2O_5: cwt per acre*		K_2O: cwt per acre*	
	PK	Dung	0.9	1.8	0.9	1.8
Fosters						
N: cwt per acre						
0.5	95.8	92.8	94.5	94.1	94.4	94.3
1.0	95.3	91.9	93.9	93.4	93.7	93.5
PK			95.7	95.4	95.8	95.4
Dung			92.7	92.1	92.3	92.4
P_2O_5: cwt per acre*						
0.9					94.1	94.3
1.8					94.0	93.5

*Including basal dressing

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

	Treatment crops 1956–1958				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	41.7	42.2	42.8	42.0	42.2
N: cwt per acre					
None	38.7	40.3	40.0	38.8	39.4
0.2	44.8	44.0	45.6	45.3	44.9
Difference (±1.32)	+6.1	+3.7	+5.6	+6.5	+5.5 (±0.65)
Dung to potatoes 1960: tons per acre					
None	41.1	41.2	42.8	40.3	41.3
12	42.4	43.1	42.9	43.8	43.0
Difference (±1.32)	+1.3	+1.9	+0.1	+3.5	+1.7 (±0.65)
Fosters					
Mean	46.6	47.1	45.5	42.5	45.4
N: cwt per acre					
0.2	43.9	45.3	44.0	38.9	43.0
0.4	49.3	48.8	47.1	46.2	47.8
Difference (±0.98)	+5.4	+3.5	+3.1	+7.3	+4.8 (±0.49)
Dung to potatoes 1960: tons per acre					
None	46.0	45.9	44.7	41.5	44.5
12	47.1	48.3	46.3	43.6	46.3
Difference (±0.98)	+1.1	+2.4	+1.6	+2.1	+1.8 (±0.49)

	Highfield		Fosters	
	N: cwt per acre		N: cwt per acre	
	None	0.2	0.2	0.4
Dung to potatoes 1960: tons per acre	(±0.65)		(±0.49)	
None	37.8	44.8	41.8	47.3
12	41.0	45.1	44.2	48.4

Mean dry matter % as harvested:
Highfield: 82.7
Fosters: 83.2

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61/B/1.17

Treatment crops Arable and Hay rotation

	Highfield Mean	Fosters Mean
Hay (dry matter): cwt per acre		
No dung	46.5	46.0
Dung in 1959	48.2	45.1
Mean	47.3	45.5
Sugar beet		
Roots washed: tons per acre		
	23.14	18.10
Sugar percentage		
	16.6	17.2
Total sugar: cwt per acre		
	77.0	62.3
Tops: tons per acre		
	20.62	12.89
Oats		
Grain (at 85% dry matter): cwt per acre		
No dung	29.4	26.6
Dung in 1960	28.6	26.8
Mean	29.0	26.7

Highfield, oats, mean dry matter % as harvested, Grain: 83.6
Fosters, oats, mean dry matter % as harvested, Grain: 83.7

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Cut grass. Dry matter: cwt per acre

1st year (2 cuts)	Highfield: Dung to potatoes 1959: tons per acre			Fosters: Dung to potatoes 1959: tons per acre		
	None	12	Mean	None	12	Mean
N to test crops						
Single rate	37.8	37.7	37.7	31.2	30.8	31.0
Double rate	37.4	37.1	37.3	30.3	30.5	30.4
Mean	37.6	37.4	37.5	30.8	30.6	30.7
2nd year (4 cuts)			72.6			69.2
3rd year (4 cuts)			57.3			48.6

Lucerne. Dry matter: cwt per acre

1st year (2 cuts)	Highfield: N to 3 previous test crops			Fosters: N to 3 previous test crops		
	Single Rate	Double Rate	Mean	Single Rate	Double Rate	Mean
Dung to potatoes 1959						
None	19.2	19.4	19.3	23.2	28.8	26.0
12 tons	18.5	21.5	20.0	25.5	29.2	27.3
Mean	18.9	20.5	19.7	24.3	29.0	26.7
2nd year (4 cuts)			63.1			93.4
3rd year (4 cuts)			61.2			84.7

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

	Highfield Mean	Fosters Mean
1st year	29.9	20.1
2nd year	41.7	30.4
3rd year	30.8	27.2

Permanent grass. Dry matter: cwt per acre

	Cut for silage Mean	Grazed. Estimated from sampling cuts Mean
	Highfield	
11th exptl. year		
Blocks 2 and 4		25.0*
Blocks 1 and 3	46.2	16.8*
12th exptl. year		
Blocks 9 and 11		27.6*
Blocks 10 and 12	47.2	17.5*
13th exptl. year		
Blocks 5 and 6		27.9*
Blocks 7 and 8	43.2	20.5*

*Aftermath grazing

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Reseeded grass. Dry matter: cwt per acre

	Cut for silage Mean	Grazed. Estimated from sampling cuts Mean
Highfield		
11th exptl. year		
Blocks 2 and 4		31.4*
Blocks 1 and 3	47.8	16.7*
12th exptl. year		
Blocks 9 and 11		28.4*
Blocks 10 and 12	40.1	20.0*
13th exptl. year		
Blocks 5 and 6		27.0*
Blocks 7 and 8	48.4	17.2*
Fosters		
11th exptl. year		
Blocks 3 and 4		28.0*
Blocks 1 and 2	39.7	17.1*
12th exptl. year		
Blocks 11 and 12		34.8*
Blocks 6 and 10	32.1	22.5*
13th exptl. year		
Blocks 7 and 8		27.6*
Blocks 5 and 9	41.6	16.5*

*Aftermath grazing

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61/B/2.1

REFERENCE PLOTS -

ROTHAMSTED (R) GREAT FIELD IV

WOBURN (W) STACKYARD SERIES C 1961

The effects of N,P,K and Dung (R & W), and of Mg,Ca,S and trace elements in the presence of N,P,K (R), on a sequence of five arable crops. Also the effects of N,P,K and Dung on permanent grass (R & W) and soft fruit (W).

Cultivations, etc.:

Great Field IV (R):-

Winter wheat: Dug by hand: Sept 14, 1960. P,K,Mg,Ca and S applied: Oct 7. First N dressing applied: Mar 13, 1961. Second N dressing applied: Apr 11. Harvested: Aug 9. Variety: Cappelle.

Kale: Dung applied, dug by hand: Dec 9, 1960. Rotary cultivated, first dressing of N and P,K,Mg,Ca and S applied and seed sown: Mar 20, 1961. Second dressing of N applied: May 23. Trace element spray applied: June 8. Harvested: Nov 1. Variety: Thousand Head.

Barley: Dug by hand: Dec 13, 1960. Rotary cultivated, N,P,K,Mg, Ca and S applied, seed sown on original plots: Mar 9, 1961. Seed sown on additional plots: Mar 28. Trace element spray applied: June 2. Harvested: Aug 1. Variety: Proctor.

Grass-clover ley: Undersown in barley: Mar 18, 1960. N,P,K,Mg, Ca and S applied: Mar 13, 1961. Trace element spray applied: Apr 24. Cut four times: Oct 7, May 23, July 19 and Sept 12. Varieties: S22 Italian Ryegrass and Dorset Marl Red Clover.

Potatoes: Dung applied: Dec 9, 1960. Dug by hand: Dec 13. Rotavated, first dressing of N and P,K,Mg,Ca and S applied on flat and setts planted: Mar 24, 1961. Second dressing of N applied: May 23. Trace element spray applied: June 8. Harvested: Sept 14. Variety: King Edward.

Permanent grass: Dung applied: Dec 9, 1960. First N dressing and P,K applied: Mar 2, 1961. Second N dressing applied: May 23. Cut twice: May 23 and Sept 28.

Stackyard Series C (W):-

Oats: Dug by hand: Jan 4, 1961. Rotary cultivated, first dressing of N and P,K applied and seed sown: Mar 8. Second dressing of N applied: May 5. Harvested: July 31. Variety: Condor.

Sugar beet: Dung applied, plots dug by hand: Jan 3, 1961. Rotary cultivated and first dressing of N and P,K applied and seed sown: Mar 21. Second dressing of N applied: May 24. Harvested: Oct 13. Variety: Klein E.

Barley: Dug by hand: Jan 4, 1961. Rotary cultivated, first dressing of N and P,K applied and seed sown: Mar 8. Second dressing of N applied: May 5. Harvested: July 31. Variety: Proctor.

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Grass-clover ley: Undersown in barley: Mar 23, 1960. N,P and K applied: Mar 6, 1961. Cut four times: Oct 5, 1960, May 24, 1961, July 22 and Sept 20. Varieties: S22 Italian Ryegrass and Dorset Marl Broad Red Clover.

Potatoes: Dung applied, plots dug by hand: Jan 3, 1961. Rotary cultivated, first dressing of N and P,K applied, setts planted: Mar 21. Second dressing of N applied: May 24. Harvested: Sept 20. Variety: King Edward.

Permanent grass: Dung applied: Jan 6, 1961. First dressing of N and P,K applied: Mar 6. Cut twice: May 24 and Sept 20. Second dressing of N applied: May 24.

Soft fruit: Dung applied: Jan 6, 1961. N,P and K applied: Mar 6. Varieties: Blackcurrants - Wellington XXX; Gooseberry - Careless; Strawberry - Cambridge Vigour.

For details of the previous years results, and for rates of fertilisers etc., see "Results of the Field Experiments" 60/B/3, 59/Bc/1 and 58/Bc/1.

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Summary of Results

Great Field IV (R): Original plots

Treatment	cwt per acre Winter wheat Grain (at 85% D.M.)	Straw	tons per acre Kale total weight	cwt per acre Barley Grain (at 85% D.M.)	Straw	cwt per acre Ley: dry matter 1st cut	2nd cut	3rd cut	4th cut	Total	tons per acre Potatoes total tubers	cwt per acre Permanent grass: dry matter 1st cut	2nd cut	Total
None	32.1	44.6	8.34	18.2	15.9	11.4	40.3	23.3	14.2	89.2	2.34	11.6	14.1	25.7
N_1	32.2	48.8	15.28	32.2	31.1	8.1	49.6	16.2	9.1	83.0	2.10	20.7	15.0	35.7
P	29.4	42.9	8.34	30.1	25.3	13.4	42.2	15.2	9.7	80.5	2.02	13.6	10.6	24.2
N_1P	35.2	55.8	17.88	36.0	35.2	6.5	51.1	13.1	8.8	79.5	1.54	27.4	16.6	44.0
K	34.1	50.1	5.73	24.5	20.4	13.1	40.4	32.1	17.8	103.4	7.29	13.8	13.3	27.1
N_1K	45.3	75.8	13.37	18.4	16.8	13.1	59.5	26.3	17.0	115.9	6.56	40.6	19.4	60.0
PK	36.1	59.6	7.82	28.1	23.2	19.7	50.1	40.2	20.3	130.3	7.18	22.5	15.6	38.1
N_1PK	50.6	100.0	15.10	38.2	41.6	14.2	61.4	28.5	15.1	119.2	8.27	40.3	14.6	54.9
N_2PK	45.8	94.1	22.57	41.4	44.9	11.8	68.5	19.1	12.8	112.2	10.18	44.3	19.0	63.3
D	37.9	69.1	13.54	35.6	31.1	17.2	53.7	34.3	17.5	122.7	10.90	33.7	10.4	44.1
N_1PKD	35.1	91.6	20.49	43.1	48.8	15.5	64.6	28.7	17.2	126.0	15.14	55.6	19.0	74.6
N_2PKD	41.2	103.2	22.92	42.9	57.9	13.8	72.1	22.7	15.2	123.8	15.62	61.3	20.3	81.6
Mean dry matter % as harvested:	78.3	57.8		76.1	50.6	16.6	23.3	26.9	26.0	23.2		24.7	25.9	25.3

64/B/2.3

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Great Field IV (R): Additional plots

Treatment	cwt per acre Winter wheat Grain (at 85% D.M.)	Straw	tons per acre Kale total weight	Barley Grain (at 85% D.M.)	Straw	cwt per acre Ley: dry matter 1st cut	2nd cut	3rd cut	4th cut	Total	tons per acre Potatoes total tubers
None	44.9	68.1	12.16	23.2	18.6	10.8	34.9	13.3	11.7	70.7	3.30
N_2PK	47.5	93.8	23.26	36.5	45.5	14.1	66.6	19.8	11.1	111.6	10.16
N_2PK Mg Ca	50.1	106.8	22.40	39.9	49.8	11.4	57.3	17.8	12.3	98.8	10.66
N_2PK Mg S	46.7	104.4	24.31	31.3	41.4	12.4	56.5	19.0	16.6	104.5	9.98
N_2PK Ca S	47.2	100.8	22.40	33.5	45.3	13.7	63.9	18.7	16.2	112.5	9.76
N_2PK Mg Ca S	37.1	111.6	20.84	38.2	45.5	16.5	58.8	18.6	9.7	103.6	11.14
N_2PK Mg Ca S TE	43.2	95.5	24.14	36.8	45.1	13.2	56.9	16.6	14.4	101.1	10.31
Mean dry matter % as harvested:	80.1	65.0		79.1	50.3	16.4	22.6	27.1	27.0	23.3	

61/B/2.4

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Stackyard Series C (W)

Treatment	cwt per acre Oats Grain (at 85% D.M)	Oats Straw (at 85% D.M)	tons per acre Sugar beet roots washed	Barley Grain (at 85% D.M)	Barley Straw (at 85% D.M)	cwt per acre Ley: dry matter 1st cut	2nd cut	3rd cut	4th cut	Total	tons per acre Potatoes total tubers	cwt per acre Permanent grass: dry matter 1st cut	2nd cut	Total
None	23.3	28.7	14.42	21.2	19.4	23.7	39.2	26.7	13.9	103.5	5.90	43.8	5.7	49.5
N_1	28.4	37.1	14.76	23.2	24.0	22.3	47.2	21.2	13.9	104.6	6.38	57.6	15.6	73.2
P	20.4	24.0	14.35	18.6	18.0	23.9	35.8	20.5	13.3	93.5	7.62	42.2	7.6	49.8
N_1P	28.8	35.2	15.62	27.1	29.3	24.9	43.8	15.8	13.1	97.6	6.96	59.6	16.0	75.6
K	24.5	31.8	14.42	20.0	19.1	24.4	38.7	22.4	14.9	100.4	7.70	44.7	6.6	51.3
N_1K	26.0	34.4	15.40	27.5	31.9	22.1	51.5	14.0	13.6	101.2	8.78	61.9	17.2	79.1
PK	20.7	26.8	15.03	20.9	19.5	23.4	40.6	22.3	13.0	99.3	7.26	42.3	7.7	50.0
N_1PK	26.0	39.5	16.39	25.6	30.7	25.2	51.9	23.1	16.2	116.4	7.68	63.4	18.6	82.0
N_2PK	27.3	41.9	18.12	31.3	36.4	20.0	50.2	16.8	14.7	101.7	8.82	51.9	20.9	72.8
D	25.8	30.8	19.50	22.9	22.2	24.4	44.4	19.1	12.3	100.2	11.67	45.7	9.6	55.3
N_1PKD	31.1	38.2	21.26	29.4	31.1	24.7	51.3	18.5	15.0	109.5	15.26	59.7	19.7	79.4
N_2PKD	27.3	32.1	20.77	32.2	42.2	22.2	54.7	17.9	14.0	108.8	15.20	61.7	24.9	86.6
Mean dry matter % as harvested:	73.7	50.1		83.5	75.4	12.5	28.2	30.4	20.4	22.9		24.9	28.9	26.9

61/B/2.5

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61/B/3.1

GREEN MANURING EXPERIMENT

Woburn Stackyard - 1961, the 8th year of the revised scheme.

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

Area of each plot (acres): 0.0406. Area harvested: Potatoes - 0.0221; barley - 0.0295.

Cultivations, etc.:

Green manures after barley 1960 (for early potatoes 1961): Trefoil at 30 lb per acre, ryegrass at 40 lb per acre, undersown: Apr 27, 1960. Varieties: Trefoil - English; Ryegrass - Italian.

Early potatoes: Straw applied (green manure and "fallow" plots): Aug 26, 1960. "Fallow" plots ploughed: Sept 7 and Jan 11, 1961. All plots ploughed: Feb 13. Basal fertiliser and 'Nitro-Chalk' applied, potatoes mechanically planted: Mar 21. Earthed up: June 28. Lifted: July 11. Variety: Ulster Chieftain.

Green manures after early potatoes 1960 (for barley 1961): Ground chalk applied at 23 cwt per acre, trefoil at 30 lb per acre, ryegrass at 40 lb per acre, sown: Aug 4, 1960. Varieties: Trefoil - English; Ryegrass - Western Wolths.

Barley: "Fallow" plots and "early" green manure plots ploughed: Dec 13, 1960. "Late" green manure plots ploughed: Feb 7, 1961. 'Nitro-Chalk' applied: Mar 14. Seed drilled at 2½ bushels per acre: Mar 15. Trefoil and ryegrass undersown: Apr 19. Combine harvested: Aug 10. Variety: Herta.

Standard errors per plot.

Potatoes.	Total tubers:	0.200 tons per acre or 10.4% (18 d.f.)
Barley.	Grain (at 85% D.M.):	2.57 cwt per acre or 10.6% (20 d.f.)

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

	Green manures	Ploughed in	Dry matter	Nitrogen
For early potatoes	Trefoil		22.0	0.623
	Ryegrass		25.9	0.323
For barley	Trefoil	Early	9.2	0.295
	Ryegrass	Early	22.4	0.312
	Trefoil	Late	7.8	0.231
	Ryegrass	Late	23.1	0.388

Note: The low yield of potatoes was due to severe frost damage.

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61/B/3.2

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		
	None	1½	0.6	1.2	None	10	Mean
Excluding plots fallow under old scheme							
Undersown green manures for potatoes	(±0.071)		(±0.071)		(±0.071)		(±0.050)
None	1.88	1.81	1.77	1.92	1.88	1.80	1.84
	(±0.100)		(±0.100)		(±0.100)		(±0.071)
Trefoil	1.97	2.01	1.95	2.03	2.08	1.90	1.99
Ryegrass	2.15	2.15	2.15	2.16	1.94	2.36	2.15
Straw: tons per acre			(±0.071)		(±0.071)		(±0.050)
None			1.88	2.06	1.96	1.98	1.97
1½			1.93	1.95	1.94	1.95	1.94
N: cwt per acre (including basal)							
0.6					1.90	1.92	1.91
1.2					2.00	2.01	2.01
Mean (±0.050)					1.95	1.97	1.96
Plots fallow under old scheme							
Straw: tons per acre			(±0.142)		(±0.142)		(±0.100)
None			1.88	1.63	1.66	1.85	1.75
1½			1.74	1.91	1.85	1.80	1.82
N: cwt per acre (including basal)							
0.6					1.67	1.95	1.81
1.2					1.84	1.70	1.77
Mean (±0.100)					1.75	1.82	1.79

Undersown green manures for potatoes

Old scheme	None Fallow	None	Trefoil	Ryegrass	Mean
		Excluding fallow			
	1.79 (±0.071)	1.84 (±0.050)	1.99	2.15 (±0.071)	1.93

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

	Green manures: In barley for potatoes		Green manures: After potatoes for barley		N: cwt per acre (including basal)		Dung to cabbages 1952: tons per acre		
	None	Under-sown	Trefoil	Rye-grass	0.23	0.46	None	10	Mean
Excluding plots fallow under old scheme									
	(±0.91)		(±0.91)		(±0.91)		(±0.91)		(±0.64)
Green manures ploughed in: Early	25.2	24.2	26.0	23.4	23.1	26.3	23.3	26.1	24.7
Green manures ploughed in: Late	25.8	26.0	26.5	25.2	24.3	27.4	24.3	27.4	25.9
Green manures in barley for potatoes: None			26.4	24.6	23.7	27.3	24.2	26.8	25.5
Green manures in barley for potatoes: Undersown			26.2	24.0	23.8	26.4	23.5	26.6	25.1
Green manures after potatoes for barley: Trefoil					25.5	27.0	25.5	27.0	26.3
Green manures after potatoes for barley: Ryegrass					21.9	26.7	22.2	26.5	24.3
N: cwt per acre (including basal): 0.23							22.7	24.7	23.7
N: cwt per acre (including basal): 0.46							25.0	28.8	26.9
Mean (±0.64)							23.8	26.7	25.3

Old scheme	Green manures after potatoes for barley: None Fallow	Trefoil (Excluding fallow)	Ryegrass (Excluding fallow)	Mean
	19.8 (±0.91)	26.3	24.3 (±0.64)	24.2

Mean dry matter % as harvested: 82.9

Plots fallow under old scheme

N: cwt per acre (including basal)	(±1.82)		(±1.28)
0.23	14.5	21.9	18.2
0.46	18.0	24.7	21.4
Mean (±1.28)	16.3	23.3	19.8

61/B/3.3

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LEY AND ARABLE ROTATIONS

Woburn Stackyard 1961 - the 24th year.

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

Liming: The routine dressing (before barley) is now increased to 2 tons $CaCO_3$ per acre.

Potato lifting: Owing to the introduction of the 2-row elevator digger yields are now estimated from 6 rows per plot instead of 8.

Cultivations, etc.,

Treatment crops

Ley rotations

Ley 1st year. Ploughed twice: Aug 25, 1960 and Jan 11, 1961. PK fertilisers and 'Nitro-Chalk' applied, seed sown at 40 lb per acre: Apr 10. 2nd dressing of 'Nitro-Chalk' applied, sprayed with MCPB at 4 pints in 40 gallons per acre: June 19. 3rd dressing of 'Nitro-Chalk' applied: Aug 11. Grazed 4 circuits: July 18 - Oct 17. Seeds mixture: 20 lb S24 Perennial Ryegrass, 11 lb S143 Cocksfoot, 6 lb Late Flowering Red Clover, 3 lb S100 White Clover per acre.

Ley 2nd year. Potash and nitrogen fertiliser applied: Mar 15, June 19, July 27, 1961. Grazed 7 circuits: Apr 17 - Oct 9.

Ley 3rd year. Potash and nitrogen fertiliser applied: Mar 15, June 19, July 27, 1961. Grazed 7 circuits: Apr 21 - Oct 1.

Lucerne 1st year. Ploughed twice: Aug 25, 1960 and Jan 11, 1961. Treated for control of stem eelworm:- Plots 25, 26, 29, 30 fumigated with undiluted metham sodium ("Vapam") at 2 pints to 50 sq. ft: Mar 15. Ploughed: Apr 19. PK fertilisers applied: May 8. Seed drilled at 20 lb per acre: May 9. Sprayed (against weevil) with DDT emulsion (25% DDT) at 2 pints in 40 gallons per acre: May 20. Sprayed with dieldrin (as a bird deterrent) at $2\frac{1}{2}$ pints in 40 gallons per acre: June 12. Cut once: Sept 18. Variety: Du Puits.

Lucerne 2nd year. Muriate of potash applied: Mar 15, 1961. Cut 3 times: June 14, July 24, Sept 18.

Lucerne 3rd year. Treated for control of stem eelworm:- Plots 69, 70, 79, 80 treated with 5% granular 'E18133' at 8 lb active material per acre: Oct 20, 1960. Muriate of potash applied: Mar 15, 1961. Cut 3 times: June 14, July 24, Sept 18.

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Arable rotations

Potatoes 1st course. Ploughed twice: Aug 25, 1960 and Jan 11, 1961. Compound fertiliser applied, potatoes machine planted: Mar 20. Earthed up: June 16. Haulm destroyed mechanically: Sept 19. Lifted: Sept 21. Variety: Majestic.

Rye 2nd course. Ploughed: Oct 14, 1960. Seed drilled at 3 bushels per acre: Jan 18, 1961. Seeds hay mixture undersown on 4 plots: Apr 11. 'Nitro-Chalk' applied: Apr 12. Combine harvested: Aug 28. Variety: King II.

Seeds hay 3rd course. Seeds undersown at 30 lb per acre in rye: Apr 7, 1960. Potash and nitrogen fertiliser applied: Mar 15, 1961. 'Nitro-Chalk' applied: May 29. Cut twice: May 29 and Aug 14. Seeds mixture: 19 lb S24 Perennial Ryegrass, 9 lb Late Flowering Red Clover, 2 lb Alsike American per acre.

Carrots 3rd course. Ploughed twice: Aug 25, 1960 and Jan 7, 1961. Potash and nitrogen fertilisers applied: Apr 12. Seed drilled at 5 lb per acre: Apr 14. Sprayed with demeton-methyl at 12 fluid oz in 40 gallons per acre: May 29 and June 12. Thinned: July 3 - 10. Lifted: Sept 14. Variety: Scarlet Intermediate.

Test crops

Sugar beet 1st test crop. Treated for control of lucerne stem eelworm:- Plots 37 and 38 split for fumigation with undiluted metham sodium ("Vapam") at 1 pint to 50 sq. ft: Nov 24, 1960. Ground chalk applied at 16 cwt per acre: Jan 5, 1961. Dung applied: Jan 16. Ploughed: Jan 19. Treatment fertilisers and basal compound fertilisers applied: Mar 27. Seed drilled at 10 lb per acre: Apr 10. Sprayed (against flea beetle) with DDT emulsion (25% DDT) at 3 pints in 40 gallons per acre: May 20. Singled: May 30. Sprayed with demeton methyl at 12 fluid oz in 40 gallons per acre: June 20, July 10. Lifted: Oct 9. Variety: Klein E.

Barley 2nd test crop. Ground chalk applied at 40 cwt per acre: Jan 5, 1961. Ploughed: Jan 7. 'Nitro-Chalk' applied, muriate of potash applied to equalise treatment dressings to 1960 sugar beet test crop: Mar 13. Seed drilled at $2\frac{1}{2}$ bushels per acre: Mar 15. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 6. Combine harvested: Aug 12. Variety: Herta.

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Standard errors per plot. Test crops.

Sugar beet.	Roots (washed).	Whole plot:	1.511 tons per acre or 9.3% (4 d.f.)
		½ plot:	1.376 tons per acre or 8.4% (4 d.f.)
		⅛ plot:	1.470 tons per acre or 9.0% (24 d.f.)
	Total sugar.	Whole plot:	4.26 cwt per acre or 7.9% (4 d.f.)
		½ plot:	4.34 cwt per acre or 8.1% (4 d.f.)
		⅛ plot:	4.87 cwt per acre or 9.1% (24 d.f.)
	Tops.	Whole plot:	1.418 tons per acre or 10.9% (4 d.f.)
		½ plot:	1.196 tons per acre or 9.2% (4 d.f.)
		⅛ plot:	1.161 tons per acre or 8.9% (24 d.f.)
Barley.	Grain (at 85% dry matter).	Whole plot:	3.56 cwt per acre or 12.2% (4 d.f.)
		½ plot:	0.83 cwt per acre or 2.8% (4 d.f.)

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61/B/4.4

Summary of Results

Treatment crops

Ley, sheep days of grazing per acre

1st year	2nd year	3rd year
915	1638	1753

Lucerne, dry matter: cwt per acre

	1st cut	2nd cut	3rd cut	Total
1st year				
Dung in 1959: tons per acre				
None	18.2			18.2
15	23.1			23.1
Difference	+4.9			+4.9
Previous rotation				
Lucerne	19.9			19.9
Arable with roots	21.3			21.3
Mean	20.6			20.6
2nd year				
Dung in 1958: tons per acre				
None	12.4	14.1	6.0	32.5
15	24.0	18.7	9.0	51.7
Difference	+11.6	+4.6	+3.0	+19.2
Previous rotation				
Lucerne	16.2	14.3	6.9	37.4
Arable with hay	20.1	18.5	8.1	46.7
Mean	18.2	16.4	7.5	42.0
3rd year				
Dung in 1957				
None	9.8	14.3	11.2	35.3
15	16.7	19.1	13.8	49.6
Difference	+6.9	+4.8	+2.6	+14.3
Previous rotation				
Lucerne	10.6	16.2	17.1	43.9
Arable with roots	15.9	17.2	7.9	41.0
Mean	13.2	16.7	12.5	42.4

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Treatment crops

	Potatoes		Rye	
	Total tubers: tons per acre	Percentage ware ($1\frac{5}{8}$" riddle)	Grain: (at 85% D.M.) cwt per acre	Straw: cwt per acre
Dung: tons per acre				
None	11.38	97.6	24.8	37.8
15*	13.34	97.4	25.3	39.8
Difference	+1.96	-0.2	+0.5	+2.0
Previous rotation				
Ley	13.65	97.9	26.8	39.3
Lucerne	13.40	97.4	25.8	41.0
Arable with hay	10.74	96.5	22.4	35.8
Arable with roots	11.67	98.0	25.2	39.3
Mean	12.36	97.5	25.1	38.8

Hay

Yield, dry matter: cwt per acre

	1st cut	2nd cut	Total
Dung in 1957: tons per acre			
None	62.6	9.8	72.4
15	66.6	13.2	79.8
Difference	+4.0	+3.4	+7.4
Previous rotation			
Ley	66.8	12.2	79.0
Arable with hay	62.4	10.8	73.2
Mean	64.6	11.5	76.1

Carrots

	Roots washed: tons per acre	Tops tons per acre
Dung in 1957: tons per acre		
None	4.46	1.85
15	6.02	2.54
Difference	1.56	0.69
Previous rotation		
Lucerne	5.34	2.16
Arable with roots	5.14	2.22
Mean	5.24	2.20

*Dung applied: Potatoes for test crop sugar beet in 1959.
Rye for test crop sugar beet in 1958.

Mean dry matter % as harvested: Rye, Grain: 82.6
Straw: 93.2

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1st Test crop

Sugar beet

Previous rotation

	Ley	Lucerne	Arable with hay	Arable with roots	Mean
Roots (washed): tons per acre					
Mean (±1.068)	17.48	16.52	15.68	15.60	16.32
Dung: tons per acre					
None (±1.271)	16.33	14.43	13.03	12.87	14.17
15	18.63	18.61	18.32	18.32	18.47
Difference (±1.376)	+2.30	+4.18	+5.29	+5.45	+4.30
Response to additional 0.72 cwt N per acre					
		(±1.040)			(±0.520)
No dung	-0.07	-0.27	+0.58	+0.19	+0.11
Dung 15 tons per acre	+0.94	-0.86	-0.46	-0.56	-0.24
Response to additional 0.9 cwt K_2O per acre					
		(±1.040)			(±0.520)
No dung	-1.63	+0.31	+0.26	+0.41	-0.17
Dung 15 tons per acre	+0.60	-0.04	+1.58	-1.60	+0.14
Sugar Percentage					
Mean	16.6	16.3	16.2	16.5	16.4
Dung: tons per acre					
None	16.6	16.3	16.0	16.2	16.3
15	16.6	16.2	16.5	16.9	16.5
Difference	0.0	-0.1	+0.5	+0.7	+0.2
Response to additional 0.72 cwt N per acre					
No dung	-1.0	-0.9	-0.9	-1.0	-1.0
Dung 15 tons per acre	-1.3	-1.1	-0.2	-0.5	-0.7
Response to additional 0.9 cwt K_2O per acre					
No dung	+0.1	-0.1	-0.1	-0.6	-0.1
Dung 15 tons per acre	+0.2	+0.1	+0.2	+0.3	+0.3

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1st Test Crop

Sugar beet

Previous rotation

	Ley	Lucerne	Arable with hay	Arable with roots	Mean
Total sugar: cwt per acre					
Mean (±3.01)	57.9	53.7	51.0	51.7	53.6
Dung: tons per acre					
None (±3.71)*	54.0	47.1	41.6	41.6	46.1
15	61.7	60.3	60.3	61.8	61.1
Difference (±4.34)	+7.7	+13.2	+18.7	+20.2	+15.0 (±2.17)
Response to additional 0.72 cwt N per acre		(±3.44)			(±1.72)
No dung	-3.7	-3.4	-0.6	-2.3	-2.5
Dung 15 tons per acre	-1.6	-7.1	-1.9	-3.6	-3.5
Response to additional 0.9 cwt K_2O per acre		(±3.44)			(±1.72)
No dung	-4.6	+1.0	+0.4	0.0	-0.8
Dung 15 tons per acre	+2.5	+0.5	+5.9	-4.4	+1.1
Tops: tons per acre					
Mean (±1.002)	12.75	13.67	13.39	12.24	13.01
Dung: tons per acre					
None (±1.167)*	12.57	13.03	12.44	11.66	12.42
15	12.93	14.31	14.35	12.82	13.60
Difference (±1.196)	+0.36	+1.28	+1.91	+1.16	+1.18 (±0.598)
Response to additional 0.72 cwt N per acre		(±0.821)			(±0.410)
No dung	+3.14	+3.62	+3.22	+4.15	+3.53
Dung 15 tons per acre	+2.96	+1.88	+2.80	+2.23	+2.47
Response to additional 0.9 cwt K_2O per acre		(±0.821)			(±0.410)
No dung	+0.96	-0.62	+0.54	-0.41	+0.13
Dung 15 tons per acre	-1.32	-0.06	+1.88	+0.07	+0.14

*For use in horizontal and diagonal comparisons only.

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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 roots	Mean
Roots (washed): tons per acre						
Mean	(±1.101)	17.50	16.61	14.82	16.28	16.30
None	(±1.468)*	16.89	14.25	12.00	12.88	14.00
15		18.11	18.97	17.64	19.69	18.60
Difference	(±1.875)	+1.22	+4.72	+5.64	+6.81	+4.60
Sugar percentage						
Mean		17.1	16.6	16.7	17.0	16.8
None		17.1	17.1	16.6	17.1	17.0
15		17.0	16.2	16.8	16.9	16.7
Difference		-0.1	-0.9	+0.2	-0.2	-0.3
Total sugar: cwt per acre						
Mean	(±3.36)	59.7	55.0	49.4	55.1	54.8
None	(±4.49)*	57.9	48.5	39.8	44.0	47.5
15		61.4	61.5	59.0	66.3	62.0
Difference	(±6.05)	+3.5	+13.0	+19.2	+22.3	+14.5
Tops: tons per acre						
Mean	(±0.966)	10.91	12.03	11.58	11.16	11.42
None	(±1.288)*	10.54	10.79	10.78	9.93	10.51
15		11.27	13.27	12.38	12.38	12.32
Difference	(±1.562)	+0.73	+2.48	+1.60	+2.45	+1.81

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2nd Test Crop

Barley

Previous rotation

Dung in 1960: tons per acre	Ley	Lucerne	Arable with hay	Arable with roots	Mean
Grain (at 85% dry matter): cwt per acre					
None (±2.55)*	30.6	25.2	26.5	29.4	27.9
15	31.3	30.0	29.8	31.8	30.7
Mean (±2.41)	30.9	27.6	28.1	30.6	29.3
Difference (±0.83)	+0.7	+4.8	+3.3	+2.4	+2.8 (±0.42)
Straw (at 85% dry matter): cwt per acre					
None	24.2	15.8	16.7	18.7	18.8
15	25.6	20.1	20.9	21.5	22.0
Mean	24.9	17.9	18.8	20.1	20.4
Difference	+1.4	+4.3	+4.2	+2.8	+3.2

*For use in horizontal and diagonal comparisons only.

Mean dry matter % as harvested: Grain 82.8
Straw 80.8

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61/B/5.1

WOBURN MARKET GARDEN EXPERIMENT

Organic manures, N,P,K and Mg - Lansome Field 1961, the 20th year of the experiment, the 1st year with revised treatments.

Revised treatments commencing 1961:-

The following treatments are now discontinued:
No organics with none; 0.3; 0.6; 0.9 cwt N per acre.
N at 0.3 cwt per acre to plots receiving organics.

The following treatments are now superimposed on the existing design:-

To plots without organics: all combinations of:
Nitrogen: 0.9; 1.8 cwt N per acre as 'Nitro-Chalk'. (N_1: N_2)
Phosphate and potash: 1.5 cwt P_2O_5 with 1.5 or 3.0 cwt K_2O per acre as compound fertiliser 20% P_2O_5, 20% K_2O or 14% P_2O_5, 28% K_2O. (P_1K_1: P_1K_2)
There are 2 plots per series for each of the above factorial combinations and of these one has all its fertiliser applied for all crops in the seedbed; the other has half its PK (for potatoes) and half its NPK (for beet and leeks) ploughed in with the organics; the remainder of its dressing is reserved for seedbed application.

To plots receiving organics at 10 and 20 tons per acre: NPK at the lower rate shown above v no fertiliser (2 plots per series for each treatment).

In addition all plots are split for a test of 0 v 500 lb of magnesium sulphate per acre.

Area of each plot (acres):		Area harvested (acres):
Leeks (whole plot)	0.0125	0.0104
Early potatoes (sub plot)	0.0063	0.0023
Globe beet (sub plot)	0.0063	0.0011

Harvesting of globe beet: These are now harvested on 2 dates, about one month apart, 3 rows per sub-plot being harvested on each date.

Note: The results for the 1961-62 leeks will be included in the 1962 report.

Cultivations, etc.:

Leeks 1960-61. Organic manures applied (vegetable compost, at ½ rate): July 20, 1960. Ploughed: July 21. 'Nitro-Chalk' and basal fertiliser applied, leeks planted: July 25. Second dressing of 'Nitro-Chalk' applied: Sept 9. Harvested: Feb 22-Apr 6, 1961. Variety: Musselburgh.

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Early potatoes: Ploughed: Sept 21, 1960. Organic manures applied: Jan 18, 1961. PK applied, ploughed second time: Jan 20. N and second half of PK applied, potatoes machine planted: Mar 18. Earthed up: May 23. Lifted: July 20. Variety: Arran Pilot.
Globe beet. Ground chalk applied at 20 cwt per acre, organic manures and NPK applied: Apr 11, 1961. Ploughed: Apr 12. Second half of NPK applied: May 2. Seed drilled at 14 lb per acre: May 8. Sprayed against flea-beetle with DDT emulsion (25% DDT) at 2 pints in 40 gallons per acre: May 20. Singled: June 16. Lifted: July 17 and Aug 9. Variety: Detroit.

Standard errors per plot.

Leeks 1960-61.	Saleable produce:	0.818 tons per acre	or 14.6% (17 d.f.)
Early potatoes.	Total tubers:		
	whole plot:	0.702 tons per acre	or 10.2% (15 d.f.)
	sub plot:	0.448 tons per acre	or 6.5% (16 d.f.)
Globe beet.	1st harvest:		
Saleable bulbs	whole plot:	0.457 tons per acre	or 10.7% (15 d.f.)
	sub plot:	0.615 tons per acre	or 14.3% (16 d.f.)
	2nd harvest:		
	whole plot:	1.829 tons per acre	or 15.8% (15 d.f.)
	sub plot:	0.990 tons per acre	or 8.6% (16 d.f.)
	Mean of 2 harvests:		
	whole plot:	1.036 tons per acre	or 13.0% (15 d.f.)
	sub plot:	0.612 tons per acre	or 7.7% (16 d.f.)

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Summary of Results

Organic manures	Level of manuring: tons per acre	N: cwt per acre None	0.3	0.6	0.9	Mean
Leeks 1960-61. Saleable produce: tons per acre						
			(±0.578)			(±0.409)
None		1.72	3.94	4.44	5.23	2.83*
Dung	10	5.70	5.06			5.38
	20	6.68	7.14			6.91
Sludge compost	10	4.92	6.55			5.74
	20	6.46	6.75			6.60
Sludge	10	6.00	6.19			6.10
	20	6.15	6.90			6.53
Vegetable compost	10	4.92	5.94			5.43
	20	5.72	5.64			5.68
Mean (±0.204)		5.82+	6.27+			5.60**
Leeks 1960-61. Percentage saleable (by number)						
None		81.1	91.8	95.2	99.5	86.4*
Dung	10	99.6	99.7			99.6
	20	98.2	99.2			98.7
Sludge compost	10	99.4	100.0			99.7
	20	99.6	99.0			99.3
Sludge	10	100.0	98.9			99.5
	20	97.8	100.0			98.9
Vegetable compost	10	96.5	98.7			97.6
	20	99.4	98.6			99.0
Mean		98.8+	99.3+			97.6**

*Mean over None and 0.3 cwt N per acre only. **General mean.

+Excluding 'no organics'.

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Organic manures	tons per acre	Mag.sulph. lb p.a. Mean	None	500	Diff.	Fertiliser None	$N_1P_1K_1$	Diff.
Early potatoes: Total tubers tons per acre								
		(±0.351)	(±0.385)(1)		(±0.317)	(±0.496)		(±0.702)
Dung	10	6.84	7.11	6.58	-0.53	5.48	8.21	+2.73
	20	8.03	8.19	7.88	-0.31	6.74	9.33	+2.59
Sludge compost	10	6.25	6.24	6.26	+0.02	5.20	7.30	+2.10
	20	7.13	7.21	7.06	-0.15	6.18	8.09	+1.91
Sludge	10	6.11	6.06	6.17	+0.11	5.41	6.81	+1.40
	20	6.75	6.66	6.84	+0.18	6.23	7.27	+1.04
Vegetable compost	5	6.25	6.54	5.96	-0.58	4.88	7.62	+2.74
	10	7.57	7.88	7.27	-0.61	6.53	8.61	+2.08
Mean		6.87	6.98	6.75	-0.23 (±0.112)	5.83	7.91	+2.08 (±0.248)
NPK								
111*		6.71	6.93	6.49	-0.44			
111		5.79	6.40	5.18	-1.22			
211*		6.30	5.72	6.88	+1.16			
211		6.04	6.35	5.72	-0.63			
112*		6.61	6.15	7.07	+0.92			
112		6.83	6.54	7.12	+0.58			
212*		8.26	7.27	9.25	+1.98			
212		6.47	6.74	6.20	-0.54			
Mean		6.63	6.51	6.74	+0.23			
Globe beet, Saleable bulbs: tons per acre. 1st harvest								
		(±0.229)	(±0.316)		(±0.435)	(±0.323)		(±0.457)
Dung	10	5.05	5.20	4.90	-0.30	4.58	5.53	+0.95
	20	6.12	6.23	6.00	-0.23	5.60	6.63	+1.03
Sludge compost	10	3.69	3.79	3.59	-0.20	2.64	4.75	+2.11
	20	4.26	4.04	4.47	+0.43	3.67	4.85	+1.18
Sludge	10	3.17	2.99	3.34	+0.35	2.16	4.17	+2.01
	20	2.84	2.97	2.72	-0.25	1.81	3.87	+2.06
Vegetable compost	5	4.12	4.15	4.10	-0.05	3.04	5.20	+2.16
	10	5.11	4.98	5.25	+0.27	3.95	6.28	+2.33
Mean		4.29	4.29	4.30	+0.01 (±0.154)	3.43	5.16	+1.73 (±0.162)
NPK								
111*		2.16	2.41	1.91	-0.50			
111		2.31	2.21	2.41	+0.20			
211*		3.06	3.12	3.01	-0.11			
211		3.26	2.71	3.82	+1.11			
112*		2.61	2.81	2.41	-0.40			
112		3.92	3.42	4.42	+1.00			
212*		1.81	1.81	1.81	0.00			
212		2.51	2.31	2.71	+0.40			
Mean		2.71	2.60	2.81	+0.21			

*$\frac{1}{2}$ $\frac{1}{2}$ NPK or PK ploughed in in seedbed.

(1) For use in vertical and diagonal comparisons

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Organic manures	tons per acre	Mean	Mag. sulph. lb p.a. None	500	Diff.	Fertiliser None	$N_1P_1K_1$	Diff.
Globe beet, Saleable bulbs: tons per acre. 2nd harvest								
		(±0.914)	(±0.979)(1)		(±0.700)	(±1.293)		(±1.829)
Dung	10	12.22	11.83	12.61	+0.78	11.43	13.01	+1.58
	20	15.09	14.89	15.30	+0.41	13.15	17.04	+3.89
Sludge	10	11.01	10.86	11.17	+0.31	9.04	12.99	+3.95
compost	20	10.69	10.64	10.74	+0.10	9.14	12.24	+3.10
Sludge	10	10.70	10.50	10.90	+0.40	9.55	11.85	+2.30
	20	10.34	10.60	10.07	-0.53	7.86	12.82	+4.96
Vegetable	5	10.01	10.04	9.98	-0.06	7.57	12.44	+4.87
compost	10	12.53	12.25	12.82	+0.57	9.74	15.33	+5.59
Mean		11.57	11.45	11.70	+0.25 (±0.248)	9.68	13.46	+3.78 (±0.647)
NPK								
111*		5.42	3.90	6.93	+3.03			
111		5.80	5.73	5.88	+0.15			
211*		8.80	7.36	10.25	+2.89			
211		9.74	9.32	10.17	+0.85			
112*		10.09	9.95	10.23	+0.28			
112		12.08	12.14	12.01	-0.13			
212*		7.18	5.93	8.44	+2.51			
212		10.84	10.71	10.98	+0.27			
Mean		8.75	8.13	9.36	+1.23			

Globe beet, Saleable bulbs: tons per acre. Mean of 2 harvests

		(±0.518)	(±0.561)		(±0.432)	(±0.732)		(±1.036)
Dung	10	8.64	8.52	8.76	+0.24	8.01	9.27	+1.26
	20	10.61	10.56	10.65	+0.09	9.38	11.84	+2.46
Sludge	10	7.36	7.33	7.38	+0.05	5.84	8.87	+3.03
compost	20	7.48	7.34	7.61	+0.27	6.41	8.55	+2.14
Sludge	10	6.93	6.74	7.12	+0.38	5.86	8.01	+2.15
	20	6.59	6.79	6.40	-0.39	4.84	8.35	+3.51
Vegetable	5	7.07	7.10	7.04	-0.06	5.31	8.83	+3.52
compost	10	8.83	8.62	9.04	+0.42	6.85	10.81	+3.96
Mean		7.94	7.87	8.00	+0.13 (±0.153)	6.56	9.31	+2.75 (±0.366)
NPK								
111*		3.79	3.16	4.42	+1.26			
111		4.06	3.97	4.14	+0.17			
211*		5.94	5.24	6.63	+1.39			
211		6.51	6.02	7.00	+0.98			
112*		6.35	6.38	6.32	-0.06			
112		8.00	7.78	8.22	+0.44			
212*		4.50	3.87	5.12	+1.25			
212		6.68	6.51	6.84	+0.33			
Mean		5.73	5.37	6.09	+0.72			

*½ ½ ½ NPK ploughed in in seedbed.

(1) For use in vertical and diagonal comparisons.

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Organic manures	tons per acre	Mean	Mag.sulph.lb p.a. None	500	Diff.	Fertiliser None	$N_1P_1K_1$	Diff.
Globe beet, Total produce: tons per acre. 1st harvest								
Dung	10	10.48	10.78	10.18	-0.60	8.90	12.06	+3.16
	20	12.42	12.66	12.19	-0.47	11.58	13.27	+1.69
Sludge	10	8.15	8.42	7.89	-0.53	6.71	9.60	+2.89
compost	20	9.17	8.97	9.37	+0.40	7.76	10.58	+2.82
Sludge	10	7.55	7.31	7.79	+0.48	6.38	8.72	+2.34
	20	7.12	7.19	7.06	-0.13	4.98	9.27	+4.29
Vegetable	5	8.57	8.57	8.57	0.00	6.63	10.50	+3.87
compost	10	10.55	10.33	10.78	+0.45	8.74	12.36	+3.62
Mean		9.25	9.28	9.23	-0.05	7.71	10.79	+3.08
NPK								
111*		4.68	5.23	4.12	-1.11			
111		5.98	5.43	6.53	+1.10			
211*		7.34	7.14	7.54	+0.40			
211		7.28	6.93	7.64	+0.71			
112*		5.68	5.93	5.43	-0.50			
112		7.84	7.14	8.54	+1.40			
212*		4.22	4.12	4.32	+0.20			
212		5.58	5.33	5.83	+0.50			
Mean		6.08	5.91	6.24	+0.33			
Globe beet, Total produce: tons per acre. 2nd harvest								
Dung	10	16.98	16.48	17.48	+1.00	14.92	19.03	+4.11
	20	21.40	21.47	21.34	-0.13	17.81	24.99	+7.18
Sludge	10	15.60	15.41	15.79	+0.38	12.90	18.30	+5.40
compost	20	15.50	15.42	15.59	+0.17	13.07	17.94	+4.87
Sludge	10	15.44	15.22	15.66	+0.44	14.06	16.82	+2.76
	20	15.25	15.60	14.89	-0.71	11.80	18.69	+6.89
Vegetable	5	14.25	14.40	14.11	-0.29	10.50	18.00	+7.50
compost	10	17.32	16.99	17.65	+0.66	13.25	21.39	+8.14
Mean		16.47	16.37	16.56	+0.19	13.54	19.40	+5.86
NPK								
111*		8.44	6.56	10.31	+3.75			
111		8.62	8.49	8.74	+0.25			
211*		12.71	10.90	14.52	+3.62			
211		13.47	12.99	13.95	+0.96			
112*		15.08	15.05	15.10	+0.05			
112		17.01	17.26	16.76	-0.50			
212*		11.76	9.82	13.69	+3.87			
212		15.82	15.35	16.30	+0.95			
Mean		12.86	12.05	13.67	+1.62			

*$\frac{1}{2}$ NPK ploughed in $\frac{1}{2}$ in seedbed.

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Organic manures	tons per acre	Mean	Mag. sulph. lb p.a. None	500	Diff.	Fertiliser None	$N_1P_1K_1$	Diff.
Globe beet, Total produce: tons per acre. Mean of two harvests								
Dung	10	13.73	13.63	13.83	+0.20	11.91	15.55	+3.64
	20	16.92	17.07	16.77	-0.30	14.70	19013	+4.43
Sludge	10	11.88	11.91	11.84	-0.07	9.80	13.95	+4.15
compost	20	12.34	12.20	12.48	+0.28	10.42	14.26	+3.84
Sludge	10	11.50	11.27	11.73	+0.46	10.22	12.77	+2.55
	20	11.19	11.40	10.98	-0.42	8.39	13.98	+5.59
Vegetable	5	11.41	11.48	11.34	-0.14	8.57	14.26	+5.69
compost	10	13.94	13.66	14.22	+0.56	11.00	16.88	+5.88
Mean		12.86	12.83	12.90	+0.07	10.63	15.10	+4.47
NPK								
111*		6.56	5.90	7.22	+1.32			
111		7.30	6.96	7.64	+0.68			
211*		10.02	9.02	11.03	+2.01			
211		10.38	9.96	10.80	+0.84			
112*		10.38	10.49	10.26	-0.23			
112		12.42	12.20	12.65	+0.45			
212*		7.98	6.97	9.00	+2.03			
212		10.70	10.34	11.06	+0.72			
Mean		9.47	8.98	9.96	+0.98			
Globe beet, Plant number: thousands per acre. 1st harvest								
Dung	10	77.7	80.3	75.2	-5.1	81.5	74.0	-7.5
	20	86.1	89.1	83.1	-6.0	95.7	76.5	-19.2
Sludge	10	80.9	86.5	75.4	-11.1	89.2	72.7	-16.5
compost	20	69.2	71.8	66.6	-5.2	59.9	78.5	+18.6
Sludge	10	73.5	71.1	75.8	+4.7	76.7	70.2	-6.5
	20	68.2	66.6	69.8	+3.2	59.6	76.7	+17.1
Vegetable	5	71.2	67.1	75.4	+8.3	76.7	65.7	-11.0
compost	10	85.2	88.0	82.4	-5.6	88.5	82.0	-6.5
Mean		76.5	77.6	75.4	-2.2	78.5	74.5	-4.0
NPK								
111*		48.6	54.0	43.2	-10.8			
111		76.0	74.7	77.4	+2.7			
211*		85.5	85.5	85.5	0.0			
211		89.2	80.1	98.2	+18.1			
112*		47.2	54.0	40.5	-13.5			
112		74.7	81.9	67.5	-14.4			
212*		39.6	36.9	42.3	+5.4			
212		41.0	36.0	45.9	+9.9			
Mean		62.7	62.9	62.6	-0.3			

*$\frac{1}{2}$ NPK ploughed in $\frac{1}{2}$ in seedbed.

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Organic manures	tons per acre	Mean	Mag.sulph.lb. p.a. None	500	Diff.	Fertiliser None	$N_1P_1K_1$	Diff.
Globe beet, Plant number: thousands per acre. 2nd harvest								
Dung	10	84.2	85.1	83.3	-1.8	91.8	76.5	-15.3
	20	87.6	89.6	85.7	-3.9	86.0	89.3	+3.3
Sludge	10	78.7	74.7	82.6	+7.9	78.1	79.2	+1.1
compost	20	67.3	66.2	68.4	+2.2	61.9	72.7	+10.8
Sludge	10	83.4	83.3	83.5	+0.2	86.9	79.9	-7.0
	20	74.7	73.6	75.8	+2.2	74.0	75.4	+1.4
Vegetable	5	80.9	77.6	84.2	+6.6	85.5	76.3	-9.2
compost	10	83.4	84.4	82.4	-2.0	83.3	83.5	+0.2
Mean		80.0	79.3	80.7	+1.4	80.9	79.1	-1.8
NPK								
111*		62.6	57.6	67.5	+9.9			
111		47.2	47.7	46.8	-0.9			
211*		69.8	69.3	70.2	+0.9			
211		90.4	91.8	89.1	-2.7			
112*		82.4	94.5	70.2	-24.3			
112		78.8	84.6	72.9	-11.7			
212*		58.5	53.1	63.9	+10.8			
212		72.0	60.3	83.7	+23.4			
Mean		70.2	69.9	70.5	+0.6			
Globe beet, Plant number: thousands per acre. Mean of two harvests								
Dung	10	81.0	82.7	79.3	-3.4	86.7	75.3	-11.4
	20	86.9	89.4	84.4	-5.0	90.9	82.9	-8.0
Sludge	10	79.8	80.6	79.0	-1.6	83.7	76.0	-7.7
compost	20	68.3	69.0	67.5	-1.5	60.9	75.6	+14.7
Sludge	10	78.5	77.2	79.7	+2.5	81.8	75.1	-6.7
	20	71.5	70.1	72.8	+2.7	66.8	76.1	+9.3
Vegetable	5	76.1	72.4	79.8	+7.4	81.1	71.0	-10.1
compost	10	84.3	86.3	82.4	-3.9	85.9	82.8	-3.1
Mean		78.3	78.5	78.1	-0.4	79.7	76.8	-2.9
NPK								
111*		55.6	55.8	55.4	-0.4			
111		61.6	61.2	62.1	+0.9			
211*		77.6	77.4	77.8	+0.4			
211		89.8	86.0	93.6	+7.6			
112*		64.8	74.2	55.4	-18.8			
112		76.7	83.2	70.2	-13.0			
212*		49.0	45.0	53.1	+8.1			
212		56.5	48.2	64.8	+16.6			
Mean		66.5	66.4	66.6	+0.2			

*$\frac{1}{2}$ NPK ploughed in $\frac{1}{2}$ in seedbed.

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61/B/6.1

IRRIGATION EXPERIMENT

The 11th year - revised 1960

The effects of irrigation and nitrogen - Woburn Butt Close 1961.

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

Cut grass: The basal PK compound is now applied in winter. Applications of muriate of potash are now made in spring and after each cut except the last at the rates 0.3; 0.6 cwt K_2O per acre. Plots of the different treatments may be cut and manured independently if rates of growth vary. (applied to ½ plots)

Beans: Owing to weather conditions the third year crop in the rotation was spring, and not winter beans.

Area of each whole plot (acres): Spring beans: 0.0555.
Sub plots (acres): Grass: 0.0264; remainder: 0.0277.
Area harvested (acres): Early potatoes: 0.0171; barley: 0.0098; spring beans: 0.0181; Cut grass: 0.0165.

Rainfall and Irrigation: inches

Week ending	Rain-fall	Grass C	Barley C	Potatoes C	Beans A	Beans B	Beans C
May 1	0.36						
8	0.62						
15	-						
22	0.01	0.50	0.50	0.50	-	0.50	0.50
29	0.01	-	-	-	-	-	-
June 5	0.23	0.50	0.50	0.50	-	0.50	0.50
12	0.03	0.75	0.50	0.75	-	0.50	0.50
19	0.85	-	0.23	-	-	-	-
26	0.02	0.75	0.50	0.75	0.50	-	0.50
July 3	0.33	0.75	0.50	0.75	0.75	-	0.75
10	-	0.75	0.50	0.75	0.75	-	0.75
17	1.03	0.75	-	-	-	-	-
24	0.02	-	-	-	-	-	-
31	0.10	0.75	-	-	0.50	-	0.50
Aug 7	0.71	0.50	-	-	0.50	-	0.50
14	0.86						
21	0.21						
28	0.55						
Sept 4	0.32						
11	0.30						
Total	6.56	6.00	3.23	4.00	3.00	1.50	4.50

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Cultivations, etc.:

Early potatoes: Ploughed twice: Sept 24, 1960 and Feb 14, 1961. Machine planted, fertilisers applied: Mar 17. Appropriate plots sprayed with simazine: Mar 31. Earthed up (except the simazine plots): May 23. Lifted: July 18. Simazine plots ploughed: July 19. Trefoil (inoculated seed) sown at 30 lb per acre: July 21. Variety: Arran Pilot.

Barley: Ploughed: Feb 7, 1961. Fertilisers applied: Mar 7. Seed drilled at 2¼ bushels per acre: Mar 8. Sprayed with CMPP at 5 pints in 40 gallons per acre: May 10. Combine harvested: Aug 17. Variety: Proctor.

Spring beans: Ploughed 3 times: Aug 16 and Sept 26, 1960; Jan 19, 1961. Seed placement drilled at 200 lb per acre with PK compound: Feb 22. Sprayed with demeton methyl at 12 fluid oz in 40 gallons per acre: May 29. Combine harvested: 0 and A - Aug 12, B and C - Aug 21. Variety: Tick

Grass: PK compound applied: Nov 9, 1960. Muriate of potash and 'Nitro-Chalk' applied: Mar 21, 1961. Cut six times: Apr 18, May 15, June 15, July 14, Aug 14, Sept 11. Muriate of potash and 'Nitro-Chalk' applied to appropriate plots after each cut except the last. One application, however (immediately following the fourth cut), was to appropriate irrigated plots only. Variety: S22 Italian ryegrass.

Standard errors per plot.

Early potatoes, total tubers

Whole plot:	1.338 tons per acre or 15.7%	(4 d.f.)
½ plot:	0.554 tons per acre or 6.5%	(4 d.f.)
¼ plot:	1.012 tons per acre or 11.9%	(8 d.f.)

Barley, (grain at 85% dry matter)

Whole plot:	2.06 cwt per acre or 6.9%	(5 d.f.)
Sub plot:	2.16 cwt per acre or 7.3%	(10 d.f.)

Spring beans, (grain at 85% dry matter)

Whole plot:	1.98 cwt per acre or 9.6%	(6 d.f.)

Cut grass, dry matter. Total of 6 cuts

Whole plot:	3.38 cwt per acre or 5.4%	(6 d.f.)
Sub plot:	4.60 cwt per acre or 7.4%	(8 d.f.)

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Summary of Results

Early potatoes, Total tubers: tons per acre

Weed control	Irrigation 0	Irrigation C
	(±0.320) (1)	(±0.805) (2)
Normal cultivation	6.01	14.13
Simazine spray	5.23	8.77

N: cwt per acre including basal	Weed control: Normal cultivation	Weed control: Simazine spray	Mean
	(±0.413) (3)	(±0.805) (4)	
0.6	9.58	5.98	7.78
1.2	10.55	8.02	9.29
Mean	10.07	7.00	8.54
Difference	0.97 (±0.773)	2.04	1.51
	(±0.584)		(±0.413)

N: cwt per acre including basal	Irrigation 0	Irrigation C	Mean
	(±0.88) (3)	(±1.05) (4)	
0.2	23.3	29.0	26.2
0.4	31.3	35.4	33.4
Mean (±0.84)	27.3	32.2	29.7
Difference (±1.25)	+8.0	+6.4	+7.2 (±1.76)

Mean dry matter % as harvested: 82.3

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

Irrigation 0	Irrigation A	Irrigation B	Irrigation C	Mean
13.3	21.3	18.7	28.8	20.5
	(±1.14)			

Mean dry matter % as harvested: 77.9

(1) For use in horizontal and interaction comparisons
(2) For use in vertical and diagonal comparisons
(3) For use in vertical and interaction comparisons
(4) For use in horizontal and diagonal comparisons.

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

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61/B/6.4

Cut grass, Dry matter: cwt per acre

Total of 6 cuts

For each cut K_2O cwt per acre	For each cut N cwt per acre	Irrigation 0	Irrigation C	Mean
		(±2.66) (1)	(±2.71) (2)	
None	0.3	46.0	68.9	57.4
0.3	0.3	44.7	69.4	57.1
None	0.6	46.2	81.5	63.8
0.6	0.6	45.4	97.9	71.6
Mean (±1.38)		45.6	79.4	62.5

Mean dry matter % as cut: 22.9

(1) For use in comparisons within the same irrigation or absence or presence of K.
(2) For use in comparisons involving different irrigations or absence or presence of K.

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CONCENTRATED FERTILISER ROTATION

Concentrated compound fertiliser and forms of N - West Barnfield I 1961, the second year.

Rotation: Kale, ryegrass, barley.

Design (each crop): 2 randomised blocks of 14 plots each.

Area of each plot (acres): 0.0174. Area harvested: Kale - 0.0084, ryegrass - 0.0061, barley - 0.0116.

Treatments (per acre): No fertiliser (0)

P_2O_5 and K_2O each at 0.3 cwt to barley and each at 1.0 cwt to kale and ryegrass, as triple superphosphate and potassium bicarbonate. (B)

Compound fertiliser, 20% N, 10% P_2O_5, 10% K_2O at 0.3(1), 0.6(2) cwt N to barley and 1.0(1), 2.0(2) to kale and ryegrass. (F)

Sulphate of ammonia, granular superphosphate and muriate of potash at rates equivalent to treatments F(1) and (2). (P)

PK as treatment B plus

Sulphate of ammonia (S)
Calcium nitrate (C)
Urea (U)
Ammonium nitrate (A)
each at rates 1 and 2 of N.

Basal dressing: None.

Cultivations, etc.: Ploughed: Jan 11, 1961. Fertilisers broadcast for barley, barley drilled at $2\frac{1}{2}$ bushels per acre: Mar 13. Fertilisers broadcast for ryegrass, ryegrass sown at 30 lb per acre: Mar 17. Fertilisers applied for kale: Apr 11. Kale drilled at 3 lb per acre: Apr 24. Barley and ryegrass sprayed with CMPP at 6 pints in 40 gallons per acre: May 13. Grass cut: July 20. Barley combine harvested: Aug 16. Grass cut second time: Sept 26. Kale harvested: Nov 6 and 16. Varieties: Kale - Thousand head (Canson); ryegrass - S22; barley - Proctor.

Erratum to "Results of the Field Experiments" 1960 page 60/B/8.1.(q.v.): Treatment B should read "P_2O_5 and K_2O each at 0.3 cwt to barley and each at 1.0 cwt to kale and ryegrass ....." and not as shown.

Standard errors per plot.

Kale, fresh weight: 1.343 tons per acre or 6.6% (13 d.f.)

Ryegrass dry matter:

1st cut: 3.10 cwt per acre or 14.5% (13 d.f.)
2nd cut: 1.21 cwt per acre or 13.2% (13 d.f.)
Total of 2 cuts: 3.43 cwt per acre or 11.2% (13 d.f.)

Barley, grain (at 85% dry matter): 1.66 cwt per acre or 5.9% (13 d.f.)

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Summary of Results

Fertiliser	Kale fresh weight: tons per acre	Ryegrass dry matter: cwt per acre 1st cut	2nd cut	Total of 2 cuts	Barley (at 85% dry matter): cwt per acre Grain	Straw
	(±0.949)	(±2.19)	(±0.85)	(±2.43)	(±1.18)	
0	10.91	8.2	5.5	13.7	9.3	4.5
B	13.05	7.4	5.0	12.3	12.6	5.2
F_1	19.48	21.5	9.5	31.0	27.1	16.0
F_2	23.72	26.4	11.4	37.7	37.0	27.9
P_1	20.14	19.9	8.8	28.6	25.5	15.1
P_2	23.91	24.2	10.4	34.6	37.3	28.4
S_1	20.96	20.6	7.3	27.9	24.1	14.0
S_2	21.97	26.4	13.2	39.5	34.3	24.7
C_1	21.39	24.3	8.6	32.9	27.0	16.3
C_2	23.64	26.2	10.4	36.5	36.4	22.8
U_1	19.46	20.2	7.9	28.1	26.4	16.3
U_2	22.60	23.5	10.8	34.3	35.0	26.4
A_1	19.42	25.2	9.5	34.6	27.1	18.4
A_2	22.84	24.8	10.5	35.3	34.2	21.8
Mean	20.25	21.3	9.2	30.5	28.1	18.4
Mean dry matter % as harvested:		25.0	22.2	23.6	80.8	78.1

Treatments

0 = No fertiliser
B = P_2O_5 and K_2O each at 0.3 cwt to barley and each at 1.0 to kale and ryegrass, as triple superphosphate and potassium bicarbonate.
F = Compound fertiliser, 20% N, 10% P_2O_5, 10% K_2O at 0.3(1), 0.6(2) cwt N to barley and 1.0(1), 2.0(2) to kale and ryegrass.
P = Sulphate of ammonia, granular superphosphate and muriate of potash at rates equivalent to treatments F (1) and (2).
S = Sulphate of ammonia Plus PK as treatment B
C = Calcium nitrate " " " " "
U = Urea " " " " "
A = Ammonium nitrate " " " " "

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RESIDUAL PHOSPHATE ROTATIONS

The long term and residual effects of a number of phosphate fertilisers compared with superphosphate - Great Field IV and Sawyers I 1961, the second year.

Design: Great Field IV: 1 randomised block of 12 plots per crop.
Sawyers I: 2 randomised blocks of 12 plots per crop.

Rotation: Potatoes, Barley, Swedes.

Area of each plot (acres):
Great Field IV: 0.0193. Area harvested: Potatoes and Barley - 0.0129, Swedes - 0.0096.
Sawyers I: 0.0212. Area harvested: Potatoes and Barley - 0.0141, Swedes - 0.0106.

Treatments:
Granular superphosphate treatments broadcast in spring before sowing or ridging:-
1. No phosphate.
2. 0.25 cwt P_2O_5 per acre per year.
3. 0.50 cwt P_2O_5 per acre per year.
4 & 5. No phosphatic fertiliser in 1960 or 1961, but later at rates to be decided.

Phosphate fertilisers ploughed in (to a depth not exceeding 6 inches) at 3.0 cwt P_2O_5 per acre in September 1959 and rotary hoed in in spring.
6. Nitrophosphate I (17.1% P_2O_5, none water soluble)
7. Nitrophosphate II (18.8% P_2O_5, one quarter water soluble)
8. Nitrophosphate III (22.4% P_2O_5, half water soluble)
9. Gafsa rock phosphate (28.9% P_2O_5)
10. Bessemer basic slag (15.2% P_2O_5)
11. Potassium metaphosphate* (57.9% P_2O_5, 38.8% K_2O)
12. Granular superphosphate (20.4% P_2O_5)

*Note. To balance the K_2O content of potassium metaphosphate, all the other treatments included 2.0 cwt K_2O per acre as sulphate of potash in autumn 1959.

Basal dressings per acre: Broadcast in spring before sowing or ridging:
N as 'Nitro-Chalk' 21:-
To potatoes: 1.2 cwt; to barley: 0.6 cwt; to swedes: 0.5 cwt.
K_2O as sulphate of potash:-
To potatoes: 1.0 cwt; to barley: 1.0 cwt; to swedes: 1.0 cwt.

Cultivations, etc. (both fields, except as indicated):
Ploughed: Dec 28, 1960 - Jan 7, 1961. Ground chalk applied to Sawyers I at 9 cwt per acre: Feb 15.

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Potatoes: Rotary cultivated twice, fertilisers applied, planted: Apr 20, 1961. Earthed up: July 5. Lifted: Sept 26. Variety: Majestic. Previous crop: Swedes.

Barley: Fertilisers applied, seed drilled at 2 bushels per acre on Great Field IV: Mar 14, 1961. Sawyers I rotary cultivated twice, fertilisers applied, seed drilled at 2 bushels per acre: Mar 16. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 12. Combine harvested: Aug 17. Variety: Proctor. Previous crop: Potatoes.

Swedes: Rotary cultivated twice: May 15, 1961. Fertilisers applied: May 16. Seed hand drilled at $2\frac{3}{4}$ lb per acre: May 17. Singled: Great Field IV - June 30; Sawyers I - July 10. Lifted: Nov 2. Variety: Wilhelmsburger. Previous crop: Barley.

Standard errors per plot:

Sawyers I

Potatoes, Total tubers: 0.705 tons per acre or 9.9% (13 d.f.)

Barley, Grain (at 85% dry matter): 3.41 cwt per acre or 10.5% (13 d.f.)

Swedes, Roots: 1.438 tons per acre or 11.4% (13 d.f.)

Note. For details for the previous year's results see 'Results of the Field Experiments' 1960 pages 60/B/9.1 to 60/B/9.3.

Summary of Results

Potatoes

	Total tubers: tons per acre				Percentage ware ($1\frac{1}{2}$" riddle)			
	Great Field IV		Sawyers I		Great field IV		Sawyers I	
Phosphate	Mean	Increase	Mean	Increase	Mean	Increase	Mean	Increase
			(±0.499)	(±0.576)				
None(1,4,5)	10.23		6.60(1)		96.0		93.1	
2	9.24	-0.99	6.53	-0.07	95.2	-0.8	94.1	+1.0
3	11.53	+1.30	8.09	+1.49	94.7	-1.3	95.0	+1.9
6	11.78	+1.55	7.34	+0.74	96.8	+0.8	95.3	+2.2
7	11.53	+1.30	7.93	+1.33	96.8	+0.8	94.4	+1.3
8	11.89	+1.66	6.35	-0.25	95.7	-0.3	93.9	+0.8
9	11.49	+1.26	6.26	-0.34	96.3	+0.3	94.5	+1.4
10	10.83	+0.60	7.62	+1.02	96.4	+0.4	95.6	+2.5
11	10.98	+0.75	7.55	+0.95	95.2	-0.8	94.3	+1.2
12	11.52	+1.29	8.17	+1.57	94.8	-1.2	95.3	+2.2
Mean	10.96		7.13		95.8		94.3	

(1) (±0.288)

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Phosphate	Great Field IV Mean	Increase	Sawyers I Mean	Increase	Great Field IV Mean	Increase	Sawyers I Mean	Increase
	Barley							
	Grain (at 85% dry matter) cwt per acre				Straw (at 85% dry matter) cwt per acre			
			(±2.41)	(±2.78)				
None(1,4,5)	41.0		31.0 (1)		31.1		17.1	
2	44.6	+3.6	32.4	+1.4	31.9	+0.8	15.2	-1.9
3	45.1	+4.1	30.0	-1.0	35.2	+4.1	15.1	-2.0
6	45.1	+4.1	29.2	-1.8	35.3	+4.2	20.7	+3.6
7	46.0	+5.0	30.0	-1.0	34.8	+3.7	19.4	+2.3
8	43.0	+2.0	37.0	+6.0	33.6	+2.5	20.1	+3.0
9	47.1	+6.1	35.5	+4.5	37.4	+6.3	20.5	+3.4
10	45.7	+4.7	34.1	+3.1	41.8	+10.7	20.1	+3.0
11	45.0	+4.0	33.2	+2.2	38.2	+7.1	19.9	+2.8
12	41.5	+0.5	34.4	+3.4	37.9	+6.8	19.9	+2.8
Mean	43.8		32.4		35.0		18.5	
Mean dry matter % as harvested:	81.9		80.5		72.0		71.5	

(1) (±1.39)

Swedes, Roots: tons per acre

			(±1.017)	(±1.174)
None(1,4,5)	10.28		6.20 (1)	
2	12.83	+2.55	11.87	+5.67
3	17.04	+6.76	12.00	+5.80
6	18.57	+8.29	17.58	+11.38
7	22.09	+11.81	16.31	+10.11
8	22.18	+11.90	16.82	+10.62
9	19.59	+9.31	14.12	+7.92
10	18.89	+8.61	13.64	+7.44
11	19.03	+8.75	14.84	+8.64
12	22.73	+12.45	15.28	+9.08
Mean	16.98		12.59	

(1) (±0.587)

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61/B/9.1

N LEVELS AND RESIDUES ROTATION

Direct and residual effects of sulphate of ammonia - Long Hoos III 1961, the 2nd year.

Rotation: Wheat, potatoes.

Design (each crop): 3 randomised blocks of 9 plots each.

Area of each plot: 0.0212 acres. Area harvested: 0.0141 acres.

Treatments. All combinations of:-
Nitrogen (applied as sulphate of ammonia) at 3 levels in 1960 and at 3 levels in 1961.
To Wheat: None; 0.5; 1.0 cwt N per acre
To Potatoes: None; 0.75; 1.50 cwt N per acre.

Basal dressing (per acre):
To wheat: 2¼ cwt compound fertiliser, 14% P_2O_5, 28% K_2O combine drilled.
To potatoes: 5 cwt compound fertiliser, 14% P_2O_5, 28% K_2O broadcast on the flat.

Cultivations, etc.:
Wheat: Ground chalk applied at 23 cwt per acre, ploughed: Mar 7, 1961. Rotary cultivated: Mar 20. Sulphate of ammonia applied, seed combine drilled at 3 bushels per acre: Mar 21. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 19. Combine harvested: Aug 30. Variety: Jufy I.
Potatoes: Ground chalk applied at 23 cwt per acre: Dec 16, 1960. Ploughed: Dec 29. Basal fertiliser broadcast on flat: Apr 17, 1961. Rotary cultivated, sulphate of ammonia applied, ridged, potatoes planted: Apr 24. Earthed up: July 6. Sprayed with zineb at 2 lb in 40 gallons per acre: Aug 3. Sprayed with undiluted BOV at 15 gallons per acre: Sept 21. Lifted: Oct 5. Variety: Ulster Supreme.

Standard errors per plot.
Wheat. Grain (at 85% dry matter): 2.18 cwt per acre or 6.5% (16 d.f.)
Potatoes. Total Tubers: 0.775 tons per acre or 8.4% (16 d.f.)

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61/B/9.2

Summary of Results

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

N: cwt per acre to potatoes in 1960	N: cwt per acre in 1961 None	0.5	1.0	Mean
		(±1.25)		(±0.73)
None	23.8	34.9	37.9	32.2
0.75	26.1	34.2	39.0	33.1
1.50	31.0	34.5	39.2	34.9
Mean (±0.73)	27.0	34.5	38.7	33.3

Mean dry matter % as harvested: 84.9

Potatoes

N: cwt per acre to wheat in 1960	N: cwt per acre in 1961 None	0.75	1.50	Mean
	Total tubers: tons per acre			
		(±0.448)		(±0.258)
None	5.83	9.26	11.70	8.93
0.5	5.73	10.38	11.29	9.13
1.0	6.74	10.00	12.01	9.58
Mean (±0.258)	6.10	9.88	11.67	9.21
N: cwt per acre to wheat in 1960	Percentage ware (1½" riddle)			
None	93.9	95.4	97.2	95.5
0.5	94.2	96.3	96.9	95.8
1.0	93.2	96.0	97.6	95.6
Mean	93.8	95.9	97.2	95.6

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61/B/10.1

WEEDKILLER CULTIVATION ROTATION

Great Harpenden I - 1961

A comparison of weed control by various cultivation methods and by a pre-emergence weedkiller.

Rotation: Winter beans, winter wheat, potatoes, barley.

Design: 2 randomised blocks of 12 plots each per crop, plots (except beans) being split into 2.

Area of each plot (acres): 0.048. Area harvested (acres):

Whole plots - Beans - 0.00241
Sub plots - Wheat and barley - 0.0114, potatoes - 0.0107

Treatments.

Whole plots: All combinations of:-

Cultivations to all crops: Ploughed (P); rotary cultivated (R); tine cultivated (T).

Treatments to individual crops:

To beans: Normal cultivations (M); no cultivations after planting, simazine* applied - duplicate plots (X).

To wheat: Residuals of treatments to beans. All plots receive normal cultivations after planting.

To potatoes: Treatment M; treatment X; inter-row cultivations, then simazine* applied (Y).

To barley: Residuals of treatments to potatoes. All plots receive normal cultivations after planting.

In addition three plots per block are kept in reserve, receiving treatment PM and basal hormone spray to cereals for weed control.

Sub plots:

Potatoes: X plots split for final earthing up (E) v no final earthing up. M plots split for high (ME) v low ridges.

Barley and wheat: Plots split for hormone spray (H) v no hormone spray for weed control.

*At 1 lb active ingredient in 40 gallons per acre.

Basal dressings per acre:

Beans: 3¼ cwt compound fertiliser (14% P_2O_5, 28% K_2O) placement drilled.

Wheat: 3½ cwt compound fertiliser (16% N, 9% P_2O_5, 9% K_2O) combine drilled.

Potatoes: 12 cwt compound fertiliser (10% N, 10% P_2O_5, 18% K_2O).

Barley: 3 cwt compound fertiliser (16% N, 9% P_2O_5, 9% K_2O) combine drilled.

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61/B/10.2

Operations in 1961: 1st year

Note: The rotation was modified -
Spring beans and spring wheat were sown instead of winter beans and winter wheat.

Treatments. All plots were ploughed.
P and T plots were tine cultivated and disced; except for the cereals, which were disced. (P)
R plots were rotary cultivated. (R)

Cultivations, etc.: All plots ploughed: Dec 28, 1960.
Spring beans: R plots rotary cultivated, remaining plots disced: Mar 22, 1961. P and reserve plots spring tine cultivated and disced, seed placement drilled at 200 lb per acre: Mar 23. All plots harrowed and rolled, X plots sprayed with simazine: Mar 24. M and reserve plots horse hoed: May 23. All plots machine hoed: May 26. Sprayed with demeton methyl at 12 fluid oz in 60 gallons per acre: June 26. Combine harvested: Sept 4. Variety: Tick.

Spring wheat: R plots rotary cultivated: Mar 22, 1961. Remaining plots disced three times: Mar 22 - 24. All plots harrowed, seed combine drilled at 3 bushels per acre, all plots harrowed: Mar 24. All plots rolled: Mar 25. Reserve plots and appropriate sub plots sprayed with CMPP at 6 pints in 40 gallons per acre: May 19. Combine harvested: Aug 30. Variety: Jufy I.

Potatoes: Disced (except R plots): Mar 22, 1961. Springtine cultivated (Except R plots): Mar 23, 27 and 28. All plots rolled: Mar 28. R plots rotary cultivated: Apr 13. Basal compound fertiliser applied: Apr 17. Springtine cultivated (except R plots): Apr 18. R plots rotary cultivated, remaining plots springtine cultivated, seed machine planted: Apr 19. Rolled, X plots sprayed with simazine: Apr 25. Chain harrowed (except X plots): May 16. Y plots grubbed and then ridged twice: May 30. Tractor weeded (excluding X and Y plots): June 2. Y plots sprayed with simazine: June 3. M and reserve plots grubbed: June 23 and again July 4. E sub plots of X plots grubbed: July 4. ME sub plots, E sub plots and reserve plots earthed up with high ridges: July 6. Remaining sub plots of PM and RM treatments earthed up: July 7. Sprayed with undiluted BOV at 15 gallons per acre: Sept 5. Lifted: Oct 3. Variety: Majestic.

Barley: R plots rotary cultivated: Mar 22, 1961. Remaining plots disced three times: Mar 22 - 24. All plots harrowed, seed combine drilled at 2¼ bushels per acre, all plots harrowed: Mar 24. All plots rolled: Mar 25. Reserve plots and appropriate sub plots sprayed with CMPP at 6 pints in 40 gallons per acre: May 19. Combine harvested: Aug 17. Variety: Proctor.

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Standard error per plot.

Spring beans. Grain (at 85% dry matter): 2.79 cwt per acre or 14.9% (16 d.f.)

Spring wheat. Grain (at 85% dry matter)
- Whole plot: 1.20 cwt per acre or 3.3% (18 d.f.)
- Sub plot: 1.55 cwt per acre or 4.3% (21 d.f.)

Potatoes, total tubers:
- Whole plot: 1.264 tons per acre or 10.3% (14 d.f.)
- Sub plot: 0.485 tons per acre or 3.9% (19 d.f.)

Barley. Grain (at 85% dry matter)
- Whole plot: 3.34 cwt per acre or 10.1% (18 d.f.)
- Sub plot: 1.78 cwt per acre or 5.4% (21 d.f.)

Summary of Results

Spring beans

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

Treatment	Cultivation P	R	T	Mean
M (±1.97)	17.9	19.0	18.8	18.6 (±1.14)
X (±1.39)	18.9	19.7	17.7	18.8 (±0.80)
Mean (±1.14)	18.6	19.5	18.1	18.7

Reserve plots: 18.6 (±1.14)

Mean dry matter % as harvested: 82.6

Spring wheat

Spray	Cultivation P	R	T	Mean
		(±0.66)(1)		
None	38.0	36.1	36.2	36.8
Hormone	35.8	34.2	34.4	34.8
Mean (±0.49)	36.9	35.2	35.3	35.8
Diff.(±0.90)	-2.2	-1.9	-1.8	-2.0 (±0.52)

Reserve plots (PH): 36.0 (±0.49)

Mean dry matter % as harvested: 86.0

(1) For use in horizontal and interaction comparisons

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Potatoes

Treatment	Cultivation P	R	T	Mean	Not earthed up	Earthed up
	Total tubers: tons per acre				(1)	(2)
	(±0.893)			(±0.516)	(±0.198)	(±0.534)
M	10.40	12.85	13.44	12.23	12.54	11.91
X	11.91	11.26	12.16	11.78	11.83	11.72
Y	12.01	13.64	12.29	12.65		
Mean (±0.516)	11.44	12.58	12.63	12.22		

Reserve plots (PM): 12.57 (±0.516)

General mean 12.31

Percentage ware ($1\frac{1}{2}$" riddle)

M	95.3	95.8	94.9	95.3	94.8	95.8
X	95.4	96.3	95.3	95.8	95.9	95.7
Y	95.6	95.9	95.5	95.7		
Mean	95.4	96.1	95.2	95.6		

Reserve plots (PH): 95.5

General mean 95.6

Barley

Spray	Cultivation P	R	T	Mean
		(±1.46) (1)		
None	30.6	34.4	33.4	32.8
Hormone	29.7	33.6	33.6	32.3
Mean (±1.36)	30.1	34.0	33.5	32.5
Diff.(±1.03)	-0.9	-0.8	+0.2	-0.5 (±0.59)

Reserve plots (PH): 34.6 (±1.36)

Mean dry matter % as harvested: 84.7

(1) For use in horizontal and interaction comparisons
(2) For use in vertical and diagonal comparisons

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WEEDKILLER CULTIVATION ROTATION

A comparison of weed control by various cultivation methods and by a pre-emergence weedkiller - Woburn Great Hill I and II 1961.

For previous history see "Results of the Field Experiments" 60/B/11.

Rotation (commencing 1960): Potatoes, barley.

Design: 2 randomised blocks of 9 plots each per crop.

Area of each plot (acres): 0.0482. Area harvested: Potatoes - 0.0107, barley - 0.0115.

Treatments:

Potatoes: All combinations of:-

Cultivations before planting: Ploughed and spring-tine cultivated (P) - duplicate plots. Ploughed and rotary cultivated (R).

Treatments after planting: Normal cultivations (N); simazine* applied after planting (Sx); simazine* applied after early cultivations (Sy).

Barley: All combinations of:-

Cultivations: Ploughed (P); rotary cultivated (R); rigid-tine cultivated (T).

Simazine to potatoes 1960: None; 1; 2 lb per acre.

*Simazine at 1 lb active material in 40 gallons per acre.

Basal dressings per acre:

Potatoes: 10 cwt compound fertiliser, 17% N, 11% P_2O_5, 22% K_2O.

Barley: 4 cwt compound fertiliser, 16% N, 9% P_2O_5, 9% K_2O, combine drilled.

Cultivations, etc.

Potatoes: All plots ploughed: Dec 12, 1960. P plots spring-tine cultivated twice: Mar 16, 1961. P plots rolled and then spring-tine cultivated twice: Mar 23. R plots rotary cultivated: Mar 23. Basal dressing applied, potatoes machine planted: Mar 24. Simazine applied on rolled bouts to Sx plots: Mar 31. N and Sy plots earthed up: May 2. Sy plots earthed up and sprayed with simazine: May 19. Sx plots grubbed twice+: May 30. N and Sx+ plots earthed up: June 14. Sprayed with undiluted BOV at 12 gallons per acre: Sept 18. Lifted: Sept 21. Variety: Majestic.

+Because of failure of Sx treatment.

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Barley: P plots ploughed, T plots rigid-tine cultivated twice: Feb 24, 1961. P and T plots disced: Mar 17. P and T plots rolled and spring-tine harrowed: Mar 23. R plots rotary cultivated: Mar 23. Seed combine drilled at 2¼ bushels per acre: Mar 24. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 10. Combine harvested: Aug 17. Variety: Proctor.

Standard errors per plot.
Potatoes, total tubers: 0.977 tons per acre or 16.5% (11 d.f.)
Barley, grain (at 85% dry matter): 1.76 cwt per acre or 8.2% (8 d.f.)

Summary of Results

Potatoes

Cultivation before planting

Treatment after planting	P	R	Mean
	Total tubers: tons per acre		
	(±0.488)	(±0.691)	(±0.399)
N	7.16	7.54	7.28
Sx	1.82	2.61	2.08
Sy	8.61	8.14	8.45
Mean	5.86 (±0.282)	6.09 (±0.399)	5.93
	Percentage ware (1½" riddle)		
N	90.7	89.1	90.1
Sx	77.8	81.1	78.9
Sy	91.8	88.4	90.6
Mean	86.8	86.2	86.5

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61/B/11.3

Barley

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

Simazine to potatoes 1960 lb per acre	Cultivation			
	P	R	T	Mean
		(±1.25)		(±0.72)
None	21.0	22.8	20.9	21.5
1	23.4	22.3	19.9	21.8
2	21.1	22.2	21.0	21.4
Mean (±0.72)	21.8	22.4	20.6	21.6

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61/C/1.1

CEREALS AND BEANS ROTATIONS

The effect of crop sequences on the incidence of cereal foot and root rot diseases - Great Field I 1961 - the 5th year.

Design: Three series each of 3 randomised blocks of 6 plots, starting in each of the years 1957, 1958 and 1959.

Area of each plot (acres): 0.0305. Area harvested: Winter wheat, series starting 1958 - 0.0095; series starting 1959, Spring wheat, Barley - 0.0200; Beans - 0.0191.

Treatments:

Crop sequences for each series:

1st year:	WW	SW	O	WW	B	WW
2nd year:	WW	WW	WW	O	WW	O
3rd year:	SW	SW	SW	SW	B	Be

WW = Winter wheat, SW = Spring wheat, O = Oats, B = Barley, Be = Beans.

In the 4th year the plots are split for N and all cropped with winter wheat, the series starting in 1958 falling due for this treatment this year, and receiving N at 0.5, 1.0 cwt per acre in 2 doses on Mar 22 and May 8, 1961 as 'Nitro-Chalk'.

Basal dressing: 2 cwt compound fertiliser (16% P_2O_5, 16% K_2O) per acre combine drilled with seed (placed in sideband for beans); all blocks received 23 cwt ground chalk per acre in Nov 1956 and 54 cwt per acre in Oct 1960.

Nitrogen for cereals: 0.46 cwt N as 'Nitro-Chalk' 21 per acre to spring wheat and 0.31 cwt N as 'Nitro-Chalk' 21 per acre to barley, all in seedbed.

Cultivations, etc.: Ground chalk applied: Oct 4 - 14, 1960. Ploughed: Oct 14. Winter wheat combine drilled at 3 bushels per acre: Jan 23, 1961. 'Nitro-Chalk' applied to spring wheat and barley: Mar 7. Beans placement drilled at 200 lb per acre, barley combine drilled at 2 bushels per acre, and spring wheat at 3 bushels per acre: Mar 8. Winter wheat sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 10. Spring wheat and barley sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 11. Beans sprayed with demeton-methyl at 12 fluid oz in 60 gallons per acre: June 14. Combine harvested: Barley - Aug 23; winter and spring wheat - Aug 31; beans - Sept 4. Varieties: Beans - Gartons Tick; winter wheat - Cappelle; spring wheat - Koga II; barley - Proctor.

Note. Estimates of plant height, % area lodged, incidence of Eyespot (*Cercosporella herpotrichoides*) and Take-all (*Ophiobolus graminis*) and counts of plants and shoots were made.

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Errata to "Results of the Field Experiments" 1960.
Page 60/Cd/1.1 the 6th line should read ".... series starting 1958, and 1959, all cereals - 0.0200".

Standard errors per plot, Grain (at 85% dry matter):
Series starting:
1958 Winter wheat
Whole plot: 2.03 cwt per acre or 7.1% (10 d.f.)
Sub plot: 2.53 cwt per acre or 8.8% (12 d.f.)
1959 Spring wheat 1.58 cwt per acre or 4.7% (6 d.f.)

Summary of Results

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

Series starting in 1958

Winter wheat

Crop in 1958 1959 1960	WW WW SW	SW WW SW	0 WW SW	WW 0 SW	B WW B	WW 0 Be	Mean
N cwt per acre			(±1.45)(1)	(±1.56)(2)			
0.5	28.2	26.4	20.0	22.9	19.6	39.7	26.2
1.0	30.3	28.7	27.4	27.5	24.4	47.1	30.9
Mean (±1.18)	29.3	27.6	23.7	25.2	22.0	43.4	28.5
Diff. (±2.07)	+2.1	+2.3	+7.4	+4.6	+4.8	+7.4	+4.7 (±0.84)
Mean dry matter % as harvested:			85.1				

(1) for use in vertical and interaction comparisons

(2) for use in horizontal and diagonal comparisons

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

Series starting in 1959

Crop in 1959 1960	Spring wheat WW WW	 SW WW	 0 WW	 WW 0	Mean	Barley B W	Spring beans W 0
	32.7	33.4	32.3	36.7	33.8	35.3	23.9
		(±0.90)					
Mean dry matter % as harvested:		85.9				84.7	78.1

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61/C/2.1

ONE YEAR LEYS FOR WHEAT

The comparison of various clover and grass leys as a preparation for wheat - Stackyard 1961.

Design: 4 randomised blocks of 18 plots each.

Area of each plot (acres): 0.0159. Area harvested: 1st cut - 0.0045; 2nd and 3rd cuts - 0.0114.

Treatments:

Nitrogen to leys 1961:- 3 plots per block of each of the following 6 treatments:

To clover: None (Co)

To ryegrass: None (Ro); 1 cwt (R1); 2 cwt (R2) N per acre.

To clover-ryegrass: None (CRo); 1cwt (CR1) N per acre.

The nitrogen was applied as 'Nitro-Chalk', 0.625 and 1.25 cwt N in spring, and 0.375 and 0.75 cwt N after 1st silage cut.

Note: The experiment is designed to include three rates of N applied to wheat in 1961/62.

Basal dressings per acre:

To barley nurse crop 1960: 3 cwt compound fertiliser (16% N, 9% P_2O_5, 9% K_2O) combine drilled.

To leys, combine drilled in seedbed 1960: 1½ cwt superphosphate.

Cultivations, etc.: Barley combine drilled, leys combine drilled, ryegrass at 30 lb, clover at 12 lb and clover-ryegrass at 10 lb clover and 20 lb ryegrass, per acre: Apr 19, 1960. 'Nitro-Chalk' dressings applied: Mar 13 and May 17, 1961. Cut three times for silage: May 15, July 6 and Sept 18. Varieties: Italian ryegrass S22 and Dorset Marl broad red clover.

Standard error per plot, Grass dry matter cwt per acre:*

1st cut:	3.34 cwt per acre or 6.7%	(62 d.f.)
2nd cut:	2.25 cwt per acre or 9.7%	(63 d.f.)
3rd cut:	1.42 cwt per acre or 11.3%	(63 d.f.)
Total of 3 cuts:	3.88 cwt per acre or 4.5%	(63 d.f.)

*1 missing value.

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61/C/2.2

Summary of Results

Grass dry matter: cwt per acre

	Nitrogen to leys 1961					
C_o	R_o	R_1	R_2	CR_o	CR_1	Mean
		1st cut				
28.5	39.6	62.5	59.6+	51.3	59.1	50.1
		(±0.97)				
		2nd cut				
28.2	9.9	25.2	32.9	15.8	26.7	23.1
		(±0.65)				
		3rd cut				
23.7	4.9	6.7	10.5	19.1	10.9	12.6
		(±0.41)				
		Total of 3 cuts				
80.4	54.3	94.3	102.9	86.2	96.8	85.8
		(±1.12)				

+ Includes 1 estimated value.

Mean dry matter % as harvested:

1st cut:	21.8
2nd cut:	30.7
3rd cut:	31.6
Total of 3 cuts:	28.0

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SPRING WHEAT

Residues of grass species, testing N and K - Harwood's Piece 1961 - the 4th year.

Design: 4 blocks of 12 plots each, plots being split into 3 for the application of N.

Area of each sub plot: 0.0029 acres. Area harvested: 0.0019 acres.

Treatments:

Whole plots: All combinations of:-

Grass species sown in spring 1958:

- S37 Cocksfoot at 30 lb per acre (C)
- S215 Meadow Fescue at 30 lb per acre (M)
- S24 Perennial Ryegrass at 25 lb per acre (R)
- Timothy "Scotia" at 20 lb per acre (T)

Nitrogen (applied 1958-1960): None; 0.3; 0.6 cwt N per acre as 'Nitro-Chalk', applied for each cut.

Potassium: None; 1; 2; 3 cwt K_2O per acre as potassium bicarbonate.

Sub plots:

Nitrogen: None; 0.5; 1.0 cwt N per acre as 'Nitro-Chalk'.

Basal dressing: 2½ cwt per acre triple superphosphate combine drilled (see below).

Cultivations, etc.: Ploughed: Aug 30, 1960. Rotary cultivated: Oct 13. Cappelle winter wheat combine drilled at 3 bushels per acre with triple superphosphate at 1¼ cwt per acre: Oct 17. Winter wheat failed, ploughed in: Feb 9, 1961. Potassium bicarbonate applied, seed drilled at 3 bushels per acre with triple superphosphate at 1¼ cwt per acre, 'Nitro-Chalk' applied: Mar 16. Sprayed with CMPP at 4 pints in 50 gallons per acre: May 19. Harvested: Aug 22. Variety: Jufy I.

Note: For details of the previous years' results see 'Results of the Field Experiments' 58/Cg/3, 59/Cg/3 and 60/Ci/2.

Standard errors per plot. Grain (at 85% dry matter)

Whole plot: 1.66 cwt per acre or 6.1% (15 d.f.)

Sub plot: 2.52 cwt per acre or 9.2% (78 d.f.)

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51/C/3.2

Summary of Results

Species of grass, 1958 - 60

	C	M	R	T	Mean
Grain (at 85% dry matter): cwt per acre					
N: cwt per acre 1958 - 60		(±0.83)			(±0.41)
None	23.9	28.4	28.8	22.0	25.8
0.3	23.8	26.7	29.4	24.4	26.1
0.6	30.1	31.0	31.0	28.4	30.1
K_2O: cwt per acre 1961		(±0.96)			(±0.48)
None	27.2	27.3	28.9	24.9	27.1
1	26.2	27.1	29.4	25.3	27.0
2	24.9	30.5	30.1	24.7	27.5
3	25.3	29.9	30.6	24.8	27.7
N: cwt per acre 1961		(±0.73)(1)	(±0.76)(2)		(±0.36)
None	18.4	20.8	21.7	18.4	19.8
0.5	27.0	29.4	31.7	26.4	28.6
1.0	32.3	35.9	35.8	30.1	33.5
Mean (±0.48)	25.9	28.7	29.7	25.0	27.3

(1) For use in vertical and interaction comparisons
(2) For use in horizontal and diagonal comparisons

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61/C/3.3

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

N: cwt per acre, 1958 - 60

K_2O: cwt per acre 1961	None	0.3	0.6
		(±0.83)	
None	26.0	25.9	29.4
1	25.6	25.8	29.7
2	25.4	26.6	30.7
3	26.2	26.0	30.8
N: cwt per acre 1961		(±0.63)(1)	(±0.66)(2)
None	18.7	18.4	22.4
0.5	26.3	27.2	32.4
1.0	32.3	32.7	35.6

K_2O: cwt per acre, 1961

N: cwt per acre 1961	None	1	2	3
		(±0.73)(1)	(±0.76)(2)	
None	18.8	19.3	20.7	20.6
0.5	28.9	28.9	28.7	28.0
1.0	33.7	32.8	33.3	34.4

(1) For use in vertical and interaction comparisons
(2) For use in horizontal and diagonal comparisons

Mean dry matter % as harvested: 78.6

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61/C/3.4

Species of grass, 1958 - 60

	C	M	R	T	Mean
Straw (at 85% dry matter): cwt per acre					
N: cwt per acre 1958 - 60					
None	28.3	35.2	34.2	26.1	30.9
0.3	27.4	33.5	36.3	31.1	32.1
0.6	36.8	39.4	40.9	37.4	38.6
K_2O: cwt per acre 1961					
None	32.7	32.9	34.2	31.9	32.9
1	30.4	34.8	35.8	32.7	33.4
2	29.3	37.4	39.9	31.0	34.4
3	30.8	38.9	38.6	30.5	34.7
N: cwt per acre 1961					
None	19.6	23.0	24.5	20.5	21.9
0.5	32.5	36.5	40.1	33.7	35.7
1.0	40.3	48.6	46.8	40.4	44.0
Mean	30.8	36.0	37.1	31.5	33.9

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61/C/3.5

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

N: cwt per acre, 1958 - 60

	None	0.3	0.6
K_2O: cwt per acre 1961			
None	31.5	30.5	36.8
1	30.8	31.0	38.6
2	30.1	33.5	39.6
3	31.3	33.3	39.5
N: cwt per acre 1961			
None	20.0	19.8	25.8
0.5	31.5	33.5	42.2
1.0	41.3	42.9	47.8

K_2O: cwt per acre, 1961

	None	1	2	3
N: cwt per acre 1961				
None	20.5	21.1	22.8	23.1
0.5	34.9	36.7	36.1	35.2
1.0	43.4	42.5	44.3	45.9

Mean dry matter % as harvested: 64.5

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61/C/4

BARLEY

Effects of green manures, N and straw - Stackyard (the second year) 1961.

Design: 6 randomised blocks of 9 plots each.

Area of each plot: 0.0114 acres. Area harvested: 0.0141 acres.

Treatments. All combinations of:-
Nitrogen: None; 0.3; 0.6 cwt N per acre as 'Nitro-Chalk'.
Green manures and straw: None; ryegrass undersown; ryegrass undersown plus straw left on the plot after harvest. (0;R;RS)

Basal dressing: $2\frac{1}{2}$ cwt per acre compound fertiliser (20% P_2O_5, 20% K_2O) combine drilled.

Cultivations, etc.: Straw spread: Sept 8, 1960. Ploughed: Dec 17. Seed combine drilled at $2\frac{1}{2}$ bushels per acre, N applied: Mar 11, 1961. Ryegrass drilled at 40 lb per acre: Apr 18. Sprayed with 2,4-D at $\frac{3}{4}$ pint in 40 gallons per acre: May 13. Combine harvested: Aug 17. Variety: Proctor; Ryegrass - S22 Italian.

Standard error per plot.
Grain (at 85% dry matter): 2.31 cwt per acre or 7.7% (40 d.f.)

Summary of Results

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

Green manure and straw	N: cwt per acre			
	None	0.3	0.6	Mean
		(±0.94)		(±0.54)
0	21.5	33.5	40.8	31.9
R	17.6	29.4	36.8	27.9
RS	19.6	30.8	39.2	29.9
Mean (±0.54)	19.6	31.2	38.9	29.9

Mean dry matter % as harvested: 84.6

Note: For details of the previous year's results see "Results of the Field Experiments" 60/Cb/2.

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61/C/5

BARLEY

Effects of Trefoil and Ryegrass green manures and N - Woburn, Lansome Field 1961.

Design: 3 randomised blocks of 16 plots each.

Area of each plot: 0.0193 acres. Area harvested: 0.0138 acres.

Treatments. All combinations of:-
Nitrogen: None(0); 0.3; 0.6; 0.9 cwt N per acre as 'Nitro-Chalk'.
Green manures: None; trefoil (T); Italian ryegrass (R);
Italian ryegrass sown with 0.6 cwt N per acre as 'Nitro-Chalk'(RN).

Basal dressing: 3 cwt compound fertiliser (16% P_2O_5, 16% K_2O) per acre combine drilled.

Cultivations, etc.: N applied for ryegrass: July 22, 1960. Trefoil sown at 30 lb and ryegrass at 40 lb per acre: July 23. Ground chalk applied at 48 cwt per acre: Jan 12, 1961. Ploughed: Jan 26. Seed combine drilled at 2¼ bushels per acre: Mar 8. Sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 6. Combine harvested: Aug 17. Variety: Proctor; Ryegrass - S22 Italian. Previous crop: Early potatoes.

Standard error per plot.
Grain (at 85% dry matter): 2.86 cwt per acre or 10.2% (30 d.f.)

Summary of Results

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

Green Manure	N: cwt per acre None	0.3	0.6	0.9	Mean
		(±1.65)			(±0.83)
0	18.2	28.1	34.4	31.8	28.1
T	22.5	27.5	32.8	30.7	28.4
R	19.4	26.9	33.3	30.0	27.4
RN	25.6	30.7	29.8	29.4	28.9
Mean (±0.83)	21.4	28.3	32.6	30.5	28.1

Mean dry matter % as harvested: 81.4

Note: The trefoil made very poor growth. Estimates of dry matter and N per acre in the green manures were made just before ploughing.

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61/C/6.1

SUGAR BEET

Effects of trefoil and ryegrass green manures and N - Woburn Stackyard 1961.

Design: 3 randomised blocks of 16 plots each.

Area of each plot: 0.0180 acres. Area harvested: 0.0135 acres.

Treatments. All combinations of:-

Nitrogen: None; 0.5; 1.0; 1.5 cwt N per acre as 'Nitro-Chalk' in seedbed.

Green manures undersown in barley 1960: None; trefoil; ryegrass; ryegrass with 0.6 cwt N per acre in autumn as 'Nitro-Chalk'.

Basal dressing:

To barley:- 2½ cwt per acre compound fertiliser, 16% N; 9% P_2O_5; 9% K_2O combine drilled.

To sugar beet:- 5 cwt salt and 0.45 cwt K_2O as muriate of potash ploughed in; 0.45 cwt P_2O_5, 0.45 cwt K_2O as compound fertiliser, 20% P_2O_5, 20% K_2O in seedbed.

Cultivations, etc.: Trefoil undersown in barley at 30 lb per acre, ryegrass undersown at 40 lb per acre: Apr 27, 1960. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 6. Barley combine harvested: Aug 25. 'Nitro-Chalk' applied to ryegrass: Sept 2. "Fallow" plots ploughed: Sept 8 - 26, and Jan 18, 1961. Salt and potash applied; all plots ploughed: Feb 16. Seedbed fertilisers applied: Mar 24. Sugar beet drilled at 10 lb per acre: Apr 10. Sprayed against flea beetle with DDT emulsion (25% DDT) at 3 pints in 40 gallons per acre: May 20. Singled: May 24. Sprayed with demeton methyl at 12 fluid oz in 40 gallons per acre: June 10 and again on July 10. Sugar beet lifted: Oct 17. Varieties: Ryegrass-- S22 Italian; Sugar beet - Klein E. Previous crop: Barley

Standard errors per plot.

Roots (washed): 0.900 tons per acre or 7.0% (30 d.f.)
Total sugar: 3.71 cwt per acre or 8.5% (30 d.f.)

Notes: The trefoil made very poor growth. Estimates were made of dry matter and N per acre in green manures just before ploughing.

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Summary of Results

N: cwt per acre

Green manure undersown in barley	None	0.5	1.0	1.5	Mean
Roots (washed): tons per acre					
		(±0.520)			(±0.260)
None	9.30	11.43	11.36	12.97	11.27
Trefoil	10.77	12.95	15.02	14.78	13.38
Ryegrass	9.13	12.58	13.60	14.25	12.39
Ryegrass + N*	12.55	14.52	14.57	14.92	14.14
Mean (±0.260)	10.44	12.87	13.64	14.23	12.79
Sugar percentage					
None	18.0	16.9	16.0	15.9	16.7
Trefoil	17.8	18.0	17.5	16.3	17.4
Ryegrass	18.3	17.1	17.5	16.3	17.3
Ryegrass + N*	17.6	17.9	16.7	16.5	17.2
Mean	18.0	17.5	16.9	16.2	17.1
Total sugar: cwt per acre					
		(±2.14)			(±1.07)
None	33.6	38.5	36.3	41.3	37.4
Trefoil	38.3	46.7	52.6	48.2	46.5
Ryegrass	33.4	43.0	47.4	46.5	42.6
Ryegrass + N*	44.3	51.9	48.7	49.2	48.5
Mean (±1.07)	37.4	45.1	46.3	46.3	43.7
Plant number: thousands per acre					
None	24.2	17.3	16.3	18.1	19.0
Trefoil	21.6	19.2	21.1	23.1	21.3
Ryegrass	25.3	23.4	21.6	20.8	22.8
Ryegrass + N*	23.9	21.5	21.3	21.8	22.1
Mean	23.8	20.3	20.1	20.9	21.2

*0.6 cwt N per acre applied to ryegrass in autumn as 'Nitro-Chalk'

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61/C/7.1

GRASS

K and Mg - Rothamsted (R) Sawyers I 1961 the third year and Woburn (W) Stackyard Series C 1961 the second year.

Design: Sawyers I (R): 8 randomised blocks of 9 plots each.
Stackyard Series C (W): 4 randomised blocks of 9 plots each.

	Area of each plot (acres):	Area harvested (acres):
Sawyers I (R):	0.0209	0.0050
Stackyard Series C (W):	0.0011	0.0005

Treatments (applied 1959, 1960 and 1961). All combinations of:-
Mg: None; 29; 58 lb Mg per acre applied as magnesium sulphate on Sawyers I (R) and as kieserite (16.3% Mg) on Stackyard Series C (W).
K: None; 95; 190 lb K per acre (approximately 1; 2 cwt K_2O per acre) applied as sulphate of potash.
In addition in 1959 magnesium-free calcium carbonate was applied to blocks on Sawyers I (R) at 10; 40 cwt per acre (four blocks at each rate).

Basal dressings per acre:
Sawyers I (R): In seedbed 1961: 1.0 cwt P_2O_5 as triple superphosphate, 0.5 cwt N as sulphate of ammonia. In spring 1961: 0.5 cwt N as sulphate of ammonia. After every cut except the last: 1.0 cwt N as sulphate of ammonia.

Stackyard Series C (W): 1.0 cwt P_2O_5 as triple superphosphate, 1.0 cwt N as ammonium nitrate. After every cut except the last: 1.0 cwt N as ammonium nitrate.

Cultivations, etc.:
Sawyers I (R): Ploughed: Dec 2, 1960. Sulphate of ammonia and triple superphosphate applied: Mar 20, 1961. Magnesium sulphate and sulphate of potash applied: Mar 22. Seed drilled at 39 lb per acre: Mar 26. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 13. Sulphate of ammonia applied: May 15. Grass cut: Aug 9 and Sept 25. Sulphate of ammonia applied: Aug 10. Variety: S22 Italian ryegrass.
Stackyard Series C (W): Sulphate of potash, kieserite, triple superphosphate and ammonium nitrate applied: Mar 6, 1961. Cut 3 times: Apr 27, June 16, July 31. Ammonium nitrate applied after every cut except the last. Variety: S22 Italian ryegrass.

Note: For details of the previous year's results see "Results of the Field Experiments", 60/Ci/3.

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Standard errors per plot. Grass dry matter

Sawyers I (R)

1st cut:	1.89 cwt per acre	or 14.8% (48 d.f.)
2nd cut:	0.91 cwt per acre	or 9.5% (48 d.f.)
Total of 2 cuts:	2.55 cwt per acre	or 11.4% (48 d.f.)

Stackyard Series C (W)

1st cut:	3.34 cwt per acre	or 8.1% (24 d.f.)
2nd cut:	2.34 cwt per acre	or 9.4% (24 d.f.)
3rd cut:	0.86 cwt per acre	or 11.5% (24 d.f.)
Total of 3 cuts:	5.43 cwt per acre	or 7.4% (24 d.f.)

Summary of Results

Sawyers I (R)

Grass, Dry matter: cwt per acre

	K: lb per acre			Mg: lb per acre			
	None	95	190	None	29	58	Mean
		1st cut					
Calcium carbonate cwt per acre		(±0.55)*			(±0.55)*		
10	10.4	14.6	14.8	12.9	13.8	13.1	13.2
40	9.4	13.7	14.0	12.3	12.4	12.3	12.3
Diff.	-1.0	-0.9 (±0.77)**	-0.8	-0.6	-1.4 (±0.77)**	-0.8	-0.9
K: lb per acre					(±0.67)		(±0.39)
None				9.3	10.1	10.2	9.9
95				13.6	14.8	14.0	14.1
190				14.9	14.4	13.9	14.4
Mean				12.6	13.1 (±0.39)	12.7	12.8

*For use in horizontal and interaction comparisons only.
**For use only in testing the difference of 2 differences.

Mean dry matter % as cut: 1st cut 25.4

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61/C/7.3

Sawyers I (R)

Grass, Dry matter: cwt per acre

	K: lb per acre			Mg: lb per acre			Mean
	None	95	190	None	29	58	
2nd cut							
Calcium carbonate cwt per acre		(±0.26)*			(±0.26)*		
10	8.2	10.4	10.5	9.9	9.8	9.4	9.7
40	7.5	10.5	10.8	9.7	9.7	9.5	9.6
Diff.	-0.7	+0.1	+0.3	-0.2	-0.1	+0.1	-0.1
		(±0.37)**			(±0.37)**		
K: lb per acre					(±0.32)		(±0.19)
None				8.1	7.9	7.5	7.8
95				10.5	10.7	10.3	10.5
190				10.8	10.6	10.5	10.6
Mean				9.8	9.7 (±0.19)	9.4	9.6
Total of 2 cuts							
Calcium carbonate cwt per acre		(±0.74)*			(±0.74)*		
10	18.5	25.0	25.2	22.8	23.5	22.5	22.9
40	16.9	24.2	24.8	22.0	22.1	21.7	22.0
Diff.	-1.6	-0.8	-0.4	-0.8	-1.4	-0.8	-0.9
		(±1.04)**			(±1.04)**		
K: lb per acre					(±0.90)		(±0.52)
None				17.4	18.0	17.7	17.7
95				24.0	25.5	24.3	24.6
190				25.7	25.0	24.3	25.0
Mean				22.4	22.8 (±0.52)	22.1	22.4

*For use in horizontal and interaction comparisons only.
**For use only in testing the difference of 2 differences.

Mean dry matter % as cut: 2nd cut 20.9
Total of 2 cuts 23.1

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61/C/7.4

Stackyard Series C (W)

Grass, Dry matter: cwt per acre

K: lb per acre	Mg: lb per acre None	29	58	Mean	Mg: lb per acre None	29	58	Mean
	1st cut (±1.66)			(±0.96)	2nd cut (±1.16)			(±0.68)
None	38.1	39.3	36.0	37.8	20.7	23.1	23.3	22.4
95	44.2	41.0	41.8	42.3	22.7	25.9	25.9	24.8
190	42.7	43.1	45.3	43.7	26.3	27.5	27.8	27.2
Mean	41.7	41.1 (±0.96)	41.0	41.2	23.2	25.5 (±0.68)	25.7	24.7

	3rd cut				Total of 3 cuts			
	(±0.43)			(±0.25)	(±2.71)			(±1.56)
None	7.5	7.7	6.8	7.3	66.3	70.0	66.1	67.5
95	7.0	6.9	7.4	7.1	73.9	73.8	75.0	74.2
190	7.8	8.3	8.0	8.0	76.7	78.8	81.1	78.9
Mean	7.4	7.6 (±0.25)	7.4	7.4	72.3	74.2 (±1.56)	74.1	73.5

Mean dry matter % as cut:

1st cut	14.8
2nd cut	27.7
3rd cut	35.3
Total of 3 cuts	25.9

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61/C/8.1

INTENSIVE BARLEY GROWING EXPERIMENT

Little Knott I - 1961

Design: 2 replicates of 40 treatments in 4 blocks of 20 plots each.

Area of each plot (acres): 0.0212. Area harvested: 0.0138

Treatments. All combinations of:-

Crop sequences:

	1961	1962	1963	1964	1965	1966	1967	1968
1	O	Be	B	B	B	B	B	B
2	SW	O	Be	B	B	B	B	B
3	O	SW	O	Be	B	B	B	B
4	Be	O	SW	O	Be	B	B	B
5	SW	Be	O	SW	O	Be	B	B
6	SW	SW	Be	O	SW	O	Be	B
7	B	B	B	B	B	B	B	B
8	SW	SW	SW	SW	SW	SW	SW	SW
9	W*	W	W	W	W	W	W	W
10	Be	W	P	B	Be	W	P	B

O = Oats, Be = Spring beans, SW = Spring wheat, W = Winter wheat, B = Barley, P = Potatoes.

Nitrogen: Applied to continuous crops and to the winter wheat and barley in treatment 10 - none; 0.3; 0.6; 0.9 cwt N per acre as 'Nitro-Chalk'.

*In this case, because of bad weather, spring instead of winter wheat was sown.

Basal dressings (per acre): 240 lb compound fertiliser, 14% P_2O_5, 28% K_2O, to all crops except potatoes, which receive 10 cwt compound fertiliser, 10% N, 10% P_2O_5, 18% K_2O. The non-continuous crops oats and spring wheat also receive 0.45 cwt N as 'Nitro-Chalk'.

Cultivations, etc.: Ground chalk applied at 24 cwt per acre: Sept 23, 1960. Ploughed: Oct 4.

Spring beans: Seed placement drilled at 200 lb per acre: Mar 10, 1961. Sprayed with demeton-methyl at 12 fluid oz in 60 gallons per acre: June 12. Combine harvested: Aug 26. Variety: Tick.

Oats: Seed combine drilled at 4 bushels per acre, 'Nitro-Chalk' applied: Mar 10, 1961. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 12. Combine harvested: Aug 22. Variety: Condor.

Spring wheat: Seed combine drilled at 3 bushels per acre, 'Nitro-Chalk' applied: Mar 10, 1961. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 12. Combine harvested: Aug 30. Variety: Jufy I.

Barley: Seed combine drilled at 2½ bushels per acre: Mar 9, 1961. 'Nitro-Chalk' applied: Mar 10. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 12. Combine harvested: Aug 30. Variety: Proctor.

Previous crop: Spring wheat.

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Note. Yields were only taken for sequences 2, 7, 8 and 9.

Standard error per plot. Grain (at 85% dry matter):
Spring wheat (8 & 9): 2.27 cwt per acre or 8.2% (11 d.f.)
Spring wheat (2): 2.70 cwt per acre or 9.2% (6 d.f.)

Summary of Results

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

Spring wheat (8 and 9)

N: cwt per acre

None	0.3	0.6	0.9	Mean
16.9	25.3	32.0	36.0	27.5
		(±1.13)		

Mean dry matter % as harvested: 85.5

Spring wheat (2)

N: cwt per acre

0.45

29.3

(±0.96)

Mean dry matter % as harvested: 85.8

Barley (7)

N: cwt per acre

None	0.3	0.6	0.9	Mean
22.7	34.5	38.8	38.8	33.7

Mean dry matter % as harvested: 83.9

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61/Da/1

WINTER WHEAT

Effect of weedkillers on Take-all (Ophiobolus graminis) - Great Field I 1961.

Design: 4 randomised blocks of 4 plots each.

Area of each plot: 0.0318 acres. Area harvested: 0.0147 acres.

Treatments: Unsprayed (0); 2,4-D at $\frac{3}{4}$ pint in 40 gallons per acre (A); CMPP at 6 pints in 40 gallons per acre (B); MCPA/TBA at 4 pints in 40 gallons per acre (C).

Basal dressings per acre: 5$\frac{1}{4}$ cwt ground chalk; 2$\frac{1}{2}$ cwt compound fertiliser (16% P_2O_5, 16% K_2O) combine drilled; 3$\frac{1}{2}$ cwt 'Nitro-Chalk' 21.

Cultivations, etc.: Ground chalk applied: Oct 4, 1960. Ploughed: Oct 15. Seed combine drilled at 3 bushels per acre: Jan 23, 1961. 'Nitro-Chalk' applied: Apr 19. Sprays applied: May 19. Combine harvested: Aug 31. Variety: Cappelle. Previous crop: Winter wheat.

Note. Counts of plant number, and estimates of incidence of Take-all (Ophiobolus graminis) were made.

Standard error per plot.
Grain (at 85% dry matter): 2.49 cwt per acre or 14.1% (9 d.f.)

Summary of Results

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

Spray				
0	A	B	C	Mean
19.4	17.3 (±1.24)	17.4	16.6	17.7

Mean dry matter % as harvested: 84.4

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61/Da/2

WINTER WHEAT

Varieties and levels of nitrogen - Deacons Field 1961.

Design: 4 randomised blocks of 12 plots each.

Area of each plot: 0.0212 acres. Area harvested: 0.0141 acres.

Treatments. All combinations of:-
Varieties: Cappelle (C); Professeur Marchal (M); Viking (V).
Levels of nitrogen (in addition to basal): 0.0; 0.3; 0.6; 0.9 cwt N per acre as 'Nitro-Chalk'.

Basal dressing: 2 cwt compound fertiliser (6% N, 15% P_2O_5, 15% K_2O) per acre combine drilled.

Cultivations, etc.: Ploughed: Nov 15 - 25, 1960. Seed combine drilled at 3 bushels per acre: Feb 13, 1961. 'Nitro-Chalk' applied: Apr 15. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 8. Combine harvested: Sept 8. Previous crop: Spring beans.

Standard error per plot.
Grain (at 85% dry matter): 2.03 cwt per acre or 4.9% (33 d.f.)

Summary of Results

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

N: cwt per acre	Variety C	Variety M	Variety V	Mean
		(±1.01)		(±0.59)
None	31.1	31.7	28.2	30.3
0.3	37.3	37.5	42.2	39.0
0.6	43.1	46.5	49.1	46.2
0.9	50.0	50.4	50.9	50.4
Mean (±0.50)	40.3	41.5	42.6	41.4

Mean dry matter % as harvested: 79.6

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61/Da/3.1

SPRING WHEAT

Combine drilling of nitrogen - Woburn, Great Hill 1961.

Design: 4 randomised blocks of 7 plots each.

Area of each plot: 0.0148 acres. Area harvested: 0.0104 acres.

Treatments:

No nitrogen. 0.40 cwt N per acre (N_1); 0.77 cwt N per acre (N_2) either broadcast as sulphate of ammonia or combine drilled as part of a compound fertiliser.

0.40 cwt N per acre as above plus 0.37 cwt N per acre as 'Nitro-Chalk' top dressing.

Compound fertilisers used:

N_1: 8% N, 8% P_2O_5, 8% K_2O.

N_2: 16% N, 9% P_2O_5, 9% K_2O.

Basal dressing per acre: 0.43 cwt P_2O_5 and 0.43 cwt K_2O combine drilled:

(a) on the plots receiving drilled nitrogen, as compounds N_1, N_2.

(b) on the no nitrogen and broadcast nitrogen plots, as compound 20% P_2O_5, 20% K_2O.

Cultivations, etc.: Ploughed Oct 17 - Dec 8, 1960. Seed combine drilled at 2¾ bushels per acre, sulphate of ammonia applied: Mar 10, 1961. 'Nitro-Chalk' top dressings applied: Apr 21. Sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 3. Combine harvested: Aug 29. Variety: Jufy I. Previous crop: Barley.

Note: The very low yields were in part due to a severe attack of Fusarium, which was worst on the plots receiving nitrogen.

Standard error per plot.

Grain (at 85% dry matter): 2.29 cwt per acre or 20.1% (18 d.f.)

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61/Da/3.2

Summary of Results

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

N: cwt per acre

	Broadcast			Drilled			
None	0.40	0.77	0.40 & 0.37+	0.40	0.77	0.40 & 0.77+	Mean
9.4	12.8	12.2	11.2	11.6	11.0	11.6	11.4
			(±1.14)				

Mean dry matter % as harvested: 84.9

+Top dressing.

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WINTER AND SPRING WHEAT

Sowing dates, seed rates and levels of nitrogen (after non-cereal crop) - Great Knott III 1961.

Design: 3 randomised blocks of 12 plots each, plots split into 2 for the application of nitrogen.

Area of each sub plot: 0.0148 acres. Area harvested: 0.0097 acres.

Treatments. All combinations of:-

Whole plots. Sowing dates: Sept 29, 1960; Jan 19, 1961; Feb 15 (winter wheat); Feb 15* (spring wheat).
Seed rates: 2; 3; 4 bushels per acre.

Sub plots. Nitrogen (in addition to basal): 0.46; 0.92 cwt N per acre applied as 'Nitro-Chalk' in two equal parts on February 16 and April 19.

* Weather conditions delayed sowing and spring wheat was drilled on Feb 15 instead of a still later sowing of winter wheat.

Basal dressing: 2 cwt compound fertiliser (14% P_2O_5, 28% K_2O) per acre broadcast in seedbed, 3 cwt compound fertiliser (5% N, 12½% P_2O_5, 12½% K_2O) per acre combine drilled with seed.

Cultivations, etc.: Ploughed: Sept 19, 1960. Compound fertiliser applied: First sowing - Sept 29; second sowing - Nov 16; third sowing - Feb 15, 1961. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 5. Combine harvested: Aug 30. Varieties: Cappelle and Jufy I. Previous crops: 1958 - Spring wheat; 1959 - Winter and spring beans; 1960 - Early potatoes.

Note. Counts of plant shoot and ear number, and estimates of plant height and % area lodged were made.

Standard error per plot, Grain (at 85% dry matter):
Whole plot: 3.30 cwt per acre or 7.4% (22 d.f.)
Sub plot: 3.30 cwt per acre or 7.4% (24 d.f.)

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Summary of Results

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

Seed rate: bushels per acre	Variety and date of sowing: Cappelle (W.W.) Sept 29th	Cappelle (W.W.) Jan 19th	Cappelle (W.W.) Feb 15th	Jufy I (S.W.) Feb 15th	N: cwt per acre (including basal) 0.6	N: cwt per acre (including basal) 1.1	Diff.	Mean
	(±1.91)				(±1.17)*		(±1.35)	(±0.95)
2	44.0	49.0	43.7	41.3	43.3	45.6	+2.3	44.5
3	39.9	47.7	45.7	43.7	43.5	45.0	+1.5	44.2
4	39.7	49.0	47.9	44.9	45.3	45.4	+0.1	45.4
			Variety and date of sowing		(±1.35)*		(±1.56)	(±1.10)
			Sept 29th		42.9	39.5	-3.4	41.2
		Cappelle (W.W.)	Jan 19th		46.3	50.7	+4.4	48.5
			Feb 15th		45.7	45.8	+0.1	45.7
		Jufy I (S.W.)	Feb 15th		41.3	45.3	+4.0	43.3
			Mean		44.0	45.4	+1.4	44.7
							(±0.78)	

*For use in vertical and diagonal comparisons only.

Mean dry matter % as harvested: 86.6

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61/Da/5.1

WINTER AND SPRING WHEAT

Sowing dates, seed rates and levels of nitrogen (after cereal crop) - Great Knott III 1961.

Design: 3 randomised blocks of 8 plots each, plots split into 2 for the application of nitrogen.

Area of each sub plot: 0.0148 acres. Area harvested: 0.0097 acres.

Treatments. All combinations of:-

Whole plots. Sowing dates: Sept 29, 1960; Jan 19, 1961; Feb 15 (winter wheat); Feb 15* (spring wheat).
Seed rates: 2; 4 bushels per acre.

Sub plots. Nitrogen (in addition to basal): 0.46; 0.92 cwt N per acre applied as 'Nitro-Chalk' in two equal parts on February 16 and April 20.

* Weather conditions delayed sowing and spring wheat was drilled on Feb 15th instead of a still later sowing of winter wheat.

Basal dressing: 2 cwt compound fertiliser (14% P_2O_5, 28% K_2O) per acre broadcast in seedbed, 3 cwt compound fertiliser (5% N, 12½% P_2O_5, 12½% K_2O) per acre combine drilled with seed.

Cultivations, etc.: Ploughed: Sept 15, 1960. Compound fertiliser applied: First sowing - Sept 29; second sowing - Nov 16; third sowing - Feb 15, 1961. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 5. Combine harvested: Aug 30. Varieties: Cappelle and Jufy I. Previous crops: 1958 - Spring wheat; 1959 - Winter beans; 1960 - Winter wheat.

Note. Counts of plant shoot and ear number, and estimates of plant height and % area lodged were made. The incidence of Eyespot (*Cercosporella herpotrichoides*) and Take-all (*Ophiobolus graminis*) was estimated.

Standard errors per plot, Grain (at 85% dry matter):
Whole plot: 1.78 cwt per acre or 5.2% (14 d.f.)
Sub plot: 2.25 cwt per acre or 6.6% (16 d.f.)

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Summary of Results

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

Seed rate: bushels per acre	Variety and date of sowing: Cappelle (W.W.) Sept 29th	Cappelle (W.W.) Jan 19th	Cappelle (W.W.) Feb 15th	Jufy I (S.W.) Feb 15th	N: cwt per acre (including basal) 0.6	N: cwt per acre (including basal) 1.1	Diff.	Mean
	(±1.03)				(±0.69)*		(±0.92)	(±0.51)
2	29.2	35.4	37.9	37.2	31.9	38.0	6.1	34.9
4	27.8	34.3	37.6	36.1	29.6	38.3	8.7	33.9

Variety and date of sowing		(±0.98)*		(±1.30)	(±0.73)
Cappelle (W.W.)	Sept 29th	22.4	34.6	12.2	28.5
	Jan 19th	29.9	39.7	9.8	34.8
	Feb 15th	35.2	40.2	5.0	37.7
Jufy I (S.W.)	Feb 15th	35.3	38.0	2.7	36.7
	Mean	30.7	38.2	7.5	34.4
				(±0.65)	

*For use in vertical and diagonal comparisons only.

Mean dry matter % as harvested: 85.2

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61/Db/1.1

BARLEY

Forms and methods of application of nitrogen - Great Knott I 1961.

Design: 3 randomised blocks of 20 plots each.

Area of each plot: 0.0194 acres.

Treatments: No nitrogen (2 plots per block) and all combinations of:-
Forms of N: Ammonium sulphate 21% N (S);
Calcium nitrate 15.5% N (C);
Urea 45.6% N (U)
Levels of N: 0.35; 0.70 cwt N per acre.
Methods of application: Broadcast (B); combine drilled (D); side band placed (P).

Basal dressing: 2 cwt granular compound fertiliser (14% P_2O_5, 28% K_2O) per acre.

Cultivations, etc.: Ground chalk applied at 45 cwt per acre: Oct 17, 1960. Ploughed: Nov 29. Seed drilled at $2\frac{1}{2}$ bushels per acre and seedbed fertilisers applied: Mar 14, 1961. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 11. Combine harvested: Aug 16. Variety: Proctor. Previous crop: Winter wheat.

Standard error per plot.
Grain (at 85% dry matter): 1.61 cwt per acre or 4.1% (37 d.f.)

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61/Db/1.2

Summary of Results

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

	Form of N S	C	U	Mean
Mean (±0.38)	39.2	39.6	38.1	39.0 (±0.22)
N: cwt per acre				
0.35 (±0.54)	36.4	36.3	36.0	36.2
0.75	42.1	42.8	40.2	41.7
Diff. (±0.76)	+5.7	+6.5	+4.2	+5.5 (±0.44)
Method of application				
B	38.0	41.1	38.0	39.0
D (±0.66)	40.3	38.3	37.1	38.5 (±0.38)
P	39.5	39.4	39.2	39.3

	Method of application B	D	P
N: cwt per acre			
0.35 (±0.54)	35.8	36.5	36.3
0.70	42.2	40.6	42.3
Diff. (±0.76)	+6.4	+4.1	+6.0

No N: 25.0 (±0.66)

General mean: 37.6

Mean dry matter % as harvested (all plots): 82.5

Form of N
S = Ammonium sulphate 21% N
C = Calcium nitrate 15.5% N
U = Urea 45.6% N

Method of application
B = Broadcast
D = Combine drilled
P = Side band placed

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61/Db/2

BARLEY

Levels and methods of application of superphosphate - Sawyers III 1961.

Design: 3 randomised blocks of 14 plots each.

Area of each plot: 0.0146 acres.

Treatments: No superphosphate (2 plots per block) and all combinations of:-

Superphosphate: 0.25; 0.50; 0.75 cwt per acre P_2O_5 as granular superphosphate (20.5% P_2O_5).

Methods of application: Machine broadcast (B); combine drilled (C); side band placed (P); restricted broadcasting* (R).

*i.e. fertiliser surface applied in a band 2" wide immediately above each row of seed.

Basal dressing: 4 cwt compound fertiliser (16% N, 16% K_2O) per acre.

Cultivations, etc.: Ploughed: Nov 28, 1960. Rotary cultivated: Mar 17 and Mar 30 - Apr 12, 1961. Seed drilled at 2½ bushels per acre, fertilisers applied: Apr 14 - 17. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 18. Combine harvested: Aug 22. Variety: Proctor. Previous crop: 6 year grass ley.

Standard error per plot.
Grain (at 85% dry matter): 1.04 cwt per acre or 2.8% (25 d.f.)

Summary of Results

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

P_2O_5: cwt per acre	Method of application B	C	P	R	Mean
		(±0.60)			(±0.30)
0.25	36.4	38.2	38.1	36.7	37.4
0.50	36.9	37.2	38.2	36.4	37.2
0.75	36.8	37.8	38.2	38.6	37.9
Mean (±0.35)	36.7	37.7	38.2	37.2	37.4 (±0.17)

No P_2O_5: 34.0 (±0.42)

General mean : 36.9

Mean dry matter % as harvested (all plots): 83.8

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BARLEY

The control of wild oats (Avena fatua) by means of a residual pre-emergence herbicide - Rothamsted (R) Great Field I and Woburn (W) Broadmead I 1961.

Design (each field): 3 randomised blocks of 6 plots each.

Area of each plot (acres): 0.0129. Area harvested: 0.0092.

Treatments. All combinations of:-
Spray. None; herbicide* spray applied to seedbed before sowing.
Cultivation. None; rotary cultivation. Spring tine cultivation (2 strokes).

*The herbicide contained 4 lb per gallon of 2,3-dichloroallyldiisopropyl-thiolcarbamate and was applied at 3 pints in 40 gallons per acre on Great Field I (R) and at 3 pints in 20 gallons per acre on Broadmead I (W).

Basal dressings per acre:
Great Field I (R): 3 cwt compound fertiliser (16% N, 9% P_2O_5, 9% K_2O) combine drilled.
Broadmead I (W): $3\frac{1}{2}$ cwt compound fertiliser (16% N, 9% P_2O_5, 9% K_2O) combine drilled.

Cultivations, etc.:
Great Field I (R): Ground chalk applied at 54 cwt per acre: Oct 4 - 14, 1960. Ploughed: Oct 14. Herbicide spray, spring tine cultivations and rotary cultivation applied: Apr 7, 1961. Seed combine drilled at $2\frac{1}{4}$ bushels per acre: Apr 10. Combine harvested: Aug 18. Variety: Proctor. Previous crop: Winter wheat.
Broadmead I (W): Sprayed with dalapon at 4 lb in 20 gallons per acre: Nov 9, 1960. Ploughed: Dec 13 - Jan 6, 1961. Herbicide spray, spring tine cultivations and rotary cultivation applied: Mar 23. Seed combine drilled at $2\frac{1}{4}$ bushels per acre: Mar 25. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: May 3. Combine harvested: Aug 18. Variety: Proctor. Previous crop: Winter wheat.

Note. Counts of wild oats were taken.

Standard error per plot, Grain (at 85% dry matter):
Gt. Field I (R): 2.73 cwt per acre or 8.5% (10 d.f.)
Broadmead I (W): 2.27 cwt per acre or 6.8% (9 d.f.)*

*1 missing value.

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Summary of Results

	Cultivation			
	None	Rotary	Spring tine	Mean
Great Field I (R)				
		(±1.56)		(±0.90)
Unsprayed	29.9	34.5	30.6	31.6
Sprayed	29.9	35.2	32.6	32.6
Mean (±1.11)	29.9	34.8	31.6	32.1
Diff.(±2.23)	0.0	+0.7	+2.0	+1.0
				(±1.29)

Mean dry matter % as harvested: 82.8

Broadmead I (W)				
		(±1.31)		(±0.76)
Unsprayed	30.1	31.1	34.3 +	31.8
Sprayed	35.7	35.1	34.5	35.1
Mean (±0.93)	32.9	33.1	34.4	33.4
Diff.(±1.85)	+5.6	+4.0	+0.2	+3.3
				(±1.07)

Mean dry matter % as harvested: 85.0

+includes 1 estimated value.

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61/Dc/1

SPRING OATS

Frit fly study (sowing dates) - Long Hoos V1, V11 1961.

Design: 2 randomised blocks of 3 plots each.

Area of each plot: 0.4821 acres. Area harvested: 0.0643 acres.

Treatments: Sowing dates: Mar 17; Apr 7; Apr 22, 1961.

Basal dressing: $2\frac{1}{2}$ cwt compound fertiliser (16% N, 9% P_2O_5, 9% K_2O) per acre combine drilled with seed.

Cultivations, etc.: Ploughed: Feb 10 and Mar 7, 1961. Rotary cultivated: Mar 16. Seed combine drilled at 3 bushels per acre: Mar 17, Apr 7 and Apr 22. Sprayed with MCPA/TBA at 4 pints in 40 gallons per acre: first and second sowing - May 15; third sowing - May 25. Combine harvested: first and second sowing - Aug 23; third sowing - Aug 31. Variety: Blenda. Previous crop: Potatoes.

Note. Counts of frit fly and egg numbers, estimates of grain and tiller damage, and of growth rates were made at intervals.

Summary of Results

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

Sowing date

Mar 17	Apr 7	Apr 22	Mean
21.3	18.3	8.2	15.9

Mean dry matter % as harvested: 84.1

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61/Dd/1

SPRING BEANS

The effect of levels of chalk - Great Field I 1961.

Design: 4 randomised blocks of 5 plots each.

Area of each plot: 0.0212 acres. Area harvested: 0.0121 acres.

Treatments: Ground chalk tons per acre applied in two dressings, half before ploughing on Dec 6 and half after ploughing on Dec 13, 1960:- None*; 1; 2; 3; 4.

*The site was very uniform in pH, the maximum range between plots being 5.9 - 6.2.

Basal dressing: 3½ cwt per acre compound fertiliser (14% P_2O_5, 28% K_2O) placement drilled.

Cultivations, etc.: Ploughed: Oct 15 and Dec 9, 1960. Rotary cultivated: Feb 21, 1961. Seed placement drilled at 200 lb per acre: Mar 11. Sprayed with demeton-methyl at 12 fluid oz. in 60 gallons per acre: June 14. Combine harvested: Aug 21. Variety: Garton's Tick. Previous crop: Winter wheat.

Note. Samples were taken for counts of pods and beans.

Standard error per plot.
Grain (at 85% dry matter): 1.64 cwt per acre or 8.3% (12 d.f.)

Summary of Results

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

Ground chalk: tons per acre

None	1	2	3	4	Mean
15.0	17.9	21.7 (±0.82)	22.0	22.5	19.8

Mean dry matter % as harvested: 75.5

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61/Dd/2.1

SPRING BEANS

Control of weeds by residual herbicides - Great Field I 1961.

Design: 3 randomised blocks of 23 plots each.

Area of each plot: 0.0176 acres. Area harvested: 0.0110 acres.

Treatments:

Beans drilled at normal (21") spacing, no inter row cultivations (0)
Beans drilled at narrow ($10\frac{1}{2}$") spacing, no inter row cultivations (A)
Beans drilled at normal (21") spacing, inter cultivated (B)

Treatments 0, A, B taken factorially with:

No spray:
Simazine: $\frac{1}{2}$; 1 lb active material per acre (S_1S_2) as pre-emergence spray
2,6-DBN: 1; 3 lb active material per acre (D_1D_2) as pre-emergence spray

Treatments 0 and A taken factorially with
2,6-DBN: $1\frac{1}{2}$; 3 lb active material per acre as post-emergence spray.

Basal dressing: $3\frac{1}{2}$ cwt per acre compound fertiliser (14% P_2O_5, 28% K_2O) placement drilled.

Cultivations, etc.: Ground chalk applied at 54 cwt per acre: Oct 4, 1960. Ploughed: Oct 14. Seedbed spray applied and worked in: Mar 4, 1961. All plots rotary cultivated except those already sprayed, seed placement drilled at 200 lb per acre: Mar 17. Pre-emergence spray applied: Mar 23. Post-emergence spray applied: May 1. Sprayed with demeton-methyl at 12 fluid oz in 60 gallons per acre: June 10. Combine harvested: Sept 4. Variety: Garton's Spring Tick. Previous crop: Winter wheat.

Note (1). The plots on which 2,6-DBN was worked into the seedbed failed reducing the experiments to 3 blocks of 19 plots each.

Note (2). Weed counts were taken on all wide row plots.

Standard error per plot.
Grain (at 85% dry matter): 2.34 cwt per acre or 9.7% (36 d.f.)

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61/Dd/2.2

Summary of Results

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

	No inter row cultivation		Inter cultivated
	21" row	10½" row	21" row
		(±1.35)	
No spray	22.5	21.0	26.8
Pre-emergence S_1	23.1	21.8	27.0
S_2	27.2	24.5	26.5
D_1	25.9	23.0	25.6
D_2	27.8	23.8	28.3
Post-emergence D_1	21.5	20.6	
D_2	20.0	21.2	
General mean		24.1	

Mean dry matter % as harvested: 79.8

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61/Dd/3

SPRING BEANS

Varietal susceptibility to virus - Great Knott III 1961.

Design: 3 randomised blocks of 7 plots each.

Area of each plot (acres):-0.0161. Area harvested: 0.0100.

Treatments:
Varieties: Albyn Tick (A); Tick 30^{B} (B); Granton (G); Herz Freya (H); Minor (M); Strubes (S); Tick (T).

Basal dressing: 3½ cwt per acre compound fertiliser, 14% P_2O_5, 28% K_2O placement drilled with seed.

Cultivations, etc.: Ground chalk applied at 61 cwt per acre: Mar 7, 1961. Sprayed with diquat at 5½ pints and 12 fluid oz spreader in 80 gallons per acre: Mar 25. Rotary cultivated twice: Mar 30 and Apr 11. Seed placement drilled at 200 lb per acre: Apr 13. Sprayed with simazine at 1 lb active material in 40 gallons per acre: Apr 25. Sprayed with demeton-methyl at 12 fluid oz in 40 gallons per acre: June 24. Combine harvested: Sept 5. Previous crop: Winter wheat.

Note. Counts of virus infected plants and estimates of numbers of aphids were made.

Standard error per plot.
Grain (at 85% dry matter): 1.54 cwt per acre or 8.2% (12 d.f.)

Summary of Results

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

Variety							
A	B	G	H	M	S	T	Mean
21.4	21.3	15.0	13.8 (±0.89)	17.1	21.2	21.1	18.7

Mean dry matter % as harvested: 78.7

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61/Dd/4

SPRING BEANS

Control of aphids by insecticides - Great Knott III 1961.

Design: 4 randomised blocks of 3 plots each.

Area of each plot (acres): 0.0260. Area harvested: 0.0175.

Treatments:
- No insecticide (0)
- Granular systemic insecticide* broadcast at 30 lb (1½ lb active ingredient) per acre (D)
- Sprayed with demeton-methyl at 12 fluid oz in 40 gallons per acre (M).

*O,O-diethyl-S-2-(ethylthio)ethylphosphorodithioate.

Basal dressing per acre: 3½ cwt compound fertiliser, 14% P_2O_5, 28% K_2O placement drilled with seed.

Cultivations, etc.: Ground chalk applied at 61 cwt per acre: Mar 7, 1961. Sprayed with diquat at 5½ pints and 12 fluid oz spreader in 80 gallons per acre: Mar 25. Rotary cultivated twice: Mar 30 and Apr 11. Seed placement drilled at 200 lb per acre: Apr 13. Sprayed with simazine at 1 lb active material in 40 gallons per acre: Apr 25. Granular systemic insecticide applied: May 28. Demeton-methyl applied: June 14. Combine harvested: Sept 12. Variety: Mixed seed. Previous crop: Winter wheat.

Note. Counts of virus infected plants and estimates of numbers of aphids were made.

Standard error per plot.
Grain (at 85% dry matter): 2.84 cwt per acre or 14.5% (6 d.f.)

Summary of Results

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

Spray			
0	D	M	Mean
13.7	23.3 (±1.41)	21.6	19.5

Mean dry matter % as harvested: 81.3

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61/De/1.1

POTATOES

Forms and levels of K - Sawyers I 1961.

Design: 4 blocks of 8 plots each with certain high order interactions partially confounded with block differences.

Area of each plot: 0.0141 acres. Area harvested: 0.0071 acres.

Treatments: No potash (2 plots per block) and all combinations of:-

Forms of K: Potassium bi-carbonate, $KHCO_3$ (C);
Potassium sulphate, K_2SO_4 (S);
Potassium chloride, KCl (M);

Levels of K: 1.25; 2.50 cwt K_2O per acre.

All the above in combination with:-

Levels of N: 0.75; 1.50 cwt N per acre as 'Nitro-Chalk'.

Basal dressing: 0.75 cwt P_2O_5 per acre as triple superphosphate.

Cultivations, etc.: Ploughed: Jan 5, 1961. Ridged: Apr 24. Fertilisers applied, potatoes hand planted: Apr 25. Earthed up: July 6. Lifted: Sept 22. Variety: King Edward. Previous crop: Fallow.

Standard errors per plot.
Total tubers tons per acre: 1.203 tons per acre or 25.7% (13 d.f.)

Note: This is a repetition with the same treatments on the same plots of the experiment of 1959 (see 59/Cf/1).

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Summary of Results

Form of K

	0	C	S	M	Mean
Total tubers: tons per acre					
Mean (±0.425)	3.88	4.88	5.13	4.83	4.68
K_2O: cwt per acre					
1.25 (±0.602)	-	5.07	4.89	4.77	4.91 (±0.347)
2.50	-	4.69	5.38	4.89	4.99
Diff. (±0.851)	-	-0.38	+0.49	+0.12	+0.08 (±0.491)
N: cwt per acre					
0.75 (±0.602)	3.92	4.27	5.09	4.21	4.37
1.50	3.83	5.49	5.18	5.45	4.99
Diff. (±0.851)	-0.09	+1.22	+0.09	+1.24	+0.62 (±0.425)
Percentage ware ($1\frac{1}{2}$" riddle)					
Mean	65.1	71.2	71.5	68.0	68.9
K_2O: cwt per acre					
1.25	-	72.4	72.3	64.7	69.8
2.50	-	70.1	70.7	71.4	70.7
Diff.	-	-2.3	-1.6	+6.7	+0.9
N: cwt per acre					
0.75	65.0	70.8	69.3	65.4	67.6
1.50	65.2	71.7	73.6	70.7	70.3
Diff.	+0.2	+0.9	+4.3	+5.3	+2.7

Forms of K

0 = None
C = Potassium bi-carbonate, $KHCO_3$
S = Potassium sulphate, K_2SO_4
M = Potassium chloride, KCl

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POTATOES

Time of burning off haulm+ - Whittlocks 1961.

Design: 4 randomised blocks of 9 plots each.

Area of each plot: 0.0565 acres. Area harvested: 0.0141 acres.

Treatments. All combinations of:-

Copper spraying: None; sprayed on 3 occasions with copper fungicide.

Burning off haulm: None; haulm burnt off. Two plots per block for each factorial treatment. In addition one plot per block was sprayed on the second and third occasions with copper fungicide and the haulm burnt off.

Basal dressing: 7 cwt per acre compound fertiliser, 17% N, 11% P_2O_5, 22% K_2O.

Cultivations, etc.: Ground chalk applied at 24 cwt per acre: Sept 6 - 17, 1960. Ploughed: Apr 27, 1961. Rotary cultivated, basal dressing applied, potatoes machine planted: May 2. Earthed up: July 7. Appropriate plots sprayed with copper fungicide at 5 lb in 30 gallons per acre: July 19, Aug 18, Sept 5. Appropriate plots sprayed with undiluted BOV at 15 gallons per acre: Sept 21. Lifted: Oct 18. Variety: King Edward. Previous crop: Barley.

+The experiment was converted to measuring the detrimental effects of copper without interference from blight as there was an exceptionally late and slight attack of the disease. As a result of this alteration the treatments described are not as originally planned.

Note: Periodic samples were taken of the weight of tops and tubers, and an assessment of blight on foliage and in tubers was made.

Standard error per plot.
Total tubers: 1.205 tons per acre or 8.5% (28 d.f.)

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Summary of Results

Unsprayed Haulm		Sprayed three times Haulm		Sprayed twice Haulm	
Not burnt off	Burnt off	Not burnt off	Burnt off	burnt off	Mean
Total tubers: tons per acre					
13.95	14.12	14.98	13.86	13.57	14.16
	(±0.426)			(±0.602)	
Percentage ware ($1\frac{1}{2}$" riddle)					
94.8	94.6	95.4	94.5	94.8	94.8

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61/De/3

POTATOES

The effect of azotobacter inoculation - Whittlocks 1961.

Design: 4 × 4 Latin square.

Area of each plot: 0.0057 acres. Area harvested: 0.0014 acres.

Treatments. All combinations of:-
Nitrogen: None; 1.2 cwt N per acre applied as 'Nitro-Chalk' in furrows before planting.
Azotobacter inoculation: None - seed potatoes dressed with mineral nutrient solution as used for azotobacter culture medium; seed potatoes inoculated with azotobacter.

Basal manuring (per acre): 7 cwt compound fertiliser, 12% P_2O_5, 24% K_2O, broadcast on the flat before ridging.

Cultivations, etc.: Ground chalk applied at 24 cwt per acre: Sept 6, 1960. Ploughed: Apr 27, 1961. Rotary cultivated: May 8. Basal PK compound applied, ridged: May 9. 'Nitro-Chalk' applied: May 10. Potatoes planted: May 12. Earthed up: July 9. Sprayed with zineb at 2 lb in 40 gallons per acre: Aug 3. Sprayed with undiluted BOV at 15 gallons per acre: Sept 22. Harvested: Oct 4. Variety: King Edward. Previous crop: Barley.

Standard error per plot.
Total tubers: 1.325 tons per acre or 10.5% (6 d.f.)

Note. Counts were made of numbers of azotobacter on tubers and roots.

Summary of Results

N: cwt per acre

	None		1.2		
	Uninoculated	Inoculated	Uninoculated	Inoculated	Mean
	Total tubers: tons per acre				
Mean (±0.663)	10.00	9.38	15.94	15.24	12.64
Increase (±0.937)		-0.62	+5.94	+5.24	

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61/De/4.1

POTATOES

The control of weeds by triazine weedkillers - Rothamsted (R) Long Hoos III and Woburn (W) Warren Field S 1961.

Design: Long Hoos III (R): 3 randomised blocks of 6 plots each.
Warren Field (W): 4 randomised blocks of 6 plots each.

	Area of each plot (acres):	Area harvested (acres):
Long Hoos III (R):	0.0145	0.0032
Warren Field (W):	0.0161	0.0054

Treatments: No weed control (0);
*Mechanical weed control (M);
Simazine: ½ lb (S_1); 1 lb (S_2) active material in 40 gallons per acre.
Methyl-mercapto-triazine: 1¼ lb (T_1); 2½ lb (T_2) active material in 40 gallons per acre.

Basal dressing per acre:
Long Hoos III (R): 10 cwt compound fertiliser, 10% N, 10% P_2O_5, 18% K_2O.
Warren field (W): 10 cwt compound fertiliser, 17% N, 11% P_2O_5, 22% K_2O.

Cultivations, etc.:-
Long Hoos III (R): Ground chalk applied at 23 cwt per acre: Sept 17 - Dec 19, 1960. Ploughed: Dec 29. Basal fertiliser applied: Apr 17, 1961. Rotary cultivated, machine planted: Apr 24. Sprays applied: May 1. M plots earthed up: July 6. Sprayed with zineb at 2 lb in 40 gallons per acre: Aug 3. Sprayed with undiluted BOV at 15 gallons per acre: Sept 21. 2 rows per plot hand dug and weighed: Sept 25. Variety: Ulster Supreme. Previous crop: Winter wheat
Warren Field (W): Ground chalk applied at 59 cwt per acre: Dec 17, 1960. Ploughed: Dec 20. Basal fertiliser applied, potatoes machine planted: Apr 17, 1961. Sprays applied: Apr 28. M plots earthed up: July 5. Sprayed with zineb at 2 lb in 40 gallons per acre: Aug 3. Sprayed with undiluted BOV at 12 gallons per acre: Sept 18. Lifted: Sept 22. Variety: King Edward. Previous crop: Winter beans.

Standard errors per plot. Total tubers tons per acre.
Long Hoos III (R): 0.945 tons per acre or 19.0% (10 d.f.)
Warren Field (W): 1.639 tons per acre or 17.3% (15 d.f.)

*Long Hoos III (R): Chain harrowed once, grubbed 3 times, tractor weeded once, earthed up.
Warren Field (W). Harrowed once, grubbed once, earthed up.

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61/De/4.2

Summary of Results

Weed Control

0	M	S_1	S_2	T_1	T_2	Mean
Long Hoos III (R)						
Total Tubers: tons per acre						
		(±0.545)				
2.34	8.03	4.11	5.14	4.03	6.14	4.96
Percentage ware ($1\frac{1}{2}$" riddle)						
77.2	96.4	88.1	92.7	91.9	93.0	89.9
Warren Field (W)						
Total Tubers: tons per acre						
		(±0.819)				
6.47	13.66	8.86	8.75	9.09	9.97	9.47
Percentage ware ($1\frac{1}{2}$" riddle)						
90.9	96.7	95.8	94.2	96.0	95.0	94.8

Weed Control

0 = No weed control
M = Mechanical weed control
S_1 = Simazine: $\frac{1}{2}$ lb active material in 40 gallons per acre
S_2 = Simazine: 1 lb " " " " " " "
T_1 = Methyl-mercapto-triazine: $1\frac{1}{4}$ lb active material in 40 gallons per acre
T_2 = Methyl-mercapto-triazine: $2\frac{1}{2}$ lb " " " " " " "

Note. Two extra plots outside the main experiment on Long Hoos III (R) gave the following results:

2,6 DHN: lb of active material in 40 gallons per acre	Total tubers tons per acre	Percentage ware
$1\frac{1}{2}$	6.84	95.9
3	7.81	94.7

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61/Df/1.1

SUGAR BEET

Control of virus spread by insecticides - Fosters Corner 1961.

Design: 4 × 4 Latin square.

Area of each plot: 0.0560 acres. Area harvested: 0.0121 acres.

Treatments:
Unsprayed (0)
Granular systemic insecticide* harrowed into seedbed at 40 lb (2 lb active ingredient) per acre (D);
Sprayed with demeton methyl at 12 fluid oz in 60 gallons per acre on June 14, 1961, after receipt of spray warning (M);
Foliar application* at 30 lb (1½ lb active ingredient) per acre (F).

*O, O-diethyl-S-2-(ethylthio) ethylphosphorodithioate.

Basal dressing per acre: 3 cwt agricultural salt and 6 cwt compound fertiliser (16% N, 9% P_2O_5, 9% K_2O).

Cultivations, etc.: Ploughed: Sept 22, 1960. Salt applied: Feb 16, 1961. Ploughed 2nd time: Feb 17. Basal compound fertiliser applied: Mar 20. Granular systemic insecticide broadcast: Apr 11. Seed drilled at 9½ lb per acre: Apr 13. Singled: June 5. Lifted: Oct 23. Variety: Klein E. Previous crop: Spring wheat.

Note: Regular counts of aphids numbers and estimates of incidence of virus yellows were made.

Standard error per plot.
Roots (washed): 0.862 tons per acre or 5.3% (6 d.f.)
Total sugar: 3.03 cwt per acre or 5.7% (6 d.f.)

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Summary of Results

	Insecticide				
	0	D	M	F	Mean
Roots (washed): tons per acre					
Mean (±0.431)	15.92	17.13	16.11	16.11	16.32
Increase (±0.610)		1.21	0.19	0.19	
Sugar percentage					
Mean	16.2	16.4	16.0	16.6	16.3
Increase		+0.2	-0.2	+0.4	
Total sugar: cwt per acre					
Mean (±1.52)	51.6	56.3	51.6	53.5	53.2
Increase (±2.14)		4.7	0.0	1.9	

Insecticide

0 = Unsprayed
D = Granular systemic insecticide* harrowed into seedbed at 40 lb (2 lb active ingredient) per acre
M = Sprayed with demeton methyl at 12 fluid oz in 60 gallons per acre on June 14, 1961, after receipt of spray warning
F = Foliar application* at 30 lb (1½ lb active ingredient) per acre.

*0,0-diethyl-S-2-(ethylthio)ethylphosphorodithioate.

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GRASS

Levels of N and K - Harwoods Piece 1961 - the 4th year.

Design: 4 randomised blocks of 12 plots each.

Area of each plot: 0.0087 acres. Area harvested: 0.0057 acres.

Treatments: None and all combinations of:-
Nitrogen: 0.3; 0.6; 0.9 cwt N per acre as 'Nitro-Chalk'.
Potash: None; 0.3; 0.6 cwt K_2O per acre as muriate of potash.
All the above in the presence of 0.6 cwt P_2O_5 per acre as superphosphate.
In addition 2 plots per block, receiving 0.9 cwt N and 0.6 cwt K_2O per acre, also received phosphate at either None or 1.2 cwt P_2O_5 per acre as superphosphate.

Note: (1) N and K dressings are applied for each cut. All P dressings are applied once annually.
(2) All treatments were applied to the same plots as in the previous seasons.

Basal dressing: None.

Cultivations, etc.: Sprayed with dalapon at 8 lb in 40 gallons per acre: Sept 7, 1960. 1st dressing of fertilisers applied: Mar 3, 1961. Cut twice: May 12 and July 4.

Standard errors per plot. Dry matter:
1st cut: 3.04 cwt per acre or 6.4% (33 d.f.)
2nd cut: 1.16 cwt per acre or 8.8% (33 d.f.)
Total of 2 cuts: 3.28 cwt per acre or 5.4% (33 d.f.)

Note: (3) For details of the previous years results see 'Results of the Field Experiments' 58/Cg/2, 59/Cg/2 and 60/Ci/1.

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61/Dg/1.2

Summary of Results

Dry matter: cwt per acre

cwt per acre* N	0.0	0.3	0.3	0.3	0.6	0.6	0.6	0.9	0.9	0.9	0.9	0.9	
P_2O_5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.0	1.2	
K_2O*	0.0	0.0	0.3	0.6	0.0	0.3	0.6	0.0	0.3	0.6	0.6	0.6	Mean
1st cut (±1.51)	12.0	43.5	39.7	39.7	53.0	54.8	55.1	52.9	52.6	53.6	54.3	54.3	47.1
2nd cut (±0.58)	5.1	10.5	10.9	10.9	13.5	11.7	12.5	15.0	16.4	17.7	17.3	17.8	13.3
Total of 2 cuts (±1.64)	17.2	54.0	50.6	50.6	66.5	66.5	67.6	67.9	69.0	71.3	71.6	72.1	60.4

*For each cut.

Mean dry matter % as cut:

1st cut:	22.1
2nd cut:	32.4
Total of 2 cuts:	27.2

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61/Dh/1.1

LUCERNE

Control of weeds by simazine and row spacing - Woburn Mill Dam Close 1961.

Design: 2 replicates of 12 treatments arranged in one randomised block.*

Area of each plot: 0.0082 acres. Area harvested: 0.0046 acres.

Treatments. All combinations of:
Row spacing: 7 inches; 14 inches.
Method of control: None (0); mechanically cultivated (M);
Simazine 1½; 3 lb active ingredient per acre each applied ~~either~~ in spring (1½ E; 3 E) or ¾ lb in spring (¾ E).

Basal dressing: 4 cwt per acre compound fertiliser (14% P_2O_5, 28% K_2O).

Cultivations, etc.: Harrowed: June 28 and July 20, 1960. Seed drilled at 20 lb per acre: Aug 11. Sprayed with diquat at 2½ pints in 80 gallons per acre: Dec 17. Basal fertiliser applied: Mar 6, 1961. Simazine sprays applied: Mar 28 and Sept 19. Cut three times: June 13, July 25, Sept 8. Variety: Du Puits. Previous crop: Kale.

*Originally 2 randomised blocks of 20 plots each, but some plots were abandoned owing to mole and bird damage.

Standard error per plot. Dry matter cwt per acre:

1st cut:	9.78 cwt per acre or 28.5%	(14 d.f.)
2nd cut:	9.01 cwt per acre or 30.8%	(14 d.f.)
3rd cut:	4.51 cwt per acre or 14.3%	(14 d.f.)
Total of 3 cuts:	19.36 cwt per acre or 20.4%	(14 d.f.)

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61/Dh/1.2

Summary of Results

Dry matter: cwt per acre

Row spacing: inches	Method of control: 0	M	1½E	3E	¾E	Mean
1st cut						
	(±6.91)		(±4.89)	(±6.91)		
7	46.9	38.3	33.4	22.9	46.6	36.9
14	35.3	43.5	26.4	26.0	32.4	31.7
Mean	41.1	40.9	29.9	24.5	39.5	34.3
	(±4.89)		(±3.46)	(±4.89)		
Diff.	-11.6	+5.2	-7.0	+3.1	-14.2	-5.2
	(±9.78)		(±6.91)	(±9.78)		(±3.99)
2nd cut						
	(±6.37)		(±4.51)	(±6.37)		
7	33.1	22.8	31.4	21.3	39.1	29.9
14	28.7	33.7	27.4	26.5	28.7	28.7
Mean	30.9	28.3	29.4	23.9	33.9	29.3
	(±4.51)		(±3.19)	(±4.51)		
Diff.	-4.4	+10.9	-4.0	+5.2	-10.4	-1.2
	(±9.01)		(±6.37)	(±9.01)		(±3.68)

Mean dry matter % as harvested:
1st cut: 23.1
2nd cut: 18.8

Method of control

0 = None
M = Mechanically cultivated
1½E; 3E = Simazine 1½ lb; 3 lb active ingredient per acre applied in spring
~~1½EL~~ = ~~Simazine 1½ lb active ingredient per acre applied half in spring half in autumn 1961~~.

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Dry matter: cwt per acre

Row spacing: inches	Method of control 0	M	1½E	3E	¾E	Mean
3rd cut						
	(±3.19)		(±2.26)	(±3.19)		
7	31.3	28.4	31.9	28.6	38.0	31.7
14	29.4	35.4	31.3	28.4	31.5	31.2
Mean	30.4	31.9	31.6	28.5	34.8	31.5
	(±2.26)		(±1.59)	(±2.26)		
Diff.	-1.9	+7.0	-0.6	-0.2	-6.5	-0.5
	(±4.51)		(±3.19)	(±4.51)		(±1.84)
Total of 3 cuts						
	(±13.69)		(±9.68)	(±13.69)		
7	111.4	89.6	96.8	72.9	123.8	98.5
14	93.4	112.6	85.1	81.0	92.7	91.6
Mean	102.4	101.1	90.9	76.9	108.2	95.1
	(±9.68)		(±6.84)	(±9.68)		
Diff.	-18.0	+23.0	-11.7	+8.1	-31.1	-6.9
	(±19.36)		(±13.69)	(±19.36)		(±7.90)

Mean dry matter % as harvested:
3rd cut: 19.6
Total of 3 cuts: 20.5

Method of control

0 = None
M = Mechanically cultivated
1½E; 3E = Simazine 1½ lb; 3 lb active ingredient per acre applied in spring
~~1½E~~ = ~~Simazine 1½ lb active ingredient per acre applied half in spring half in autumn 1961.~~

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61/Di/1.1

CARROTS

The effect of a systemic insecticide on yield through control of motley dwarf virus - Woburn Lansome Field 1961.

Design: A plaid rectangle of 4 rows and 8 columns.

Area of each sub plot: 0.0048 acres. Area harvested: 0.0030 acres.

Treatments. All combinations of:-
Sowing dates (to columns): Apr 13 (D1); May 16 (D2).
Times of spraying with demeton methyl at 12 fluid oz in 40 gallons per acre:
To treatment D1: None (0); May 15 (S1); May 29 (S2); June 19 (S3).
To treatment D2: None (0); June 5 (S1); June 19 (S2); July 7 (S3).
Infection dates: To treatment D1: May 23 (I1); June 14 (I2).
To treatment D2: June 15 (I1); July 3(I2).

Basal dressing: 10 cwt per acre compound fertiliser (10% N, 10% P_2O_5, 18% K_2O).

Cultivations, etc.: Sprayed with dalapon at 8 lb in 20 gallons per acre: Oct 13, 1960; and at 4 lb in 20 gallons per acre: Nov 9. Ploughed: Dec 5. Basal dressing applied: Apr 10, 1961. Seed drilled at 5 lb per acre: Apr 13 and May 16. Thinned: 1st sowing - June 19; 2nd sowing - July 24. Lifted: Sept.26. Variety: Scarlet Intermediate. Previous crop: Spring wheat.

Note: Aphid counts and estimates of virus infection were made.

Standard error per plot.
Saleable roots: 1.210 tons per acre or 20.4% (10 d.f.)
Tops from saleable roots: 0.467 tons per acre or 18.4% (10 d.f.)

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Summary of Results

Time of spraying

	S_0	S_1	S_2	S_3	Mean
Saleable roots: tons per acre					
Mean (±0.428)	6.85	6.42	5.71	4.79	5.94
Sowing date					
Apr 13	7.14	6.85	6.83	6.14	6.74
May 16	6.56	5.98	4.60	3.45	5.15
Diff.(±0.856)**	-0.58	-0.87	-2.23	-2.69	-1.59
Infection date					
I_1	6.75	6.45	6.02	4.40	5.90
I_2	6.95	6.38	5.41	5.19	5.98
Diff.(±0.856)	+0.20	-0.07	-0.61	+0.79	+0.08 (±0.428)

Infection date	Sowing date: Apr 13	Sowing date: May 16
	(±0.428)*	
I_1	6.56	5.25
I_2	6.93	5.04

Tops from saleable roots: tons per acre					
Mean (±0.165)	2.76	2.83	2.45	2.09	2.53
Sowing date					
Apr 13	1.95	1.96	1.98	1.80	1.92
May 16	3.57	3.70	2.93	2.39	3.14
Diff. (±0.330)**	+1.62	+1.74	+0.95	+0.59	+1.22
Infection date					
I_1	2.88	2.84	2.62	1.92	2.57
I_2	2.64	2.81	2.29	2.26	2.50
Diff.(±0.330)	-0.24	-0.03	-0.33	+0.34	-0.07 (±0.165)

Infection date	Sowing date: Apr 13	Sowing date: May 16
	(±0.165)*	
I_1	1.91	3.23
I_2	1.94	3.06

*For use in vertical and interaction comparisons only

**For use only in testing the difference of 2 differences

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	Time of spraying				
	S_0	S_1	S_2	S_3	Mean
	Saleable numbers: thousands per acre				
Mean	109.9	113.6	111.6	104.5	109.9
Sowing date					
Apr 13	107.7	115.8	115.0	107.3	111.5
May 16	112.0	111.5	108.3	101.7	108.4
Diff.	+4.3	-4.3	-6.7	-5.6	-3.1
Infection date					
I_1	107.7	115.8	112.9	96.6	108.2
I_2	112.1	111.5	110.4	112.4	111.6
Diff.	+4.4	-4.3	-2.5	+15.8	+3.4

Infection date	Sowing date	
	Apr 13	May 16
I_1	109.9	106.6
I_2	113.0	110.1

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METEOROLOGICAL RECORDS 1961 - ROTHAMSTED

(Departure from long period means in brackets)

Month	Total sunshine: hours	Mean temperature: °F Air(1)	Dew point	In ground 1 ft.	In ground 4 ft.	Ground(2) frosts	Total rainfall: in. 1/1000 acre gauge	Rain(3) days	Drainage through 20 in. soil: in.	Wind(4) m.p.h.
Jan.	45 (-7.7)	37.4 (+0.1)	34.6	37.8	42.8	25	2.87 (+0.34)	19	2.42	5.2
Feb.	61 (-8.0)	43.7 (+5.5)	40.8	42.3	42.9	9	2.53 (+0.60)	17	1.85	5.5
Mar.	165 (+48.3)	45.5 (+4.1)	39.9	44.1	44.5	20	0.14 (-1.76)	5	0.06	4.8
Apr.	94 (-63.0)	49.5 (+3.6)	46.1	49.6	46.5	6	3.05 (+1.15)	21	0.90	3.9
May	230 (+33.3)	51.1 (-0.9)	42.9	50.0	49.9	3	1.10 (-1.03)	6	0.50	4.7
June	238 (+35.4)	58.5 (+1.2)	49.7	58.2	52.6	0	1.56 (-0.64)	7	0.20	3.5
July	193 (-1.7)	59.7 (-1.0)	51.5	60.7	56.4	0	1.44 (-1.12)	9	0.00	3.9
Aug.	176 (-7.0)	60.5 (+0.3)	53.7	59.8	57.1	0	2.25 (-0.36)	18	0.05	4.6
Sept.	127 (-18.0)	59.7 (+3.6)	55.2	59.7	57.6	0	2.78 (+0.39)	16	0.86	3.1
Oct.	120 (+15.8)	50.9 (+1.9)	47.1	52.9	55.7	2	3.29 (+0.30)	23	1.90	4.3
Nov.	58 (-3.8)	41.7 (-0.8)	38.9	44.3	50.5	15	2.02 (-0.79)	15	1.26	5.3
Dec.	76 (+31.1)	36.1 (-2.6)	34.3	39.1	45.9	23	4.35 (+1.74)	18	2.28	4.6
Year*	1583 (+54.7)	49.5 (+1.2)	44.6	49.9	50.2	103	27.38 (-1.18)	174	12.28	4.5

(1) Mean of maximum and minimum.
(2) Number of nights grass minimum was 30°F or less.
(3) Number of days rainfall was 0.01 in. or more.
(4) At 2 metres above ground level.

*Mean or total

61/E/1.1

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61/E/1.2

METEOROLOGICAL RECORDS 1961 - WOBURN

Month	Total sunshine: hours	Mean temperature: °F Air(1)	Mean temperature: °F In ground 1 ft.	Grass minimum: °F	Total rainfall: in 8" gauge	Rain days(2)
January	43	38.5	38.4	30.8	2.14	17
February	68	44.9	42.7	37.1	1.99	14
March	168	46.4	44.6	33.9	0.12	4
April	85	49.5	49.7	41.2	2.30	22
May	208	51.0	54.6	40.3	0.63	10
June	216	58.1	59.6	45.4	1.26	8
July	169	59.7	62.6	47.8	1.49	10
August	165	60.5	61.4	48.8	2.50	17
September	126	59.5	60.8	47.4	2.31	16
October	119	51.0	54.0	39.9	2.96	21
November	61	42.4	45.9	33.3	1.95	11
December	53	35.5	40.0	27.0	3.72	15
Year*	1481	49.8	51.2	39.4	23.37	165

(1) Mean of maximum and minimum.

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

*Mean or total

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CONVERSION FACTORS

Factors for the Conversion of Imperial to Metric Units

1 inch (in.)	= 2·540 centimetres (cm)
1 foot (ft) (=12 in.)	= 30·48 cm
1 yard (yd) (=3 ft)	= 0·9144 metre (m)
1 square yard (yd²)	= 0·8361 m²
1 acre (ac) (=4840 yd²)	= 0·4047 hectare (ha)
1 ounce (oz)	= 28·35 grams (g)
1 pound (lb)	= 0·4536 kilogram (kg)
1 hundredweight (cwt) (=112 lb)	= 50·80 kg
1 ton (=2240 lb)	= 1016 kg = 1·016 metric tons (tonnes) (t)
1 pint	= 0·5682 litre (l)
1 gallon (gal) (=8 pints)	= 4·546 litres
1 fluid ounce = 1/20 pint	= 0·02841 litre = 28·41 ml
1 cubic foot	= 28·32 litres

To convert	*Multiply by*
oz ac^{-1} to g ha^{-1}	70·06
lb ac^{-1} to kg ha^{-1}	1·121
cwt ac^{-1} to kg ha^{-1}	125·5
cwt ac^{-1} to t ha^{-1}	0·1255
ton ac^{-1} to kg ha^{-1}	2511
ton ac^{-1} to t ha^{-1}	2·511
gal ac^{-1} to l ha^{-1}	11·233

The following factors are accurate to about 2 parts in 100:

1 lb ac^{-1} = 1·1 kg ha^{-1}
1 gal ac^{-1} = 11 litres ha^{-1}
1 ton ac^{-1} = 2·5 t ha^{-1}

In general reading of the text there will be no great inaccuracy in regarding:

1 lb = 0·5 kg
1 lb ac^{-1} = 1 kg ha^{-1}

Temperatures

To convert °F into °C subtract 32 and multiply by $\frac{5}{9}$ (0.556)
To convert °C into °F multiply by $\frac{9}{5}$ (1·8) and add 32

https://doi.org/10.23637/ERADOC-1-182 *pp 146*

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CONVERSION FACTORS

Factors for the Conversion of Metric to Imperial Units

1 centimetre (cm)	=	0·3937 inch (in.) = 0·03281 ft
1 metre (m)	=	1·094 yards (yd)
1 square metre (m^2)	=	1·196 square yards (yd^2)
1 hectare (ha)	=	2·471 acres (ac)
1 gram (g)	=	0·03527 ounce (oz)
1 kilogram (kg)	=	2·205 pounds (lb)
1 kg	=	0·01968 hundredweight (cwt) = 0·0009842 ton
1 metric ton (tonne) (t)	=	0·9842 ton
1 litre	=	1·760 pints = 0·2200 gallon (gal)

1 litre = 1000 millilitres (ml) = 35·20 fluid ounces = 0·03531 cubic foot (ft^3)

To convert	*Multiply by*
g ha^{-1} to oz ac^{-1}	0·01427
kg ha^{-1} to lb ac^{-1}	0·8921
kg ha^{-1} to cwt ac^{-1}	0·007966
t ha^{-1} to cwt ac^{-1}	7·966
kg ha^{-1} to tons ac^{-1}	0·0003983
t ha^{-1} to tons ac^{-1}	0·3983
l ha^{-1} to gal ac^{-1}	0·08902

Plant nutrients

Plant nutrients are best stated in terms of amounts of the elements (P, K, Na, Ca, Mg, S); the old 'oxide' terminology (P_2O_5, K_2O, Na_2O, CaO, MgO, SO_3) is still used in work involving fertilisers and liming since Regulations require statements of P_2O_5, K_2O, etc.

For quick conversions

(accurate to within 2%) the following factors may be used:

$2\frac{1}{3} \times P = P_2O_5$	$\frac{3}{7} \times P_2O_5 = P$
$1\frac{1}{5} \times K = K_2O$	$\frac{5}{6} \times K_2O = K$
$1\frac{2}{5} \times Ca = CaO$	$\frac{7}{10} \times CaO = Ca$
$1\frac{2}{3} \times Mg = MgO$	$\frac{3}{5} \times MgO = Mg$

For accurate conversions:

To convert	*Multiply by*	*To convert*	*Multiply by*
P_2O_5 to P	0·4364	P to P_2O_5	2·2915
K_2O to K	0·8301	K to K_2O	1·2047
CaO to Ca	0·7146	Ca to CaO	1·3994
MgO to Mg	0·6031	Mg to MgO	1·6581

https://doi.org/10.23637/ERADOC-1-182 *pp 147*