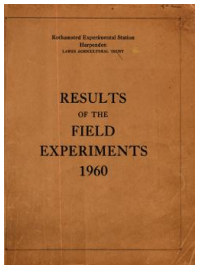
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ROTHAMSTED RESEARCH

Yields of the Field Experiments 1960

Full Table of Content



Yields of the Field Experiments 1960 - Results

Rothamsted Research

Rothamsted Research (1961) *Yields of the Field Experiments 1960 - Results ;* Yields Of The Field Experiments 1960, pp 1 - 140 **- DOI: https://doi.org/10.23637/ERADOC-1-180**

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G. F. Jarvis

Rothamsted Experimental Station
Harpenden
LAWES AGRICULTURAL TRUST

RESULTS
OF THE
FIELD
EXPERIMENTS
1960

https://doi.org/10.23637/ERADOC-1-180

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Rothamsted Experimental Station

Harpenden

Lawes Agricultural Trust

RESULTS

of the

FIELD

EXPERIMENTS

1960

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.G. Warren, D.J. Watson).

Price: 5/-

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Index 1960

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*At Rothamsted unless otherwise stated.

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Index 1960 (contd.)

Short Term Experiments* (contd.)

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*At Rothamsted unless otherwise stated.

Notes

(1) In this and future reports:

(a) All yields from grass, hay, lucerne, clover etc. experiments will be presented as dry matter. This change affects Park Grass Hay, and the hay and lucerne crops of the Woburn Ley and Arable Rotation.

(b) For all potato experiments, ware-sized tubers previously discarded because of disease etc., will be included as ware.

(2) Destruction of potato haulm:
In all cases for 15% (10%) BOV at 100 gallons per acre read undiluted BOV at 15 (10) gallons per acre.

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WHEAT - BROADBALK 1960

The 117th year

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

Cultivations, etc.:

Cropped sections. Ground chalk applied: Sept 4, 1959. Section IA sprayed with 2,4-D ester at 1¾ pints in 40 gallons per acre: Sept 8. Dung applied: Sept 21. Ploughed: Sept 21 - 28. Autumn fertilisers applied: Oct 7. Seed drilled at 2¾ bushels per acre: Oct 19. Spring fertilisers applied: Apr 4, 1960. Second dressing of nitrate of soda applied to plot 16; Section IA sprayed with CMPP at 6 pints in 40 gallons per acre: Apr 28. Combined: Aug 31 - Sept 9. Variety: Squarehead's Master 13/4.

Fallow section. (III) Ploughed: Sept 21 - 28, 1959; Apr 26, 1960; July 2.

Broadbalk Wilderness. N.

In 1960 grazing of the mown portion of Broadbalk Wilderness was introduced.

Cultivations, etc.: Shrubs grubbed out: Nov 18 - 27, 1959. Part grazed (originally mown): Mar 18 - 21, 1960, Apr 19 - 22, May 17 - 21, June 14 - 18, July 11 - 15, Aug 4 - 8, Sept 2 - 7. The grass was topped after each grazing except the first two.

Summary of Results

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

Section	IV	VA	VB	II	IB	IA	
Years after fallow	1	unlimed 2	limed 2	3	4	9	Mean
2A	24.8	23.0	20.5	23.3	16.8	21.6	22.3
2B	21.8	19.6	18.1	21.2	16.9	19.7	20.0
3	17.3	14.4	12.6	10.1	11.1	11.0	13.1
5	17.4	14.6	11.4	11.5	11.8	11.8	13.5
6	19.1	16.8	16.0	13.2	14.5	13.4	15.8
7	22.5	21.2	19.5	18.7	18.1	18.6	20.1
8	25.7	24.4	17.8	23.5	23.1	21.6	23.2
9	20.3	20.4	18.7	14.9	16.9	18.3	18.1
10	21.5	23.9	22.1	17.3	19.0	20.8	20.4
11	17.7	23.5	21.5	19.1	18.4	19.2	19.6
12	18.8	23.3	19.6	19.8	18.9	20.7	19.9
13	17.4	15.4	14.7	17.5	17.1	16.8	16.7
14	20.1	19.8	16.4	18.0	16.8	20.8	18.6
15	22.2	21.3	12.8	17.9	16.2	18.6	18.6
16	22.9	22.5	19.7	21.9	20.1	23.5	21.8
17	22.3	19.7	17.8	16.3	17.1	15.8	18.6
18	17.0	8.3	9.9	6.7	8.7	7.7	10.4
19	23.5	18.1	14.2	17.4	20.0	18.8	19.1
20				14.5	16.3	14.6	15.2

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

Section	IV	VA	VB	II	IB	IA	
Years after fallow	1	unlimed 2	limed 2	3	4	9	Mean
2A	45.9	41.0	37.4	34.9	29.9	25.2	37.6
2B	41.9	41.3	37.2	37.8	37.9	18.6	38.1
3	23.4	18.2	14.5	13.2	14.5	11.2	16.8
5	28.0	20.9	19.4	19.1	20.5	14.6	21.6
6	35.0	26.0	29.1	20.7	25.7	16.6	26.7
7	37.4	34.2	32.5	29.4	29.9	23.4	32.3
8	37.9	35.6	35.3	33.1	38.8	29.5	35.6
9	35.8	27.7	27.1	22.0	28.5	26.8	28.3
10	25.0	26.9	27.5	19.1	23.2	23.8	23.7
11	28.9	33.1	25.6	22.1	24.3	22.7	26.2
12	29.1	35.6	28.5	24.6	24.4	27.6	28.0
13	32.8	27.7	29.4	29.0	20.6	24.0	28.4
14	31.2	28.5	26.3	19.9	19.0	21.5	24.9
15	33.1	32.1	24.1	24.7	29.1	27.8	28.6
16	42.0	37.7	36.7	27.1	26.0	27.4	33.7
17	35.8	30.3	30.8	23.7	26.9	18.7	28.9
18	29.1	22.6	24.7	11.8	17.6	8.4	20.1
19	40.5	32.0	29.9	26.3	30.3	24.2	31.7
20				22.6	24.6	18.6	22.6

Mean dry matter % as harvested: Grain 77.3
Straw 90.0

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60/A/2.1

BARLEY - HOOSFIELD 1960

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

Note:

In 1960 on strips 1, 2, 3 and 4 the number of row spaces was reduced from 98 to 96 and yields estimated from 4 combine cuts per plot. On strip 6 there were 72 row spaces instead of 74 and yields estimated from 3 combine cuts per plot. On strip 7 yields were estimated from 2 combine cuts per plot. Manures were applied to the full plot areas as hitherto.

On plots showing an uneven growth, straw weights were recorded for all cuts; on the remainder one weight only was taken from a cut chosen at random.

Cultivations, etc.: Sprayed part of plots 5A, 4C, 5.0 with dalapon at 8 lb in 20 gallons per acre: Aug 26, 1959. All plots sprayed with 2,4-D ester at $1\frac{3}{4}$ pints in 40 gallons per acre: Aug 27. Quinquennial chalk supplement applied to series A, C and plot 5A; resprayed part of plots 5A, 4C, 5.0 with dalapon at 4 lb in 40 gallons per acre: Sept 7. Dung applied, ploughed: ~~Mar~~ Nov 20. Fertilisers applied: Apr 4, 1960. Seed drilled at $2\frac{3}{4}$ bushels per acre: Apr 7. Strips 1, 2 and 3 sprayed with MCPA at $6\frac{1}{2}$ pints (30% potassium salt) in 40 gallons per acre; and strips 4, 6 and 7 sprayed with CMPP at 6 pints in 40 gallons per acre: May 24. Combined: Sept 5. Variety: Plumage Archer.

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Summary of Results

Plot	Grain (at 85% dry matter): cwt per acre	Straw (at 85% dry matter): cwt per acre
1 0	8.6	3.8
2 0	10.5	3.8
3 0	9.8	4.5
4 0	12.9	7.1
5 0	12.0	8.0
1 A	10.8	5.2
2 A	12.2	6.9
3 A	12.9	9.6
4 A	19.1	12.7
5 A	20.4	14.6
1 AA	12.7	7.4
2 AA	17.5	11.1
3 AA	14.2	10.8
4 AA	18.4	12.8
1 AAS	19.9	10.6
2 AAS	22.5	11.6
3 AAS	20.0	14.8
4 AAS	26.5	19.1
1 C	17.4	7.4
2 C	19.1	6.9
3 C	18.2	10.4
4 C	22.0	13.6
7 - 1	16.4	10.8
7 - 2	31.7	20.1
6 - 1	10.1	9.4
6 - 2	10.8	6.2
1 N	11.4	6.6
2 N	14.7	8.5
Mean dry matter % as harvested	77.6	79.8

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60/A/3

WHEAT AFTER FALLOW - HOOSFIELD 1960

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 12, 1959. Seed sown at 3 bushels per acre: Oct 19. Combine harvested: Aug ~~13~~ 31, 1960. Variety: Squarehead's Master 13/4.

Fallowed plots. Ploughed twice: Sept 11 and Sept 12, 1959.

Note: Counts of plant shoot and ear number and estimates of Eyespot (Cercosporella herpotrichoides) and Take-All (Ophiobolus graminis) were made. There was no lodging.

Summary of Results

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

Plot	A_1	A_4	A_2	Mean
No. of years of fallow	1	1	3	
	6.1	5.0	8.8	6.6

Mean dry matter % as harvested: 79.5

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GRASS AND MULTIPLE CROPPING AND DIRECT AND RESIDUAL P

AGDELL 1960

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

Multiple cropping 1960

In order to measure the residues of 1959 applications the sub plots were split to carry the phosphate treatments described below.
Rotation (commencing 1959): barley, potatoes, sugar beet.

Area of each sub plot (acres): 0.0017. Area harvested (approx.):
Barley - 0.0009, Potatoes - 0.0007, Sugar beet - 0.0008.

Treatments (per acre).
To sub plots receiving no P_2O_5 in 1959: none; 0.25 cwt P_2O_5.
To sub plots receiving 0.25 cwt P_2O_5 in 1959: 1.00; 1.50 cwt P_2O_5.
To sub plots receiving 1.00 cwt P_2O_5 in 1959: none; 1.50 cwt P_2O_5.

Note: P_2O_5 applied as superphosphate.

Basal dressings. To grass: as 1959.
To potatoes and sugar beet: 1.2 cwt N per acre as sulphate of ammonia and 1.2 cwt K_2O per acre as sulphate of potash.
To barley: 0.6 cwt N per acre as sulphate of ammonia and 0.6 cwt K_2O per acre as sulphate of potash.

Cultivations, etc.: All plots ploughed: Nov 23, 1959.
Grass. Seed drilled at 40 lb per acre: Apr 8, 1960. 'Nitro-Chalk' applied: May 19. Sprayed with CMPP at 5 pints in 18 gallons per acre; parts of plots 4, 5 and 6 re-drilled: June 30. Part of plot 3 re-drilled: July 7. Plots 1 and 2 cut, other plots topped: July 22. 'Nitro-Chalk' applied: July 26. Plots 1 and 2 cut (2nd cut), plots 3, 4, 5 and 6 cut (1st cut): Sept 26. Variety: S37 Cocksfoot.
Barley. Treatment fertilisers applied: Apr 7, 1960. Seed drilled at 3 bushels per acre; basal NK applied: Apr 8. Sprayed with CMPP at 4 pints in 25 gallons per acre: May 30. Harvested: Aug 18 - 25. Variety: Proctor.
Potatoes. Rotary cultivated: Apr 14, 1960. Ridged: Apr 19. Fertilisers applied; potatoes hand planted: Apr 20. Earthed up: June 9. Sprayed with copper fungicide at 5 lb in 40 gallons per acre: July 15 and Aug 10. Sprayed with demeton methyl at 12 fluid oz in 25 gallons per acre: July 27. Lifted: Sept 27. Variety: Majestic (chitted).
Sugar beet. Fertilisers applied: Apr 7, 1960. Seed drilled at 20 lb per acre: Apr 8. Dusted with aldrin against flea beetle: May 7. Singled: June 8. Sprayed with demeton methyl at 12 fluid oz in 25 gallons per acre: June 22, July 15 and July 27. Harvested: Oct 18. Variety: Klein E.

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Summary of Results

Manure to turnips until 1948 Plot Rotation	None since 1848 5 Fallow	6 Clover	Mineral manure* no nitrogen 3 Fallow	4 Clover	Mineral* and nitrogeneous manure+ 1 Fallow	2 Clover	Mean
Grass dry matter: cwt per acre							
1st cut	0.0	0.0	0.0	0.0	12.9	9.4	3.7
2nd cut	7.1	11.0	36.4	36.1	36.4	35.6	27.1
Total of 2 cuts	7.1	11.0	36.4	36.1	49.3	45.0	30.8
Barley grain (at 85% dry matter): cwt per acre							
P_2O_5 cwt per acre 1959 1960							
None None	10.7	10.3	22.6	23.4	22.8	20.7	18.4
None 0.25	12.0	13.3	22.4	24.4	23.1	20.9	19.4
0.25 1.00	14.0	19.4	27.3	26.4	24.4	24.8	22.7
0.25 1.50	14.8	23.3	27.6	26.5	25.1	24.0	23.6
1.00 None	15.1	18.5	24.7	24.6	23.4	22.3	21.4
1.00 1.50	17.2	25.0	27.2	26.1	24.9	25.6	24.3
Mean	14.0	18.3	25.3	25.2	23.9	23.0	21.6
Barley straw (at 85% dry matter): cwt per acre							
1959 1960							
None None	15.2	11.7	23.3	22.3	26.0	24.6	20.5
None 0.25	14.8	14.2	21.5	22.1	24.3	23.9	20.1
0.25 1.00	16.8	18.0	26.6	24.6	25.5	25.9	22.9
0.25 1.50	17.1	19.7	25.4	24.3	25.7	26.0	23.0
1.00 None	17.1	17.6	23.9	21.9	25.2	23.4	21.5
1.00 1.50	18.5	21.6	25.9	24.7	24.9	26.6	23.7
Mean	16.6	17.1	24.4	23.3	25.3	25.1	22.0

Mean dry matter % as harvested: Grain 71.9
Straw 45.4

*P, K, Na, Mg.

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

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Manure to turnips until 1948 Plot Rotation	None since 1848 5 Fallow	6 Clover	Mineral manure* no nitrogen 3 Fallow	4 Clover	Minereal* and nitrogeneous manure+ 1 Fallow	2 Clover	Mean
Potatoes, total tubers tons per acre							
P_2O_5 cwt per acre							
1959 1960							
None None	5.74	6.66	18.15	14.60	18.27	19.22	13.77
None 0.25	9.08	9.08	18.94	16.46	19.45	20.36	15.56
0.25 1.00	12.72	11.97	20.40	19.65	22.26	23.12	18.35
0.25 1.50	13.77	14.60	20.56	19.53	22.42	23.52	19.07
1.00 None	9.47	9.87	17.72	16.57	19.10	20.36	15.52
1.00 1.50	13.77	14.64	21.03	19.81	22.81	23.60	19.28
Mean	10.75	11.13	19.46	17.77	20.71	21.69	16.92
Sugar beet, Roots (washed): tons per acre							
1959 1960							
None None	9.89	7.28	15.99	11.51	11.91	16.06	12.11
None 0.25	12.02	8.99	16.15	13.51	12.20	16.92	13.30
0.25 1.00	15.30	12.41	16.98	13.49	14.21	15.86	14.71
0.25 1.50	16.44	14.50	15.64	12.94	14.49	15.43	14.91
1.00 None	14.24	12.52	15.21	12.18	14.12	14.98	13.88
1.00 1.50	15.39	14.16	15.33	15.74	14.80	16.30	15.29
Mean	13.88	11.64	15.88	13.23	13.62	15.92	14.03
Sugar beet, Sugar percentage							
1959 1960							
None None	15.3	14.5	15.8	15.5	14.8	15.7	15.3
None 0.25	15.5	14.6	15.3	15.5	14.8	15.7	15.2
0.25 1.00	16.3	15.1	16.2	15.4	15.4	15.7	15.7
0.25 1.50	16.0	15.3	16.1	15.5	15.5	16.0	15.7
1.00 None	16.2	15.6	16.0	16.0	15.0	15.8	15.8
1.00 1.50	16.2	15.4	16.1	16.0	15.3	15.6	15.8
Mean	15.9	15.1	15.9	15.6	15.1	15.7	15.6
Sugar beet, Total sugar: cwt per acre							
1959 1960							
None None	30.4	21.0	50.5	35.8	35.2	50.4	37.2
None 0.25	37.1	26.4	49.6	41.9	36.1	53.1	40.7
0.25 1.00	49.8	37.4	54.9	41.4	43.9	49.6	46.2
0.25 1.50	52.4	44.2	50.3	40.2	45.0	49.2	46.9
1.00 None	46.2	39.2	48.5	39.0	42.4	47.3	43.8
1.00 1.50	49.7	43.6	49.2	50.3	45.0	51.0	48.1
Mean	44.3	35.3	50.5	41.4	41.3	50.1	43.8

*P, K, Na, Mg.
+Rape dust (or castor meal + ammonium sulphate).

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Manure to turnips until 1948		None since 1848		Mineral* manure no nitrogen		Mineral* and nitrogenous manure+		
Plot		5	6	3	4	1	2	
Rotation		Fallow	Clover	Fallow	Clover	Fallow	Clover	Mean
P_2O_5 cwt per acre		Sugar beet, Tops: tons per acre						
1959	1960							
None	None	14.14	9.60	17.58	17.28	16.91	16.78	15.38
None	0.25	15.40	13.69	18.21	17.78	18.85	18.31	17.04
0.25	1.00	18.75	19.16	18.22	19.45	18.72	16.57	18.48
0.25	1.50	19.46	20.01	15.00	18.52	19.52	16.44	18.16
1.00	None	16.89	16.15	14.40	15.40	17.85	14.40	15.85
1.00	1.50	18.49	18.71	15.50	19.86	19.49	18.15	18.37
Mean		17.19	16.22	16.48	18.05	18.55	16.77	17.21
		Sugar beet, Plant number: thousands per acre						
1959	1960							
None	None	33.0	36.3	37.2	34.5	33.3	31.8	34.4
None	0.25	36.0	34.3	33.0	34.2	32.7	33.6	34.0
0.25	1.00	34.0	34.7	36.9	33.9	34.2	31.8	34.2
0.25	1.50	34.7	35.7	36.9	32.4	32.7	34.2	34.4
1.00	None	34.0	33.4	34.5	32.7	34.2	31.2	33.3
1.00	1.50	35.3	36.4	32.7	34.2	33.6	32.4	34.1
Mean		34.5	35.1	35.2	33.6	33.4	32.5	34.1

*P, K, Na, Mg.

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

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60/A/5

HAY - THE PARK GRASS PLOTS 1960

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

Use of the flail-type forage harvester

Yields are based on sample cuts as for the second cut in 1959.

Cultivations, etc.: Ground chalk applied: Jan 27, 1960. Mineral fertilisers applied: Feb 5. Nitrogenous fertilisers applied: 1st dressing - Mar 31; 2nd dressing - Apr 28. Cut twice: June 15 and Oct 11.

Note: Commencing in 1960 yields from both 1st and 2nd crops will be presented as dry matter.

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	5.9	4.2	10.1	15.2	10.7	25.9
2	13.4	11.2	24.6	13.8	11.8	25.6
3	12.4	9.8	22.2	13.5	9.9	23.4
4-1	17.9	13.1	31.0	13.3	10.5	23.8
4-2	17.8	16.1	33.9	27.3	14.0	41.3
5-1	10.1	9.2	19.3			
5-2	16.7	15.6	32.3			
6	20.1	18.4	38.5			
7	23.6	17.3	40.9	30.9	21.1	52.0
8	18.6	15.8	34.4	12.1	13.7	25.8
9	42.3	16.5	58.8	41.3	14.4	55.7
10	26.5	17.1	43.6	29.3	11.1	40.4
11-1	50.7	32.6	83.3	42.9	27.6	70.5
11-2	54.1	28.7	82.8	49.8	29.6	79.4
12	14.5	15.7	30.2			
13	24.0	16.9	40.9	24.8	22.4	47.2
14	41.8	21.4	63.2	45.9	18.4	64.3
15	18.2	13.0	31.2	30.4	23.8	54.2
16	34.7	18.4	53.1	40.4	21.5	61.9
17	21.4	13.9	35.3	20.6	10.7	31.3
18	5.7	13.9	19.6	21.6*	8.3*	29.9*
				23.0+	11.0+	34.0+
19	24.6	18.3	42.9	28.9*	17.3*	46.2*
				29.5+	20.7+	50.2+
20	28.4	18.9	47.3	33.9*	19.9*	53.8*
				35.5+	19.1+	54.6+

*Heavy liming. +Light liming.

Mean dry matter % as cut: 1st crop 24.9; 2nd crop 25.6.

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BARLEY - EXHAUSTION LAND HOOSFIELD 1960

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

Basal dressing: 0.5 cwt N per acre as sulphate of ammonia.

Cultivations, etc.: Sprayed with dalapon at 8 lb in 20 gallons per acre: Aug 26, 1959. Sprayed with dalapon at 4 lb in 40 gallons per acre: Sept 2. Ground chalk applied to plot 2 at 21 cwt per acre: Sept 7. Ploughed: Nov 17. Sulphate of ammonia applied: Mar 7, 1960. Seed drilled at 2¾ bushels per acre: Mar 17. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 25. Combine harvested: Sept 6. Variety: Plumage Archer.

Summary of Results

Barley

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

Plots not cross cropped in 1957 and 1958 and combine harvested in 1959

Plot.	Manuring to potatoes 1876 - 1901*	Grain	Straw
2	Unmanured after dung 1876 - 81	17.0	10.7
4	Dung	24.8	15.0
6	Nitrate of soda	16.2	10.0
8	Nitrate of soda and complete minerals	19.7	13.4
10	Complete minerals	21.6	13.8

Plots cross cropped in 1957 and 1958 and combine harvested in 1959

Plot.	Manuring to potatoes 1876 - 1901*	Grain	Straw
1	Unmanured	19.0	12.4
3	Dung	24.6	17.2
5	Ammonium salts	17.6	11.3
7	Ammonium salts and complete minerals	20.3	14.0
9	Superphosphate	20.4	12.9
Mean dry matter % as harvested:		77.6	88.9

*For certain changes see history.

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60/A/7

CLOVER - ROTHAMSTED GARDEN 1960

The 107th year

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

Molybdenum test 1960: The two plots were sub-divided for a test of molybdenum spray:-
None; 1 lb sodium molybdate in about 5000 gallons of water per acre.

Cultivations, etc.: Muriate of potash applied: Dec 18, 1959. Blank patches resown: Apr 11, 1960. Molybdenum spray applied: June 17. Cut twice: July 5, Sept 28.

Summary of Results

Dry matter: cwt per acre

Muriate of Potash: cwt per acre	Spray: None	Spray: Sodium molybdate	Mean
	1st cut		
None	4.9	1.0	3.0
2	14.2	3.9	9.0
Mean	9.6	2.4	6.0
	2nd cut		
None	8.7	4.7	6.7
2	12.5	9.8	11.2
Mean	10.6	7.2	8.9
	Total of 2 cuts		
None	13.6	5.7	9.6
2	26.7	13.7	20.2
Mean	20.2	9.7	14.9

Mean dry matter % as harvested: 1st cut 22.9
2nd cut 22.2
Total of 2 cuts 22.6

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60/A/8.1

WHEAT AND BARLEY, AND BARLEY AND POTATOES MICROPLOTS - WOBURN STACKYARD 1960

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

Strip cropping and microplots 1960: Wheat and barley were sown in strips as in 1949, except that on the south eastern of the 3 blocks of each of the old experiments, the barley strip was replaced by 2 strips, one of potatoes, one of barley, for micro-plot tests of P and K fertilisers.

Area of each main plot (acres):		Area harvested (acres):
10a - 11b	0.0274	0.0206
Remainder	0.0411	0.0234

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

Treatments (to microplots only). Certain combinations of:-
Superphosphate:- None, 0.25 (P_1), 1.0 (P_4) cwt P_2O_5 per acre (barley and potatoes).
Sulphate of potash:- None, 0.15 (K_1), 0.6 (K_4) cwt K_2O per acre (barley).
Sulphate of potash:- None, 0.30 (K_2), 1.2 (K_8) cwt K_2O per acre (potatoes).
Plots 11a and 11b being narrower than the rest were divided into 4 microplots each instead of 16 and carried tests of K only (continuous wheat site) or P only (continuous barley site).

Basal dressings per acre:
To wheat and barley:- 0.9 cwt N as 'Nitro-Chalk'.
To microplots:-
Potatoes: 1.2 cwt N as 'Nitro-Chalk'.
Barley: 0.6 cwt N as 'Nitro-Chalk'.

Cultivations, etc.: Ground chalk applied to whole area at 11 cwt per acre: Sept 10, 1959.
Wheat: Permanent wheat site ploughed: Sept 11.
Permanent barley site ploughed: Sept 15. Seed drilled at 3 bushels per acre: Oct 22, 1959. 'Nitro-Chalk' applied: Mar 21, 1960. Sprayed with DNOC at 2 gallons in 8 gallons per acre: May 3. Combine harvested: Aug 31. Variety: Squarehead's Master 13/4.
Barley: Ploughed 2nd time: Nov 12 - 23, 1959. Seed drilled at $2\frac{3}{4}$ bushels per acre; 'Nitro-Chalk' applied: Mar 21, 1960. Sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 23. Combine harvested: Aug 30. Variety: Plumage Archer.

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Microplots.

Potatoes: Ploughed 2nd time: Nov 12 - 23, 1959. Basal N, basal and treatment P and K applied on the flat: Apr 21, 1960. Potatoes planted by machine: Apr 22. Blanks in rows planted with chitted seed: May 27. Earthed up: June 13. Lifted: Sept 19. Variety: Majestic.

Barley: Basal and treatment P and K applied: Mar 22, 1960. Basal N applied, seed drilled at 2¾ bushels per acre: Mar 23. Sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 23. Harvested: Aug 10. Variety: Plumage Archer.

Summary of Results

Main plots

Crop in 1960	Wheat		Barley	
Crop in old scheme	Continuous wheat	Continuous barley	Continuous wheat	Continuous barley
Grain (at 85% dry matter): cwt per acre				
Plot 1	12.2	24.9	21.3	17.9
2	9.7	24.2	15.4	16.9
3	20.0	27.4	20.4	16.0
4	15.1	21.9	21.9	19.2
5	15.0	24.0	23.0	19.0
6	20.2	25.9	24.7	23.5
7	20.9	27.3		
8	20.3	27.2		
9	23.7	27.6		
10a	19.3	25.9	19.6	20.4
10b	20.3	24.5	18.7	17.7
11a	25.3	24.9	20.9	21.9
11b	25.7	24.5	22.5	21.8
Straw (at 85% dry matter): cwt per acre				
Plot 1	26.4	29.3	18.4	13.5
2	18.6	25.9	12.8	13.3
3	22.9	41.4	15.1	12.4
4	26.9	23.0	18.1	13.3
5	19.2	26.7	17.3	12.9
6	22.8	31.2	17.5	15.6
7	23.5	34.7		
8	20.3	44.2		
9	29.3	47.4		
10a	22.0	34.8	11.2	13.6
10b	26.8	33.4	10.3	11.6
11a	+	+	13.5	14.3
11b	32.4	44.1	15.2	13.3
Mean dry matter % as harvested: Grain	76.6		78.7	
Straw	84.5		83.9	

+ Not recorded.

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Microplots

Barley

Crop in old scheme		Continuous wheat					Continuous barley				
Treatment	No. sub plots	Plot 7	8	9	11a*	11b*	11a*	11b*	Plot 9	8	7
P K		Grain (at 85% dry matter): cwt per acre									
0 4	4	20.0	18.6	27.0			23.8	24.3	23.0	23.4	16.6
1 4	2	20.4	18.6	26.3			24.1	26.1	25.8	24.4	19.3
4 4	2	23.2	18.1	28.4			24.5	26.9	26.9	25.8	19.7
4 0	4	24.6	19.0	24.2	23.2	24.6			25.0	23.5	20.6
4 1	2	25.9	18.8	24.6	22.5	26.6			27.4	24.0	21.3
4 4	2	26.2	18.0	26.4	25.0	26.8			26.9	23.8	23.0
		Mean dry matter % as harvested: 75.7									
		Straw (at 85% dry matter): cwt per acre									
0 4	4	24.0	24.3	31.6			26.9	28.0	24.0	24.2	19.6
1 4	2	24.1	24.9	30.9			26.2	29.1	29.5	24.9	21.1
4 4	2	26.9	26.5	31.6			27.7	28.1	29.0	28.8	23.3
4 0	4	27.8	24.3	28.6	26.5	29.9			27.1	24.4	22.0
4 1	2	26.0	26.5	30.0	27.5	26.7			28.1	23.9	22.0
4 4	2	30.7	27.2	32.4	30.9	33.5			28.7	26.4	24.0
		Mean dry matter % as harvested: 54.2									

*On these plots the number of sub plots was halved.

60/A/8.3

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Microplots

Potatoes

Crop in old scheme / Treatment	No. sub plots	Continuous wheat Plot 7	8	9	11a*	11b*	Continuous barley Plot 11a*	11b*	9	8	7
		Total tubers: tons per acre									
P K											
0 4	4	15.10	14.85	18.64			15.71	16.23	17.78	18.67	17.34
1 4	2	15.34	16.96	17.71			16.03	15.07	18.64	19.39	16.67
4 4	2	16.32	16.09	19.74			18.59	14.58	19.16	19.85	18.99
4 0	4	11.92	15.16	16.30	15.03	16.63			16.41	16.93	14.27
4 2	2	14.18	14.87	17.71	13.62	18.43			16.44	17.19	16.96
4 8	2	16.96	16.15	19.33	18.83	18.83			18.17	18.75	18.23
		Percentage ware ($1\frac{5}{8}$" riddle)									
0 4	4	91.5	88.7	91.2			91.6	88.3	93.6	94.8	94.6
1 4	2	90.9	88.1	92.0			90.0	89.9	93.5	94.4	93.5
4 4	2	91.8	92.0	91.9			87.5	89.0	92.9	93.4	95.7
4 0	4	84.6	85.9	89.8	84.8	89.1			92.1	91.2	91.0
4 2	2	91.5	89.5	88.2	86.5	91.7			92.8	91.6	94.2
4 8	2	89.4	93.3	92.7	92.8	87.7			90.6	91.9	92.0

*On these plots the number of sub plots was halved.

60/4/8.4

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60/B/1.1

SIX COURSE ROTATION EXPERIMENT

The 31st and last year

Seasonal effects of fertilisers - Rothamsted Long Hoos IV and Woburn Stackyard 1960.

For history, treatments, etc., see "Details of the Classical and Long Term Experiments" 1956. The experiment is now terminated.

In 1960 the cereals on the Woburn experiment were again combine-harvested the yields being estimated from 2 cuts.

Magnesium test (Woburn only): The 1959 magnesium test on potatoes was repeated in 1960.

Area of each plot (acres): Rothamsted - 0.0250; Woburn - 0.0265. Area harvested: Rothamsted - full area; Woburn - Sugar beet - full area; Barley, wheat, rye - 0.0190; Potatoes (sub plot) - 0.0095.

Cultivations, etc.:

Rothamsted

Sugar beet.
Ploughed twice: Aug 19 and Nov 27, 1959. Fertilisers applied: Apr 1, 1960. Seed drilled at 19 lb per acre: Apr 6. Sprayed with demeton methyl at 12 fluid oz in 60 gallons per acre: Apr 30. Singled: May 30 - June 1. Lifted: Nov 11. Harvested: Nov 15. Variety: Klein E.

Barley.
Sugar beet tops spread, ground chalk applied at 23 cwt per acre: Nov 17, 1959. Ploughed: Nov 27. Fertilisers applied: Mar 10, 1960. Seed drilled at 2¾ bushels per acre: Mar 18. Clover seed undersown: Apr 22. Harvested: Aug 17. Variety: Plumage Archer.

Clover.
Seed undersown in barley at 40 lb per acre: Apr 29, 1959. Autumn fertilisers applied: Oct 3. Sulphate of ammonia applied: Mar 23, 1960. Cut: June 27. Variety: S123 Late Flowering Red.

Wheat.
Ploughed three times: June 23, Aug 11 and Sept 9, 1959. Autumn fertilisers applied: Oct 3. Seed drilled at 2¾ bushels per acre: Oct 12. Sulphate of ammonia applied: Mar 23, 1960. Sprayed with CMPP, 6 pints in 40 gallons per acre: Apr 21. Harvested: Aug 5. Variety: Yeoman.

Potatoes.
Ploughed: Aug 19, 1959. Ridged, fertilisers applied: Apr 21, 1960. Potatoes planted: Apr 22. Earthed up: June 20. Sprayed twice with copper fungicide: July 16 and Aug 10. Sprayed with sulphuric acid, 15% BOV at 100 gallons per acre: Aug 31. Haulms destroyed mechanically: Sept 21. Lifted: Oct 6. Variety: Majestic.

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Rye.
Ground chalk applied at 23 cwt per acre: Oct 3, 1959. Ploughed: Oct 7. Autumn fertilisers applied: Oct 12. Seed drilled at 3 bushels per acre: Oct 13. Sulphate of ammonia applied: Mar 23, 1960. Sprayed with CMPP at 6 pints in 40 gallons per acre: Apr 21. Harvested: Aug 5. Variety: King II

Woburn

Sugar beet.
Ploughed twice: Sept 1 and Nov 28, 1959. Fertilisers applied, seed drilled at 13 lb per acre: Apr 13, 1960. Sprayed against flea beetle with miscible DDT at 3 pints in 40 gallons per acre: May 6; and with demeton methyl at 12 oz in 40 gallons per acre: June 1. Singled: May 27 - June 3. Lifted: Oct 7. Variety: Klein E.

Barley.
Ground chalk applied at 18 cwt per acre: Nov 16, 1959. Ploughed: Nov 20. Fertilisers applied: Mar 8, 1960. Seed drilled at 2½ bushels per acre: Mar 14. Sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 6. Combine harvested: Aug 13. Variety: Herta.

Clover.
Ground chalk applied at 20 cwt per acre: Sept 1, 1959. Ploughed twice: Sept 2 and Nov 25. Fertilisers applied: Mar 25, 1960. Seed broadcast at 40 lb per acre: Mar 28. Sprayed against weevil and miscible DDT at 3 pints in 40 gallons per acre: May 6. Crop discarded owing to pigeon damage and weed infestation.

Wheat.
Ploughed twice: June 3 and Sept 1, 1959. Autumn fertilisers applied: Oct 19. Seed drilled at 3 bushels per acre: Oct 23. Sulphate of ammonia applied: Mar 28, 1960. Sprayed with CMPP at 6 pints in 40 gallons per acre: Apr 19. Combine harvested: Aug 18. Variety: Yeoman.

Potatoes.
Ploughed twice: Sept 2 and Nov 25, 1959. Ridged, fertilisers applied and potatoes hand planted: Apr 28, 1960. Earthed up: June 14. Sprayed twice with copper fungicide at 5 lb in 40 gallons per acre: July 15 and July 29. Haulms destroyed mechanically: Aug 27. Lifted: Sept 29. Variety: Majestic.

Rye.
Ground chalk applied at 18 cwt per acre: Oct 1, 1959. Ploughed: Oct 2. Fertilisers applied: Oct 19. Seed drilled at 3 bushels per acre: Oct 23. Sulphate of ammonia applied: Mar 25, 1960. Sprayed with CMPP at 6 pints in 40 gallons per acre: Apr 19. Combine harvested: Aug 20. Variety: King II.

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Summary of Results

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

	Rothamsted	Woburn	Rothamsted	Woburn
	Sugar Beet, roots (washed): tons per acre		Barley, grain: cwt per acre	
Mean	11.13	9.42	25.6*	30.1*
Response to: N	+5.31	+4.48	+8.5	+16.6
P	+1.40	-1.35	-2.5	-6.0
K	-0.45	+2.30	+2.2	-4.7
Mean dry matter % as harvested:			80.9	81.0
	Sugar Beet, sugar percentage		Barley, straw: cwt per acre	
Mean	16.5	16.6	28.5*	23.0*
Response to: N	-0.5	0.0	+8.6	+13.5
P	+0.3	+0.5	-1.5	+2.5
K	+0.7	+1.4	-0.4	+0.8
Mean dry matter % as harvested:			81.9	66.2
	Sugar Beet, total sugar: cwt per acre		Clover, hay, dry matter: cwt per acre	
Mean	36.7	31.4	19.4	
Response to: N	+16.5	+14.7	+18.5	(Crop
P	+5.3	-3.7	-0.9	discarded)
K	0.0	+10.2	-0.4	
Mean dry matter % as harvested:			76.0	
	Sugar Beet, tops: tons per acre		Wheat, grain: cwt per acre	
Mean	7.75	6.41	34.9*	27.5*
Response to: N	+5.61	+3.73	+0.9	+26.8
P	+0.59	-3.21	+1.7	-0.7
K	-0.01	+0.79	-1.0	+2.5
Mean dry matter % as harvested:			83.0	80.3
	Sugar Beet, plant number: thousands per acre		Wheat, straw: cwt per acre	
Mean	27.6	**	58.9*	33.2*
Response to: N	+1.5		-3.7	+31.5
P	-1.6		+5.3	+3.9
K	+1.8		+3.8	+6.4
Mean dry matter % as harvested:			86.6	81.1

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

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

	Rothamsted	Woburn		Rothamsted	Woburn
	Potatoes, total tubers: tons per acre			Rye, grain: cwt per acre	
		Without Mg	With Mg		
Mean	12.00	9.33	10.46	26.2*	28.9*
Response to: N	+3.64	+6.71	+6.45	+8.0	+20.5
P	+0.10	-2.55	-1.64	-0.7	-4.6
K	+3.54	-0.31	+1.74	-3.2	-0.9
Mean dry matter % as harvested:				82.2	79.2
	Potatoes, percentage ware			Rye, straw: cwt per acre	
	(1)	Without (2) Mg	With Mg		
Mean	91.5	81.1	83.9	38.5*	29.5*
Response to: N	+3.3	+31.3	+19.0	+21.9	+14.8
P	-7.7	-9.6	-5.7	+4.3	+2.7
K	+2.8	+7.8	+11.3	-2.3	-0.6
Mean dry matter % as harvested:				86.9	62.8

*(At 85% dry matter)

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

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60/B/2.1

LEY AND ARABLE ROTATIONS

Highfield and Fosters Field 1960 - the 12th year.

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

Second year lucerne: Three applications of sodium molybdate were made as a foliar spray to small areas before each cut. These areas were harvested separately.
Rate of application: 4 oz of sodium molybdate in 700 gallons per acre, applied to same area for each cut.

In 1960 yields of arable hay, cut grass and silage were estimated (except where otherwise stated in "Cultivations, etc.") from samples cut by a flail action forage harvester. Two sample strips 40" wide were cut from each sub-plot.

Cultivations, etc.:

HIGHFIELD

1st year Treatment Crops

Cut grass. Ploughed twice: Sept 2, 1959 and Feb 16, 1960. Basal PK compound applied; 'Nitro-Chalk' applied: Apr 7. Seeds sown at 33 lb per acre: Apr 12. Cut by mower: July 7. Cut 4 times: July 7, Aug 3, Sept 28, Dec 16. 'Nitro-Chalk' applied after every cut except the last.

Grazed ley. Ploughed twice: Sept 2, 1959 and Feb 16, 1960. Basal PK compound applied; 'Nitro-Chalk' applied: Apr 7. Seed sown at 44 lb per acre: Apr 12. 'Nitro-Chalk' applied: July 20. Grazed: 8 circuits, June 20 - Oct 16.

Lucerne. Ploughed twice: Sept 2, 1959 and Feb 16, 1960. Basal PK compound applied: Apr 7. Seed drilled at 28 lb per acre: Apr 12. Cut twice: July 21, Sept 26. Variety: Du Puits.

Hay. Seeds undersown in barley at 28 lb per acre: Apr 29, 1959. Basal PK compound applied: Jan 18, 1960. 'Nitro-Chalk' applied: Mar 25. Cut: May 27.

2nd year Treatment Crops

Cut grass. Basal PK compound applied: Jan 18, 1960. Nitrogen and potash applied as compound fertilizer (16% N, 16% K_2O): Apr 4 and after every cut except the last. Cut 5 times: May 18, June 22, Aug 3, Sept 27, Dec 16.

Grazed ley. Basal PK compound applied: Feb 11, 1960. 'Nitro-Chalk' applied: Mar 30 and July 18. Grazed: 9 circuits, Apr 22 - Oct 4.

Lucerne. Basal PK compound applied: Feb 11, 1960. Molybdenum spray applied 3 times: Apr 28, June 17, Aug 2. Molybdenum strips cut: May 25, July 14, Sept 22. Cut 3 times: May 30, July 15, Sept 24.

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Potatoes. Ploughed 3 times: June 18, Sept 3, 1959 and Feb 16, 1960. Ridged, basal PK compound applied: Apr 25. Sulphate of ammonia and dung applied; potatoes planted: Apr 27. For later cultivations see Potato Test Crop.

3rd year Treatment Crops

Cut grass. Basal PK compound applied: Jan 18, 1960. Nitrogen and potash applied as compound fertilizer (16% N, 16% K_2O): Apr 4, and after every cut, except the last. Cut 4 times: May 19, June 22, Aug 4, Sept 27.

Grazed ley. Basal PK compound applied: Feb 11, 1960. 'Nitro-Chalk' applied: Mar 30 and July 22. Grazed: 7 circuits, Apr 26 - Sept 18.

Lucerne. Basal PK compound applied: Feb 11, 1960. Cut 3 times: May 30, July 15, Sept 26.

Oats. Ploughed: Oct 8, 1959. 'Nitro-Chalk' applied: Mar 4. Seed drilled at $3\frac{1}{2}$ bushels per acre with basal PK compound: Mar 5. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 7. Combine harvested: Aug 15.

1st Test Crop, Wheat

Ploughed: Sept 16, 1959. Seed combine drilled at $2\frac{3}{4}$ bushels per acre with basal PK compound: Oct 14. 'Nitro-Chalk' applied: Apr 1, 1960. Sprayed with CMPP at 6 pints in 40 gallons per acre: Apr 21. Combine harvested: Aug 23. Variety: Cappelle.

2nd Test Crop, Potatoes

Ploughed twice: Sept 3, 1959 and Feb 16, 1960. Ridged, basal PK compound applied: Apr 25. Sulphate of ammonia, additional P and K and dung applied, potatoes planted: Apr 28. Earthed up: June 21. Sprayed twice with copper fungicide at 5 lb in 40 gallons per acre: July 15 and Aug 10. Sprayed with undiluted BOV at 15 gallons per acre: Sept 13. Haulm destroyed mechanically: Sept 19. Lifted: Oct 14.

3rd Test Crop, Barley

Ground chalk applied to blocks 2 and 3: Oct 7, 1959. Ploughed twice: Oct 8 and Feb 15, 1960. Additional P and K applied: Feb 8. Seed combine drilled at $2\frac{1}{2}$ bushels per acre with basal PK compound: Mar 7. 'Nitro-Chalk' applied: Mar 8. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 7. Combine harvested: Aug 15. Variety: Proctor.

Permanent grasses. Basal PK compound applied to all plots: Feb 11, 1960.

10th year reseeded, 10th experimental year of permanent grass, Block 9 - 12.

Blocks 10 and 12. 'Nitro-Chalk' applied: Mar 30, 1960. 2nd dressing of 'Nitro-Chalk' applied to reseeded plots: July 18 and to permanent grass plot: July 20. Grazed: 7 circuits, Apr 30 - Oct 8.

Blocks 9 and 11. 'Nitro-Chalk' applied: Mar 25, 1960. Cut for silage: May 27. 2nd dressing of 'Nitro-Chalk' applied to permanent grass plots: July 25 and to reseeded plots: July 28. Grazed: 5 circuits, June 28 - Oct 24.

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11th year reseeded, 11th experimental year of permanent grass,
Blocks 5 - 8.
Blocks 7 and 8. 'Nitro-Chalk' applied: Mar 30, 1960. 2nd dressing of 'Nitro-Chalk' applied to permanent grass plots: July 18, and to reseeded plots: July 20. Grazed: 8 circuits, Apr 22 - Oct 28.
Blocks 5 and 6. 'Nitro-Chalk' applied: Mar 25, 1960. Cut for silage: May 27. 2nd dressing of 'Nitro-Chalk' applied to permanent grass plots: July 25 and to reseeded plots: July 27. Grazed: 5 circuits, June 24 - Oct 20.

12th year reseeded, 12th experimental year of permanent grass,
Blocks 1 and 3. 'Nitro-Chalk' applied: Mar 30, 1960. 2nd dressing of 'Nitro-Chalk' applied: July 15. Grazed: Permanent grass plots - 8 circuits, reseeded plots 5 and 6 - 7 circuits each, 31 and 32 - 8 circuits, each; Apr 26 - Oct 28.
Blocks 2 and 4. 'Nitro-Chalk' applied: Mar 25, 1960. Cut for silage: May 27. 2nd dressing of 'Nitro-Chalk' applied: July 18 - 25. Grazed: Permanent grass plots - 5 circuits, reseeded plots 13 and 14 - 5 circuits each, 39 and 40 - 6 circuits. each; June 20 - Oct 16.

FOSTERS

1st year Treatment Crops

Cut grass. Ploughed twice: Aug 22, 1959 and Feb 11, 1960. Basal PK compound and 'Nitro-Chalk' applied: Apr 7. Seeds sown at 33 lb per acre: Apr 12. Cut by mower: July 7. Cut 4 times: July 7, Aug 3, Sept 27, Dec 16. 'Nitro-Chalk' applied after every cut except the last.
Grazed ley. Ploughed twice: Aug 22, 1959 and Feb 11, 1960. Basal PK compound and 'Nitro-Chalk' applied: Apr 7. Seeds sown at 44 lb per acre: Apr 12. 2nd dressing of 'Nitro-Chalk' applied: July 25. Grazed: 6 circuits, June 18 - Oct 15.
Lucerne. Ploughed twice: Aug 22, 1959 and Feb 11, 1960. Basal PK compound applied: Apr 7. Seeds sown at 28 lb per acre: Apr 12. Cut twice: July 21 and Sept 26.
Hay. Seeds undersown in barley at 28 lb per acre: Apr 29, 1959. Basal PK applied: Jan 19, 1960. 'Nitro-Chalk' applied: Mar 25. Cut: May 27.

2nd year Treatment Crops

Cut grass. Basal PK compound applied: Jan 19, 1960. Nitrogen and potash applied as compound fertiliser (16% N, 16% K_2O): Apr 2 and after every cut except the last. Cut 5 times: May 18, June 22, Aug 3, Sept 27, Dec 16.
Grazed ley. Basal PK compound applied: Feb 10, 1960. 'Nitro-Chalk' applied: Mar 28 and July 22. Grazed: 7 circuits, Apr 24 - Oct 7.

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Lucerne. Basal PK compound applied: Feb 10, 1960. Molybdenum spray applied 3 times: Apr 28, June 17, Aug 2. Molybdenum strips cut: May 25, July 14, Sept 22. Cut 3 times: May 30, July 14, Sept 26.

Potatoes. Ploughed three times: June 18 and Aug 22, 1959, Feb 11, 1960. Ridged, basal PK compound applied: Apr 25. Sulphate of ammonia applied: Apr 26. Dung applied and potatoes planted: Apr 27. For later cultivations see Potato Test Crop.

3rd year Treatment Crops

Cut grass. Basal PK compound applied: Jan 19, 1960. Nitrogen and potash applied as compound fertiliser (16% N, 16% K_2O): Apr 2 and after every cut except the last. Cut 4 times: May 18, June 22, Aug 3, Sept 26.

Grazed ley. Basal PK compound applied: Feb 10, 1960. 'Nitro-Chalk' applied: Mar 28 and July 27. Grazed: 5 circuits, Apr 23 - Sept 17.

Lucerne. Basal PK compound applied: Feb 10, 1960. Cut 3 times: May 30, July 14, Sept 26.

Oats. Ploughed twice: Oct 8, 1959, Feb 10, 1960. 'Nitro-Chalk' applied: Mar 4. Seed drilled at $3\frac{1}{2}$ bushels per acre with basal PK compound: Mar 5. Sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 6. Combine harvested: Aug 15. Variety: Sun II.

1st Test Crop, Wheat

Ploughed: Sept 15, 1959. Seed drilled at $2\frac{3}{4}$ bushels per acre, with basl PK compound: Oct 14. 'Nitro-Chalk' applied: Apr 1, 1960. Sprayed with CMPP at 6 pints in 40 gallons per acre: Apr 21. Combine harvested: Aug 28. Variety: Cappelle.

2nd Test Crop, Potatoes

Ploughed twice: Aug 22, 1959 and Feb 11, 1960. Ridged, basal PK compound applied: Apr 25. Dung, additional P and K and sulphate of ammonia applied, potatoes planted: Apr 27. Earthed up: June 21. Sprayed twice with copper fungicide at 5 lb in 40 gallons per acre: July 16 and Aug 10. Sprayed with undiluted BOV at 15 gallons per acre: Sept 13. Haulm destroyed mechanically: Sept 20. Lifted: Oct 17. Variety: Majestic.

3rd Test Crop, Barley

Ploughed twice: Oct 8, 1959 and Feb 10, 1960. Part of additional P and K applied: Jan 20, 1960; remainder: Feb 10. Seed drilled at $2\frac{1}{2}$ bushels per acre with basal PK compound: Mar 5. 'Nitro-Chalk' applied: Mar 8. Sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 6. Combine harvested: Aug 13. Variety: Proctor.

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Permanent grasses. Basal PK compound applied to all plots: Feb 10, 1960.

10th year reseeded grass, Blocks 6, 10, 11, 12.
Blocks 6 and 10. 'Nitro-Chalk' applied: Mar 28 and July 28, 1960. Grazed: 6 circuits, May 1 - Oct 11.
Blocks 11 and 12. 'Nitro-Chalk' applied: Mar 28, 1960. Cut for silage: May 27. 2nd dressing of 'Nitro-Chalk' applied: Aug 2. Grazed: 4 circuits, June 24 - Oct 23.

11th year reseeded grass, Blocks 5, 7, 8, 9.
Blocks 5 and 9. 'Nitro-Chalk' applied: Mar 28 and July 18 - 25, 1960. Grazed: Plots 47 and 48 - 8 circuits, Plots 81 and 82 - 7 circuits, Apr 23 - Oct 7.
Blocks 7 and 8. 'Nitro-Chalk' applied: Mar 28, 1960. Cut for silage: May 27. 2nd dressing of 'Nitro-Chalk' applied: July 25. Grazed: 5 circuits, June 22 - Oct 19.

12th year reseeded grass, Blocks 1 - 4.
Blocks 1 and 2. 'Nitro-Chalk' applied: Mar 28 and July 18 - 28, 1960. Grazed: Plots 7 and 8 - 8 circuits; plots 13 and 14 - 7 circuits, Apr 23 - Oct 27.
Blocks 3 and 4. 'Nitro-Chalk' applied: Mar 28, 1960. Cut for silage: May 27. 2nd dressing of 'Nitro-Chalk' applied: July 22. Grazed: 5 circuits, June 20 - Oct 15.

Standard errors per plot. **Test Crops.**

Wheat, grain (at 85% dry matter).		Highfield:	3.27 cwt per acre or 6.7% (14 d.f.)
		Fosters:	2.10 cwt per acre or 4.6% (14 d.f.)
Potatoes, total tubers.	Highfield	$\frac{1}{4}$ plot:	1.135 tons per acre or 5.6% (14 d.f.)
		$\frac{1}{8}$ plot:	0.974 tons per acre or 4.9% (20 d.f.)
	Fosters	$\frac{1}{4}$ plot:	0.946 tons per acre or 4.9% (14 d.f.)
		$\frac{1}{8}$ plot:	0.713 tons per acre or 3.7% (20 d.f.)
Barley, grain (at 85% dry matter).		Highfield:	2.07 cwt per acre or 4.4% (15 d.f.)
		Fosters:	2.06 cwt per acre or 4.4% (15 d.f.)

Errata to 'Results of the Field Experiments' 1959 pages 59/Bb/1.14 and 1.15.

Barley Fosters. N × Treatment crops 1954 - 56 table:-
Levels of N: cwt per acre should read '0.2 not 'None
0.4' 0.2'

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60/B/2.6

Summary of Results

Wheat 1st test crop

N: cwt per acre	Treatment crops 1957 - 1959 Lucerne	Ley	Cut grass	Arable with hay	Mean
Grain (at 85% dry matter): cwt per acre					
Highfield					
Mean	53.6	52.8	41.9	48.6	49.2
To test crop					
0.3	51.8	51.6	40.2	44.3	47.0
0.6	55.4	54.1	43.6	52.9	51.5
Difference (±2.31)	+3.6	+2.5	+3.4	+8.6	+4.5 (±1.16)
To treatment crops					
Single rate		53.3	41.2	45.9	46.8
Double rate		52.4	42.6	51.3	48.8
Difference (±2.31)		-0.9	+1.4	+5.4	+2.0 (±1.34)
Fosters					
Mean	52.4	44.9	43.2	42.0	45.7
To test crop					
0.3	51.5	44.5	41.6	38.3	44.0
0.6	53.4	45.4	44.9	45.8	47.4
Difference (±1.49)	+1.9	+0.9	+3.3	+7.5	+3.4 (±0.74)
To treatment crops					
Single rate		45.5	43.3	42.0	43.6
Double rate		44.4	43.2	42.1	43.2
Difference (±1.49)		-1.1	-0.1	+0.1	-0.4 (±0.86)

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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 1958: tons per acre: None	Arable with hay only: Dung to potatoes 1958: tons per acre: 12	Arable with hay only: Mean
Grain (at 85% dry matter): cwt per acre						
Highfield						
To test crop	(±1.34)		(±0.94)	(±2.31)		(±1.64)
0.3	43.9	46.9	45.4	44.2	44.4	44.3
0.6	49.7	50.6	50.2	52.8	52.9	52.9
Mean	46.8	48.8	47.8			
	(±0.94)					
To previous treatment crops				(±2.31)		(±1.64)
Single rate				45.2	46.6	45.9
Double rate				51.9	50.8	51.3
Mean				48.5	48.7	48.6
				(±1.64)		
Mean dry matter % as harvested: 81.1						
Fosters						
To test crop	(±0.86)		(±0.61)	(±1.49)		(±1.05)
0.3	41.2	41.7	41.5	38.4	38.1	38.3
0.6	45.9	44.8	45.3	45.9	45.7	45.8
Mean	43.6	43.2	43.4			
	(±0.61)					
To previous treatment crops				(±1.49)		(±1.05)
Single rate				43.1	40.9	42.0
Double rate				41.3	42.9	42.1
Mean				42.2	41.9	42.0
				(±1.05)		
Mean dry matter % as harvested: 79.7						

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Wheat 1st test crop

N: cwt per acre	Treatment crops 1957 - 1959 Lucerne	Ley	Cut grass	Arable with hay	Mean
Straw (at 85% dry matter): cwt per acre					
Highfield					
Mean	51.0	45.7	35.1	41.0	43.2
To test crop					
0.3	49.8	44.2	33.6	36.8	41.1
0.6	52.2	47.3	36.6	45.2	45.3
Difference	+2.4	+3.1	+3.0	+8.4	+4.2
To treatment crops					
Single rate		45.4	36.0	39.0	40.1
Double rate		46.0	34.2	43.0	41.0
Difference		+0.6	-1.8	+4.0	+0.9
Fosters					
Mean	38.3	29.2	26.5	27.1	30.3
To test crop					
0.3	38.7	27.5	25.9	23.3	28.9
0.6	37.9	30.9	27.2	30.9	31.7
Difference	-0.8	+3.4	+1.3	+7.6	+2.8
To treatment crops					
Single rate		29.0	27.0	27.3	27.8
Double rate		29.4	26.1	26.9	27.4
Difference		+0.4	-0.9	-0.4	-0.4

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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 1958: tons per acre None	Arable with hay only: Dung to potatoes 1958: tons per acre 12	Arable with hay only: Mean
Straw (at 85% dry matter): cwt per acre						
Highfield						
To test crop						
0.3	38.2	38.1	38.2	35.4	38.1	36.8
0.6	42.1	43.9	43.0	43.9	46.5	45.2
Mean	40.1	41.0	40.6			
To previous treatment crop						
Single rate				37.6	40.4	39.0
Double rate				41.8	44.3	43.0
Mean				39.7	42.3	41.0

Mean dry matter % as harvested: 66.2

Fosters

To test crop						
0.3	25.1	26.0	25.6	22.2	24.5	23.3
0.6	30.4	28.9	29.6	29.8	32.0	30.9
Mean	27.8	27.4	27.6			
To previous treatment crop						
Single rate				26.9	27.8	27.3
Double rate				25.1	28.8	26.9
Mean				26.0	28.3	27.1

Mean dry matter % as harvested: 85.5

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

	Treatment crops 1956-1958				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	21.13	20.59	20.28	18.35	20.09
N: cwt per acre					
0.5	20.85	20.25	20.16	17.98	19.81
1.0	21.41	20.93	20.41	18.71	20.36
Difference (±0.802)	+0.56	+0.68	+0.25	+0.73	+0.55 (±0.401)
Dung: tons per acre					
None	19.88	20.05	19.62	16.41	18.99
12	22.38	21.13	20.94	20.28	21.18
Difference (±0.802)	+2.50	+1.08	+1.32	+3.87	+2.19 (±0.401)
P_2O_5: cwt per acre*					
0.9	21.25	20.81	20.35	18.10	20.13
1.8	21.01	20.36	20.21	18.59	20.04
Difference (±0.487)	-0.24	-0.45	-0.14	+0.49	-0.09 (±0.244)
K_2O: cwt per acre*					
0.9	21.13	20.47	20.44	17.56	19.90
1.8	21.13	20.70	20.12	19.13	20.27
Difference (±0.487)	0.0	+0.23	-0.32	+1.57	+0.37 (±0.244)
Fosters					
Mean	19.59	19.57	19.36	18.63	19.28
N: cwt per acre					
0.5	19.15	19.36	19.33	18.38	19.06
1.0	20.02	19.77	19.38	18.88	19.51
Difference (±0.669)	+0.87	+0.41	+0.05	+0.50	+0.45 (±0.334)
Dung: tons per acre					
None	18.61	18.57	18.83	17.08	18.27
12	20.56	20.56	19.88	20.19	20.30
Difference (±0.669)	+1.95	+1.99	+1.05	+3.11	+2.03 (±0.334)
P_2O_5: cwt per acre*					
0.9	19.68	19.10	19.11	18.43	19.08
1.8	19.49	20.03	19.60	18.83	19.49
Difference (±0.356)	-0.19	+0.93	+0.49	+0.40	+0.41 (±0.178)
K_2O: cwt per acre*					
0.9	19.42	19.73	18.96	18.35	19.11
1.8	19.75	19.41	19.75	18.91	19.46
Difference (±0.356)	+0.33	-0.32	+0.79	+0.56	+0.35 (±0.178)

*Including basal dressing

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60/B/2.11

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

Highfield

	Dung: tons per acre		P_2O_5: cwt* per acre		K_2O: cwt* per acre	
	None	12	0.9	1.8	0.9	1.8
N: cwt per acre						
0.5	18.44	21.18	19.84	19.78	19.65	19.97
1.0	19.54	21.18	20.41	20.31	20.15	20.57
	(±0.401)		(1) and (2)		(1) and (2)	
Dung: tons per acre						
None			19.02	18.96	18.61	19.37
12			21.23	21.13	21.19	21.17

Lucerne rotation only	K_2O: cwt per acre*		
	0.9	1.8	Mean
P_2O_5: cwt per acre*	(3) and (4)		
0.9	21.07	21.42	21.25
1.8	21.19	20.84	21.01
Mean	21.13	21.13	21.13

Fosters

	Dung: tons per acre		P_2O_5: cwt* per acre		K_2O: cwt* per acre	
	None	12	0.9	1.8	0.9	1.8
N: cwt per acre						
0.5	17.78	20.33	18.78	19.33	19.03	19.08
1.0	18.77	20.26	19.38	19.65	19.20	19.83
	(±0.334)		(1) and (2)		(1) and (2)	
Dung: tons per acre						
None			17.95	18.59	17.73	18.81
12			20.21	20.39	20.50	20.10

Lucerne rotation only	K_2O: cwt per acre*		
	0.9	1.8	Mean
P_2O_5: cwt per acre*	(3) and (4)		
0.9	19.50	19.86	19.68
1.8	19.35	19.64	19.49
Mean	19.42	19.75	19.59

*Including basal dressing

Highfield	Fosters	
(1) ±0.244	(1) ±0.178	for use in horizontal and interaction comparisons.
(2) ±0.332	(2) ±0.268	for use in all others.
(3) ±0.802	(3) ±0.669	for use only in testing the PK interaction.
(4) ±0.664	(4) ±0.536	for use in all other comparisons.

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

	Treatment crops 1956–1958				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	94.5	94.4	93.6	94.2	94.2
N: cwt per acre					
0.5	94.3	94.2	93.9	94.3	94.2
1.0	94.8	94.6	93.3	94.0	94.2
Difference	+0.5	+0.4	-0.6	-0.3	0.0
Dung: tons per acre					
None	94.1	93.7	92.8	93.1	93.4
12	94.9	95.1	94.4	95.2	94.9
Difference	+0.8	+1.4	+1.6	+2.1	+1.5
P_2O_5: cwt per acre*					
0.9	95.0	94.8	93.7	94.6	94.5
1.8	94.1	94.1	93.5	93.7	93.8
Difference	-0.9	-0.7	-0.2	-0.9	-0.7
K_2O: cwt per acre*					
0.9	94.2	93.7	93.3	93.4	93.7
1.8	94.8	95.2	93.8	95.0	94.7
Difference	+0.6	+1.5	+0.5	+1.6	+1.0
Fosters					
Mean	95.2	95.5	95.7	94.7	95.3
N: cwt per acre					
0.5	95.2	94.9	96.0	94.9	95.2
1.0	95.2	96.2	95.3	94.6	95.3
Difference	0.0	+1.3	-0.7	-0.3	+0.1
Dung: tons per acre					
None	95.3	95.6	95.8	94.7	95.4
12	95.1	95.5	95.6	94.7	95.2
Difference	-0.2	-0.1	-0.2	0.0	-0.2
P_2O_5: cwt per acre*					
0.9	95.2	95.3	95.8	94.9	95.3
1.8	95.2	95.8	95.5	94.6	95.3
Difference	0.0	+0.5	-0.3	-0.3	0.0
K_2O: cwt per acre*					
0.9	95.0	95.4	95.8	94.2	95.1
1.8	95.4	95.7	95.6	95.3	95.5
Difference	+0.4	+0.3	-0.2	+1.1	+0.4

*Including basal dressing

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60/B/2.13

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

	Dung: tons per acre		P_2O_5: cwt per acre*		K_2O: cwt per acre*	
	None	12	0.9	1.8	0.9	1.8
Highfield						
N: cwt per acre						
0.5	93.4	95.0	94.5	93.8	93.5	94.8
1.0	93.5	94.9	94.5	93.8	93.8	94.6
Dung: tons per acre						
None			93.9	92.9	92.6	94.2
12			95.1	94.8	94.7	95.2

Lucerne rotation only

P_2O_5: cwt per acre*	K_2O: cwt per acre* 0.9	1.8	Mean
0.9	94.7	95.3	95.0
1.8	93.7	94.4	94.1
Mean	94.2	94.8	94.5

	Dung: tons per acre		P_2O_5: cwt per acre*		K_2O: cwt per acre*	
	None	12	0.9	1.8	0.9	1.8
Fosters						
N: cwt per acre						
0.5	95.2	95.3	95.5	95.0	94.9	95.5
1.0	95.5	95.2	95.1	95.6	95.2	95.5
Dung: tons per acre						
None			95.4	95.3	95.2	95.5
12			95.2	95.2	94.9	95.5

Lucerne rotation only

P_2O_5: cwt per acre*	K_2O: cwt per acre* 0.9	1.8	Mean
0.9	94.7	95.6	95.2
1.8	95.2	95.2	95.2
Mean	95.0	95.4	95.2

*Including basal dressing

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

	Treatment crops 1955-1957				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	47.5	43.6	48.6	49.1	47.2
N: cwt per acre					
None	50.4	44.5	48.7	47.1	47.6
0.2	44.7	42.7	48.5	51.2	46.8
Difference (±1.46)	-5.7	-1.8	-0.2	+4.1	-0.8 (±0.73)
Dung to potatoes 1959: tons per acre					
None	48.3	42.5	48.8	48.6	47.0
12	46.7	44.7	48.4	49.7	47.4
Difference (±1.46)	-1.6	+2.2	-0.4	+1.1	+0.4 (±0.73)
Fosters					
Mean	47.4	46.5	45.4	46.1	46.4
N: cwt per acre					
0.2	45.4	44.0	44.8	44.4	44.6
0.4	49.5	48.9	45.9	47.9	48.1
Difference (±1.46)	+4.1	+4.9	+1.1	+3.5	+3.5 (±0.73)
Dung to potatoes 1959: tons per acre					
None	46.8	46.1	44.1	46.5	45.9
12	48.1	46.8	46.7	45.8	46.8
Difference (±1.46)	+1.3	+0.7	+2.6	-0.7	+0.9 (±0.73)

	Highfield		Fosters	
	N: cwt per acre		N: cwt per acre	
	None	0.2	0.2	0.4
Dung to potatoes 1959: tons per acre	(±0.73)		(±0.72)	
None	46.8	47.2	44.2	47.6
12	48.4	46.3	45.1	48.6

Mean dry matter % as harvested:
Highfield: 77.0
Fosters: 79.5

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

	Treatment crops 1955–1957				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	37.3	38.6	34.9	32.3	35.8
N: cwt per acre					
None	35.3	36.6	33.6	29.2	33.7
0.2	39.4	40.5	36.1	35.4	37.9
Difference	+4.1	+3.9	+2.5	+6.2	+4.2
Dung to potatoes 1959: tons per acre					
None	35.1	38.6	33.7	31.2	34.6
12	39.6	38.5	36.1	33.4	36.9
Difference	+4.5	-0.1	+2.4	+2.2	+2.3
Fosters					
Mean	33.9	32.2	31.0	33.0	32.5
N: cwt per acre					
0.2	31.9	30.4	27.8	30.8	30.2
0.4	36.0	34.1	34.2	35.2	34.9
Difference	+4.1	+3.7	+6.4	+4.4	+4.7
Dung to potatoes 1959: tons per acre					
None	33.7	31.0	29.3	31.8	31.5
12	34.2	33.4	32.7	34.1	33.6
Difference	+0.5	+2.4	+3.4	+2.3	+2.1

	Highfield		Fosters	
	N: cwt per acre		N: cwt per acre	
	None	0.2	0.2	0.4
Dung to potatoes 1959: tons per acre				
None	32.5	36.8	28.7	34.2
12	34.8	38.9	31.7	35.5

Mean dry matter % as harvested:
Highfield: 88.5
Fosters: 85.0

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Treatment crops Arable and Hay rotation

(values based on mean of 2 sub plots only)

	Highfield N: cwt per acre applied in 1960			Fosters N: cwt per acre applied in 1960		
	Single rate	Double rate	Mean	Single rate	Double rate	Mean
Hay (dry matter): cwt per acre						
No dung	43.1	48.9	46.0	31.9	40.3	36.1
Dung in 1958	47.6	49.4	48.5	33.8	39.5	36.6
Mean	45.4	49.1	47.2	32.9	39.9	36.4
Potatoes, total tubers: tons per acre						
No dung	18.61	18.04	18.32	18.51	18.68	18.60
Dung in 1960	20.14	19.80	19.97	20.97	20.38	20.68
Mean	19.38	18.92	19.15	19.74	19.53	19.64
Potatoes, percentage ware ($1\frac{1}{2}$" riddle)						
No dung	95.1	93.6	94.4	94.5	95.0	94.8
Dung in 1960	96.2	96.4	96.2	94.2	94.4	94.3
Mean	95.6	95.0	95.3	94.4	94.7	94.5
Oats						
	None	0.2		0.2	0.4	
Grain (at 85% dry matter): cwt per acre						
No dung	33.6	34.4	34.0	37.6	42.8	40.2
Dung in 1959	38.7	37.3	38.0	38.7	41.4	40.1
Mean	36.2	35.9	36.0	38.2	42.1	40.1
Straw (at 85% dry matter): cwt per acre						
No dung	28.8	27.8	28.3	27.2	33.4	30.4
Dung in 1959	34.8	33.2	34.0	28.9	32.1	30.5
Mean	31.8	30.5	31.2	28.1	32.8	30.4

Highfield, Oats, Mean dry matter % as harvested Grain: 73.8 Straw: 76.8
Fosters, Oats, Mean dry matter % as harvested Grain: 79.2 Straw: 73.8

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Cut grass. Dry matter: cwt per acre

1st year	Highfield N to previous 3 test crops Single rate	Highfield N to previous 3 test crops Double rate	Highfield Dung to potatoes 1958: tons per acre None	Highfield Dung to potatoes 1958: tons per acre 12	Highfield Mean	Fosters N to previous 3 test crops Single rate	Fosters N to previous 3 test crops Double rate	Fosters Dung to potatoes 1958: tons per acre None	Fosters Dung to potatoes 1958: tons per acre 12	Fosters Mean
N (1) to cut grass (4 cuts)										
Single rate	63.1	58.2	60.5	60.8	60.6	56.4	55.4	58.3	53.4	55.8
Double rate	66.1	66.1	63.8	68.4	66.1	61.5	62.6	63.0	61.1	62.0
N to test crops										
Single rate			63.0	66.2	64.6			60.4	57.4	58.9
Double rate			61.2	63.0	62.1			60.8	57.0	59.0
Mean			62.1	64.6	63.4			60.6	57.2	58.9

	Highfield N to cut grass (1) Single rate	Highfield N to cut grass (1) Double rate	Highfield Mean	Fosters N to cut grass (1) Single rate	Fosters N to cut grass (1) Double rate	Fosters Mean
2nd year (5 cuts)	66.8	91.1	78.9	51.7	70.4	61.0
3rd year (4 cuts)	51.1	74.2	62.7	47.4	67.6	57.5

60/B/2.17

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Lucerne. Dry Matter: cwt per acre

1st year (2 cuts)	Highfield N to 3 previous test crops Single rate	Highfield N to 3 previous test crops Double rate	Highfield Mean	Fosters N to 3 previous test crops Single rate	Fosters N to 3 previous test crops Double rate	Fosters Mean
Dung to potatoes 1958						
None	42.1	47.4	44.7	44.0	58.3	51.1
12 tons	41.6	54.0	47.8	44.7	44.0	44.3
Mean	41.9	50.7	46.3	44.3	51.1	47.7
2nd year (3 cuts)			94.2			115.9
3rd year (3 cuts)			80.0			117.4

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

	Highfield N: cwt per acre (yearly) 0.15	Highfield N: cwt per acre (yearly) 0.30	Highfield Mean	Fosters N: cwt per acre (yearly) 0.15	Fosters N: cwt per acre (yearly) 0.30	Fosters Mean
1st year	42.4	38.2	40.3	37.9	37.1	37.5
2nd year	33.7	42.5	38.1	24.8	31.2	28.0
3rd year	27.6	35.9	31.7	20.1	24.7	22.4

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Reseeded Grass. Dry matter: cwt per acre

	Cut for silage N			Grazed Estimated from sampling cuts N		
	Single rate	Double rate	Mean	Single rate	Double rate	Mean
Highfield						
10th exptl. year						
Blocks 10 and 12				25.3*	33.3*	29.3*
Blocks 9 and 11	20.1	24.1	22.1	22.8*	28.4*	25.6*
11th exptl. year						
Blocks 7 and 8				28.2*	36.7*	32.5*
Blocks 5 and 6	28.3	30.8	29.6	23.0*	22.0*	22.5*
12th exptl. year						
Blocks 1 and 3				28.4*	31.0*	29.7*
Blocks 2 and 4	30.0	35.7	32.8	22.2*	27.3*	24.7*
Fosters						
10th exptl. year						
Blocks 6 and 10				27.9*	35.1*	31.5*
Blocks 11 and 12	15.2	16.6	15.9	31.5*	34.7*	33.1*
11th exptl. year						
Blocks 5 and 9				35.1*	38.8*	37.0*
Blocks 7 and 8	24.7	28.6	26.6	20.4*	25.6*	23.0*
12th exptl. year						
Blocks 1 and 2				28.8*	32.1*	30.4*
Blocks 3 and 4	30.2	33.3	31.7	20.2*	21.1*	20.6*

Permanent Grass. Dry matter: cwt per acre

Highfield						
10th exptl. year						
Blocks 10 and 12				20.7*	30.8*	25.7*
Blocks 9 and 11	24.6	27.3	26.0	24.4*	28.4*	26.4*
11th exptl. year						
Blocks 7 and 8				28.2*	39.2*	33.7*
Blocks 5 and 6	22.6	27.7	25.1	20.9*	25.3*	23.1*
12th exptl. year						
Blocks 1 and 3				26.4*	37.5*	32.0*
Blocks 2 and 4	25.7	27.0	26.4	27.0*	32.3*	29.7*

*Aftermath grazing

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60/B/3.1

REFERENCE PLOTS

The effects of N,P,K and Dung on a sequence of five arable crops and on permanent grass - Rothamsted (R) Great Field IV and Woburn (W) Stackyard Series C 1960.

In 1960 additional plots were laid down at Rothamsted to provide information on the effects of Mg, Ca, S and trace elements in the presence of N,P,K (equivalent to N_2,P,K treatment of the original plots) on an unlimed continuation of the original site in Great Field IV. The same sequence of crops (wheat, kale, barley, clover-grass ley, potatoes) is followed. The turf was removed from the site before hand digging.

At Woburn soft fruit was also grown, and the site selected was old arable, shown by soil analysis to be acid and to be low in available P & K. The cultivated areas received 27 cwt per acre hydrated lime before digging on February 10, 1960. All arable crops are spring sown.

Great Field IV (R): Additional plots:-

Design: 5 rows of a 7 × 7 Latin square, one row in each crop.
Area of each plot: 0.0013 acres.
Treatments:-

1. Nil
2. N_2,P,K
3. N_2,P,K Ca Mg
4. N_2,P,K Ca - S
5. N_2,P,K - Mg S
6. N_2,P,K Ca Mg S
7. N_2,P,K Ca Mg S + trace elements.

Rates and forms of manuring:

All N as urea.
All P and part K as potassium dihydrogen phosphate.
Remaining K as muriate of potash where sulphur omitted or sulphate of potash where sulphur added.
Ca as calcium carbonate
Mg as magnesium chloride
S as potassium sulphate
Trace elements: Iron, manganese, copper, zinc, boron, molybdenum and cobalt applied as foliar spray to crops known to benefit; as under:

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Levels of application:

	Winter wheat	Kale	Barley	Grass & clover	Potatoes
			cwt per acre		
N*	1.2	2.0	0.9	0.3	1.2
P_2O_5	1.0	1.0	1.0	1.0	1.0
K_2O	1.4	1.4	1.4	1.4	1.4
MgO	1.0	1.0	1.0	1.0	1.0
CaO	1.0	1.0	1.0	1.0	1.0
S	0.25	0.25	0.25	0.25	0.25
			lb per acre		
Fe+	-	-	-	-	20
$MnSO_4$	5	-	-	5	5
$CuSO_4$	2	-	2	-	-
$ZnSO_4$	2	-	2	-	2
NaB_4O_7	-	10	-	5	-
$NaMoO_4$	-	0.5	-	0.125	-
$CoSO_4$	-	-	-	0.125	-

*For winter wheat, potatoes and kale nitrogen divided into two equal applications - one early, one late.

+Iron applied as iron chelate (12% Fe).

Stackyard Series C (W)

Design: Each crop - 1 randomised block of 12 plots. Rotation: Oats, sugar beet, barley, clover-grass ley, potatoes.

Area of each plot: 0.0014 acres.

Treatments: All combinations of:-
Nitrogen: None, N_1 (for rates see below)
Phosphate: None, 0.5 cwt P_2O_5 per acre as triple superphosphate.
Potash: None, 1.0 cwt K_2O per acre as potassium bicarbonate,
and the following additional treatments:
N_2,P,K; dung; dung and N_1,P,K; dung and N_2,P,K.
Rates of nitrogen (all as ammonium nitrate):
N_1: Potatoes and fruit bushes, 0.6; barley, 0.45; oats, 0.3; sugar beet, 0.75; grass and clover ley, 0.15; permanent grass, 1.0 cwt N per acre; N_2 double N_1 in each case.
Dung: 20 tons per acre to potatoes and beet; 10 tons to permanent grass and, in 1960 only, 7 tons to barley and oats and 3 tons to clover-grass ley.

Basal dressing, to permanent grass and fruit bushes only: 0.25 cwt N per acre as ammonium nitrate.

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Cultivations, etc.:

Great Field IV (R):- Original plots:

Winter wheat: Dug by hand: Sept 14, 1959. P,K applied, seed drilled: Oct 23. First N dressing applied: Mar 7, 1960. Second N dressing applied: Apr 28. Harvested: Aug 10. Variety: Cappelle.

Kale: Dung applied, plots dug by hand: Nov 11, 1959. N,P & K applied, seed sown: Apr 6, 1960. Harvested: Nov 24. Variety: Thousand Head.

Barley: Dug by hand: Nov 23, 1959. N,P & K applied, seed sown: Mar 18, 1960. Harvested: Aug 5. Variety: Proctor.

Grass-clover ley: Undersown in barley: Apr 2, 1959. N,P & K applied: Mar 7, 1960. Cut 3 times: May 16, July 27 and October 11, 1960. Varieties: S22 Ryegrass and S151 Late Flowering Red Clover.

Potatoes: Dung applied, plots dug by hand: Nov 23, 1959. N, P&K applied on flat, setts planted: Apr 6, 1960. Harvested: Sept 12. Variety: King Edward.

Permanent grass: Dung applied: Nov 23, 1959. First N dressing and P,K applied: Mar 7, 1960. Second N dressing: May 16. Cut twice: May 16 and Oct 10.

Great Field IV (R):- Additional plots:

Winter wheat: Dug by hand: Oct 2, 1959. Seed drilled: Oct 23. P,K,Ca and S applied to wheat: Nov 17. Mg and half N applied: Mar 7, 1960. Half N applied: Apr 28. Trace element spray applied: May 18. Harvested: Aug 10. Variety: Cappelle.

Kale: Dug by hand: Jan 4, 1960. Half N and P,K,S,Mg and Ca applied: Mar 14. Rotovated and seed sown: Apr 6. Half N applied: Apr 28. Trace element spray applied: May 25. Harvested: Nov 24. Variety: Thousand Head.

Barley: Dug by hand: Jan 5, 1960. N, P,K,S,Mg and Ca applied: Mar 14. Rotovated, seed sown: Mar 18. Trace element spray applied: May 18. Harvested: Aug 5. Variety: Proctor.

Grass-clover ley: Dug by hand: Jan 4, 1960. N,P,K,S,Mg and Ca applied: Mar 14. Rotovated and seed sown: Mar 18. Trace element spray applied: May 25. Cut twice: July 26 and Oct 11. Varieties: S22 Ryegrass and Dorset Marl Broad Red Clover.

Potatoes: Dug by hand: Jan 5, 1960. Half N and P,K,S,Mg and Ca applied: Mar 14. Rotovated, setts planted: Apr 6. Half N applied: Apr 28. Trace element spray applied: May 25. Harvested: tops - Aug 2, tubers - Aug 15. Variety: King Edward.

Stackyard Series C (W):-

Oats: Hand dug, dung applied: Feb 15, 1960. N,P,K applied, seed sown: Mar 23. Harvested: Aug 9. Variety: Condor.

Sugar beet: Hand dug, dung applied: Feb 15, 1960. N,P,K applied, seed sown: Mar 25. Harvested: Oct 13. Variety: Klein E.

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Barley: Hand dug, dung applied: Feb 15, 1960. N,P,K applied, seed sown: Mar 23. Harvested: Aug 9. Variety: Proctor.
Grass-clover ley: Hand dug, dung applied: Feb 16, 1960. N,P,K applied, seed sown: Mar 24. Cut twice: July 26 and Oct 5. Varieties: S22 Italian Ryegrass and Dorset Marl Broad Red Clover.
Potatoes: Hand dug, dung applied: Feb 16, 1960. N,P,K applied, potatoes planted: Mar 25. Harvested: Sept 15. Variety: King Edward.
Permanent grass: Hand dug, dung applied: Feb 16, 1960. P,K and three-quarters of N applied, seed sown: Mar 24. Basal N applied: May 26. One-quarter N applied: July 26. Cut twice: July 26 and Oct 5. Variety: Complex grass and clover mixture.
Fruit bushes: Blackcurrants planted: Feb 8, 1960. Hand dug: Feb 16. Gooseberries planted: Mar 2. Lime applied to surface soil: Mar 15. N,P,K applied: Mar 24. Strawberries planted: Apr 22. Dung applied to surface soil: Apr 29. Basal N applied: June 2. Varieties: Blackcurrants - Wellington XXX; Gooseberry - Careless; Strawberry - Cambridge Vigour.

For details of the previous years results for Great Field IV (R) see "Results of the Field Experiments" 59/Bc/1 and 58/Bc/1, in which the rates of N, P & K are given.

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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	Total	tons per acre Potatoes total tubers	cwt per acre Permanent grass: dry matter 1st cut	2nd cut	Total
None	40.6	45.8	6.04	20.8	17.8	13.7	17.6	7.1	38.4	4.30	6.8	34.9	41.7
N_1	47.1	50.5	13.11	27.3	24.0	19.5	14.5	4.9	38.9	4.47	13.1	31.9	45.0
P	48.4	58.0	7.77	28.0	21.2	17.7	19.9	15.7	53.3	4.12	6.0	31.8	37.8
N_1P	49.1	55.1	13.16	42.0	36.5	23.7	15.2	9.7	48.6	4.90	19.8	40.1	59.9
K	47.2	55.9	5.88	19.2	16.5	21.3	29.6	14.2	65.1	10.62	7.5	31.8	39.3
N_1K	53.5	61.3	9.14	31.8	28.9	25.8	23.0	15.4	64.2	10.29	20.2	37.4	57.6
PK	48.0	63.2	6.75	27.4	22.8	26.8	37.0	20.1	83.9	10.51	11.4	40.0	51.4
N_1PK	58.9	73.2	14.26	40.6	38.1	24.4	28.3	17.6	70.3	14.96	22.6	34.2	56.8
N_2PK	59.1	76.4	21.92	50.0	46.7	33.9	24.2	20.0	78.1	14.08	33.0	40.5	73.5
D	51.4	67.9	14.00	35.6	35.4	23.3	32.5	16.5	72.3	19.04	17.4	33.4	50.8
N_1PKD	59.6	80.6	20.18	46.2	44.8	31.5	29.6	20.2	81.3	22.68	34.0	38.5	72.5
N_2PKD	56.5	82.7	25.80	48.5	55.8	34.5	22.1	20.3	76.9	25.60	38.9	42.8	81.7
Mean dry matter % as harvested:	78.7	66.2		78.3	46.8	22.8	28.2	18.2	23.1		24.2	26.8	25.5

60/B/3.5

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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	cwt per acre Barley Grain (at 85% D.M)	Straw	cwt per acre Ley: dry matter 1st cut	2nd cut	total	tons per acre Potatoes total tubers
None	15.6	18.5	10.42	18.1	12.2	14.3	14.2	28.5	5.28
N_2PK	42.7	45.5	22.18	41.6	34.7	31.9	20.0	51.9	13.13
N_2PK Mg Ca S	45.2	52.5	18.60	35.5	35.4	29.1	18.2	47.3	15.00
N_2PK Mg Ca S TE	41.1	50.1	19.42	40.7	34.7	29.2	18.1	47.3	13.62
N_2PK Mg Ca	39.6	49.8	21.16	40.7	34.2	28.7	18.3	47.0	14.45
N_2PK Mg S	42.2	44.2	20.86	37.3	31.5	25.2	16.6	41.8	14.98
N_2PK Ca S	52.1	63.8	21.10	39.2	37.4	30.6	17.9	48.5	14.93
Mean dry matter % as harvested:	79.2	70.6		83.7	59.3	23.5	14.3	18.9	

60/B/3.6

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Stackyard Series C (W)

Treatment	cwt per acre Oats Grain (at 85% D.M)	Straw	tons per acre Sugar beet roots (washed)	tops	cwt per acre Barley Grain (at 85% D.M)	Straw	Ley: dry matter 1st cut	2nd cut	Total	tons per acre Potatoes total tubers	cwt per acre Permanent grass: dry matter 1st cut	2nd cut	Total
None	8.8	12.8	14.96	7.10	12.2	10.2	25.5	21.1	46.6	6.65	16.7	13.1	29.8
N_1	19.2	23.3	17.52	12.96	17.9	18.9	25.0	23.8	48.8	12.12	23.9	16.2	40.1
P	9.2	12.0	14.12	6.48	9.3	9.3	25.6	22.8	48.4	7.30	18.7	14.8	33.5
N_1P	19.8	24.4	19.03	10.95	19.1	17.3	27.4	22.4	49.8	11.36	23.2	15.6	38.8
K	9.8	13.5	12.82	6.17	10.4	9.2	28.1	27.3	55.4	6.56	14.1	13.6	27.7
N_1K	24.6	28.4	20.81	11.72	20.7	18.9	25.3	22.8	48.1	11.07	25.7	16.4	42.1
PK	13.2	20.0	13.47	6.02	9.6	10.1	30.3	23.2	53.5	7.70	19.6	15.9	35.5
N_1PK	19.1	24.5	19.46	10.18	21.3	21.4	30.1	24.2	54.3	12.60	28.7	16.5	45.2
N_2PK	22.1	29.4	18.84	18.20	22.7	27.9	29.0	22.4	51.4	16.16	36.2	23.7	59.9
D	11.9	17.2	17.62	8.33	11.9	11.9	24.2	24.3	48.5	12.14	18.4	16.1	34.5
N_1PKD	22.2	27.3	25.72	13.58	26.5	25.4	29.8	27.0	56.8	16.72	32.5	19.8	52.3
N_2PKD	24.5	33.3	27.62	21.28	27.4	30.4	31.7	26.6	58.3	22.15	35.4	24.5	59.9
Mean dry matter % as harvested:	68.0	38.6			74.5	50.3	15.2	12.5	13.8		18.8	15.4	17.1

60/B/3.7

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60/E/4.1

GREEN MANURING EXPERIMENT

Woburn Stackyard - 1960, the 7th 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 1959 (for early potatoes 1960): Trefoil at 30 lb per acre, ryegrass at 40 lb per acre, undersown: May 12, 1959, failed and resown: Aug 7. Varieties: Trefoil - English; Ryegrass - Western Wolths.

Early potatoes: Straw applied ("fallow" plots): Aug 31, 1959. "Fallow" plots ploughed: Sept 2 and Nov 24. Straw applied (green manure plots): Feb 11, 1960. All plots ploughed: Feb 23. Basal fertiliser applied: Apr 4. 'Nitro-Chalk' applied, potatoes mechanically planted: Apr 5. Earthed up: June 13. Sprayed with copper fungicide at 5 lb in 40 gallons per acre: July 16. Haulm destroyed mechanically: July 25. Lifted: July 26 and Aug 2. Variety: Ulster Chieftain.

Green manures after early potatoes 1959 (for barley 1960): Ground chalk applied at 15 cwt per acre: July 22, 1959. Trefoil at 30 lb per acre, ryegrass at 40 lb per acre, sown: Aug 1. Varieties: Trefoil - English; Ryegrass - Western Wolths.

Barley: "Fallow" plots and "early" green manure plots ploughed: Nov 23. "Late" green manure plots ploughed: Feb 10, 1960. 'Nitro-Chalk' applied: Mar 10. Seed drilled at 2½ bushels per acre: Mar 18. Trefoil and ryegrass undersown: Apr 27. Combine harvested: Aug 18. Variety: Herta.

Standard errors per plot.

Potatoes. Total tubers: 0.944 tons per acre or 8.7% (18 d.f.)

Barley. Grain (at 85% D.M.): 2.65 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		2.6 (7.9)	0.085 (0.146)
	Ryegrass		10.3 (4.1)	0.160 (0.077)
For barley	Trefoil	Early	15.9	0.494
	Ryegrass	Early	11.6	0.312
	Trefoil	Late	15.3	0.408
	Ryegrass	Late	13.0	0.286

Note. The figures in brackets are additional amounts derived from self-sown barley.

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Summary of Results

Early potatoes, total tubers: tons per acre

	Straw: tons per acre		N: cwt per acre (including basal)		Dung to cabbages 1952: tons per acre		Mean
	None	1½	0.6	1.2	None	10	
Excluding plots fallow under old scheme							
Undersown green manures for potatoes	(±0.334)		(±0.334)		(±0.334)		(±0.236)
None	10.43	11.12	10.20	11.34	9.92	11.63	10.78
	(±0.472)		(±0.472)		(±0.472)		(±0.334)
Trefoil	11.65	10.41	10.66	11.40	10.56	11.51	11.03
Ryegrass	10.76	11.48	10.52	11.72	10.26	11.98	11.12
Straw: tons per acre			(±0.334)		(±0.334)		(±0.236)
None			10.34	11.29	9.81	11.83	10.82
1½			10.46	11.61	10.52	11.55	11.03
N: cwt per acre (including basal)							
0.6					9.58	11.21	10.40
1.2					10.74	12.16	11.45
Mean (±0.236)					10.16	11.69	10.92
Plots fallow under old scheme							
Straw: tons per acre			(±0.667)		(±0.667)		(±0.472)
None			10.49	10.25	9.94	10.80	10.37
1½			9.80	10.61	9.60	10.81	10.20
N: cwt per acre (including basal)							
0.6					9.60	10.69	10.14
1.2					9.94	10.92	10.43
Mean (±0.472)					9.77	10.80	10.28

	Undersown green manures for potatoes				
	None	None	Trefoil	Ryegrass	Mean
Old scheme	Fallow	Excluding fallow			
	10.28 (±0.334)	10.78 (±0.236)	11.03	11.12 (±0.334)	10.79

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

	Green manures: In barley for potatoes: None	Green manures: In barley for potatoes: Undersown	Green manures: After potatoes for barley: Trefoil	Green manures: After potatoes for barley: Ryegrass	N: cwt per acre (including basal): 0.23	N: cwt per acre (including basal): 0.46	Dung to cabbages 1953: tons per acre: None	Dung to cabbages 1953: tons per acre: 10	Mean
Excluding plots fallow under old scheme									
	(±0.94)		(±0.94)		(±0.94)		(±0.94)		(±0.66)
Green manures ploughed in									
Early	22.7	25.8	26.7	21.8	22.7	25.9	23.1	25.5	24.3
Late	25.3	29.3	28.1	26.5	27.3	27.4	27.1	27.5	27.3
Green manures in barley for potatoes									
None			26.7	21.4	22.4	25.6	24.2	23.9	24.0
Undersown			28.2	26.9	27.5	27.6	26.0	29.1	27.6
Green manures after potatoes for barley									
Trefoil					27.2	27.7	27.3	27.6	27.4
Ryegrass					22.7	25.6	22.9	25.4	24.1
N: cwt per acre (including basal)									
0.23							24.0	26.0	25.0
0.46							26.2	27.0	26.6
Mean (±0.66)							25.1	26.5	25.8

Old scheme	Green manures after potatoes for barley: None Fallow	Trefoil (Excluding fallow)	Ryegrass (Excluding fallow)	Mean
	21.3 (±0.937)	27.4	24.1 (±0.66)	24.9

Mean dry matter % as harvested: 81.0

Plots fallow under old scheme

N: cwt per acre (including basal)	(±1.87)		(±1.33)
0.23	20.4	18.4	19.4
0.46	24.0	22.3	23.1
Mean (±1.33)	22.2	20.3	21.3

60/B/4.3

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60/B/5.1

LEY AND ARABLE ROTATIONS

Woburn Stackyard 1960 - the 23rd year.

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

Note: On the plots of the alternating rotations the hay and carrot crops were accidentally interchanged.

Cultivations, etc.,

Treatment crops

Ley rotations

Ley 1st year. Ploughed twice: Sept 1 and Nov 30, 1959. PK fertilisers and 'Nitro-Chalk' applied: Apr 13, 1960. Seed sown at 40 lb per acre: Apr 15. 'Nitro-Chalk' applied: 2nd dressing - June 29; 3rd dressing - Aug 28. Grazed 7 circuits: June 21 - Oct 29. 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 18, June 17 and Sept 5. Grazed 9 circuits: Apr 22 - Oct 21.

Ley 3rd year. Potash and nitrogen fertiliser applied: Mar 18, June 27 and Sept 13. Grazed 6 circuits: May 2 - Oct 12.

Lucerne 1st year. Ploughed twice: Sept 1 and Nov 30, 1959. PK fertiliser applied: Apr 13, 1960. Seed sown at 25 lb per acre: Apr 15. Sprayed with miscible DDT at 3 pints in 40 gallons per acre (against weevil): May 6. Cut twice: July 28, Sept 26. Variety: Du Puits.

Lucerne 2nd year. Muriate of potash applied: Mar 24, 1960. Cut 3 times: June 7, July 28, Sept 26.

Lucerne 3rd year. Muriate of potash applied: Mar 24, 1960. No yields taken. Treated for control of stem eelworm:- Sprayed with diquat at 1½ lb in 80 gallons per acre: July 9. Ploughed: July 19. Plots 37 and 38 split for fumigation with undiluted metham sodium ("Vapam") at 1 pt to 50 sq. ft: Oct 27.

Arable rotations

Potatoes 1st course. Ploughed twice: Sept 1 and Nov 30, 1959. Compound fertiliser applied; potatoes machine planted: Apr 12, 1960. Earthed up: June 14. Sprayed with copper fungicide at 5 lb in 40 gallons per acre: July 15. Haulm destroyed mechanically: Aug 27. Lifted: Sept 30. Variety: Majestic.

Rye 2nd course. Ploughed: Oct 2, 1959. Seed drilled at 3 bushels per acre: Oct 23. 'Nitro-Chalk' applied: Mar 24,1960. Seeds hay mixture undersown on 4 plots: Apr 7. Combine harvested: Aug 20. Variety: King II.

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Seeds hay 3rd course. Seeds undersown at 30 lb per acre in rye: Apr 7, 1959. Ground chalk applied at 20 cwt per acre: Sept 1. Potash and nitrogen fertiliser applied: Mar 18,1960. 'Nitro-Chalk' applied: June 10. Cut twice: June 7 and Aug 30. Seeds mixture: 19 lb S24 Perennial Ryegrass, 9 lb Late Flowering Red Clover, 2 lb Alsike American per acre.

Carrots 3rd course. Ground chalk applied at 20 cwt per acre: Sept 1, 1959. Ploughed twice: Sept 3 and Nov 30. Potash and nitrogen fertilisers applied: Apr 29, 1960. Seed drilled at 5 lb per acre: Apr 30. Sprayed with demeton methyl at 12 fluid oz in 40 gallons per acre: June 1. Crop failed, re-drilled: June 18. Thinned: Aug 18. Sprayed with demeton methyl at 12 fluid oz in 40 gallons per acre: July 18. Lifted: Oct 17. Variety: Scarlet Intermediate.

Test crops

Sugar beet 1st test crop. Dung applied: Dec 2, 1959. Ploughed: Dec 2. Treatment fertilisers and basal compound fertilisers applied: Apr 12, 1960. Seed drilled at 12 lb per acre: Apr 13. Singled: May 26 to June 9. Sprayed with miscible DDT at 3 pints in 40 gallons per acre (against flea beetle): May 6. Sprayed with demeton methyl at 12 fluid oz in 40 gallons per acre: June 1. Lifted: Oct 11. Variety: Klein E.

Barley 2nd test crop. Ground chalk applied at 18 cwt per acre: Nov 27, 1959. Ploughed: Nov 28. Muriate of potash applied to sub plots to equalise treatment dressings to 1959 sugar beet test crop: Mar 10, 1960. Seed drilled at 2½ bushels per acre: Mar 18. Combine harvested: Aug 15. Variety: Herta.

Standard errors per plot. Test crops.

Sugar beet.	Total sugar.	Whole plot:	6.05 cwt per acre or 11.4% (4 d.f.)
		½ plot:	4.07 cwt per acre or 7.6% (4 d.f.)
		⅛ plot:	4.76 cwt per acre or 8.9% (24 d.f.)
	Tops.	Whole plot:	1.875 tons per acre or 12.0% (4 d.f.)
		½ plot:	0.709 tons per acre or 4.5% (4 d.f.)
		⅛ plot:	1.223 tons per acre or 7.8% (24 d.f.)
Barley.	Grain (at 85% dry matter).	Whole plot:	4.95 cwt per acre or 16.0% (4 d.f.)
		½ plot:	0.64 cwt per acre or 2.1% (4 d.f.)

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Summary of Results

Treatment crops

Ley, sheep days of grazing per acre

1st year	2nd year	3rd year
1458	2253	1397

Lucerne, dry matter: cwt per acre

	1st cut	2nd cut	3rd cut	Total
1st year				
Dung in 1958: tons per acre				
None	14.0	15.1		29.1
15	20.1	21.3		41.4
Difference	+6.1	+6.2		+12.3
Previous rotation				
Lucerne	15.6	17.0		32.6
Arable with hay	18.4	19.4		37.8
Mean	17.0	18.2		35.2
2nd year				
Dung in 1957: tons per acre				
None	25.5	20.5	18.3	64.3
15	28.5	24.8	20.4	73.7
Difference	+3.0	+4.3	+2.1	+9.4
Previous rotation				
Lucerne	27.3	22.1	18.7	68.1
Arable with roots	26.7	23.2	20.0	69.9
Mean	27.0	22.6	19.4	69.0

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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	12.86	94.2	39.4	45.6
15*	13.76	92.6	39.4	46.0
Difference	+0.90	-1.6	0.0	+0.4
Previous rotation				
Ley	15.36	94.4	39.8	47.7
Lucerne	14.85	96.6	39.8	45.2
Arable with hay	12.44	91.4	40.7	46.9
Arable with roots	10.60	91.1	37.2	43.4
Mean	13.31	93.4	39.4	45.8

Hay

Yield, dry matter: cwt per acre

	1st cut	2nd cut
Dung in 1956: tons per acre		
None	34.4	12.4
15	39.7	15.6
Difference	+5.3	+3.2
Previous rotation		
Ley	37.6	17.0
Arable with hay+	36.4	11.1
Mean	37.0	14.0

Carrots

	Roots washed: tons per acre	Tops tons per acre
Dung in 1956: tons per acre		
None	6.39	3.71
15	8.58	6.14
Difference	2.19	2.43
Previous rotation		
Lucerne	7.10	4.72
Arable with roots+	7.86	5.12
Mean	7.48	4.92

*Dung applied: Potatoes for test crop sugar beet in 1958.
Rye for test crop sugar beet in 1957.

+See note on page 60/B/5.1

Mean dry matter % as harvested: Rye, Grain: 78.4
Straw: 82.6

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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	17.30	16.51	14.62	16.63	16.26
Dung: tons per acre					
None	15.37	14.64	13.12	13.55	14.17
15	19.22	18.38	16.13	19.71	18.36
Difference	+3.85	+3.74	+3.01	+6.16	+4.19
Response to additional 0.72 cwt N per acre					
No dung	+0.28	+1.47	-0.75	+3.03	+1.00
Dung 15 tons per acre	-1.03	-1.67	-0.12	+1.68	-0.28
Response to additional 0.9 cwt K_2O per acre					
No dung	+0.32	-1.33	+0.32	-0.67	-0.34
Dung 15 tons per acre	+1.67	+0.07	+0.04	+0.67	+0.61
Sugar Percentage					
Mean	16.3	16.4	16.4	16.5	16.4
Dung: tons per acre					
None	16.4	16.3	16.6	16.6	16.5
15	16.2	16.5	16.2	16.3	16.3
Difference	-0.2	+0.2	-0.4	-0.3	-0.2
Response to additional 0.72 cwt N per acre					
No dung	-0.6	-0.5	-0.5	-0.3	-0.5
Dung 15 tons per acre	-0.9	-0.5	-0.5	-0.6	-0.7
Response to additional 0.9 cwt K_2O per acre					
No dung	0.0	+0.3	+0.1	-0.1	+0.1
Dung 15 tons per acre	-0.3	+0.5	-0.3	+0.4	+0.1

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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 (±4.28)	56.5	54.3	47.9	54.6	53.3
Dung: tons per acre					
None (±4.74)*	50.4	47.8	43.4	45.0	46.6
15	62.7	60.7	52.4	64.2	60.0
Difference (±4.07)	+12.3	+12.9	+9.0	+19.2	+13.4
					(±2.03)
Response to additional 0.72 cwt N per acre		(±3.37)			(±1.68)
No dung	-0.7	+3.4	-4.0	+9.1	+1.9
Dung 15 tons per acre	-7.1	-7.1	-2.2	+2.9	-3.4
Response to additional 0.9 cwt K_2O per acre		(±3.37)			(±1.68)
No dung	+0.8	-3.2	+1.3	-2.7	-0.9
Dung 15 tons per acre	+3.8	+1.9	-0.9	+3.5	+2.0
Tops: tons per acre					
Mean (±1.326)	18.60	13.51	16.19	14.21	15.63
Dung: tons per acre					
None (±1.372)*	16.72	10.87	14.24	12.51	13.58
15	20.48	16.15	18.14	15.90	17.67
Difference (±0.709)	+3.76	+5.28	+3.90	+3.39	+4.09
					(±0.354)
Response to additional 0.72 cwt N per acre		(±0.865)			(±0.432)
No dung	+3.71	+6.02	+3.79	+6.27	+4.95
Dung 15 tons per acre	+2.72	+3.32	+3.77	+3.75	+3.39
Response to additional 0.9 cwt K_2O per acre		(±0.865)			(±0.432)
No dung	+0.91	-0.25	+1.19	+0.47	+0.58
Dung 15 tons per acre	+0.97	+0.11	-0.93	-0.33	-0.05

*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		16.90	17.22	14.58	16.30	16.25
None		15.11	14.83	13.22	13.53	14.17
15		18.68	19.61	15.94	19.07	18.33
Difference		+3.57	+4.78	+2.72	+5.54	+4.16
Sugar percentage						
Mean		16.7	16.3	16.6	16.7	16.5
None		16.7	16.1	16.7	16.8	16.6
15		16.8	16.4	16.4	16.5	16.5
Difference		+0.1	+0.3	-0.3	-0.3	-0.1
Total sugar: cwt per acre						
Mean	(±3.93)	56.8	56.1	48.2	54.3	53.8
None	(±5.25)*	50.5	47.8	44.1	45.6	47.0
15		63.1	64.3	52.3	63.0	60.7
Difference	(±5.79)	+12.6	+16.5	+8.2	+17.4	+13.7
Tops: tons per acre						
Mean	(±1.105)	16.81	11.63	14.47	11.93	13.71
None	(±1.474)*	14.36	8.01	11.99	9.63	10.99
15		19.26	15.25	16.96	14.23	16.42
Difference	(±1.274)	+4.90	+7.24	+4.97	+4.60	+5.43

*For use in horizontal and diagonal comparisons only.

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2nd Test Crop

Barley

Previous rotation

Dung in 1959: tons per acre		Ley	Lucerne	Arable with hay	Arable with roots	Mean
Grain (at 85% dry matter): cwt per acre						
None	(±3.51)*	33.5	32.9	26.7	29.6	30.6
15		32.4	33.7	27.8	31.6	31.4
Mean	(±3.50)	32.9	33.3	27.3	30.6	30.9
Difference	(±0.64)	-1.1	+0.8	+1.1	+2.0	+0.8 (±0.32)
Straw (at 85% dry matter): cwt per acre						
None		26.2	22.7	21.3	22.4	23.1
15		26.4	26.3	23.0	24.9	25.1
Mean		26.3	24.5	22.1	23.6	24.1
Difference		+0.2	+3.6	+1.7	+2.5	+2.0

*For use in horizontal and diagonal comparisons only.

Mean dry matter % as harvested: Grain 80.1
Straw 77.4

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60/B/6.1

WOBURN MARKET GARDEN EXPERIMENT

Organic manures and nitrogen - Lansome Field 1960, the 19th year.

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

Note: The results for the 1960-61 leeks will be included in the 1961 report.

Area of each plot (acres): 0.0125. Area harvested: Leeks - 0.0104; globe beet - 0.0113; early potatoes - 0.0070.

Cultivations, etc.:

Leeks 1959-60. Organic manures applied: July 16, 1959. Ploughed: July 17. 'Nitra-Shell' and basal fertilisers applied: July 27. Planted: July 27 - 29. Second dressing of 'Nitra-Shell' applied: Oct 7. Harvested: Mar 4 - Apr 26, 1960. Variety: Musselburgh.

Early potatoes. Ploughed: Sept 4, 1959. Organic manures applied, ploughed second time: Jan 8, 1960. Fertilisers applied on the flat: Apr 4. Machine planted: Apr 5. Earthed up: May 17. Lifted: July 12. Variety: Arran Pilot.

Globe beet. Ground chalk applied at 18 cwt per acre: May 2, 1960. Organic manures applied, ploughed: May 3. 'Nitro-Chalk' and basal fertilisers applied: May 12. Seed drilled at 14 lb per acre: May 16. Sprayed with miscible DDT at 3 pints in 40 gallons per acre: May 30. Second dressing of 'Nitro-Chalk' applied: June 28. Harvested: Aug 4 - Sept 7. Variety: Detroit. There was no singling owing to poor stand.

Standard errors per plot:

Leeks 1959-60.	Saleable produce:	0.476 tons per acre or 6.6%	(17 d.f.)
Early potatoes.	Total tubers:	0.565 tons per acre or 6.2%	(17 d.f.)
Globe beet.	Saleable bulbs:	1.006 tons per acre or 14.7%	(17 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 1959-60. Saleable produce: tons per acre						
			(±0.336)			(±0.238)
None		5.37	6.70	6.90	6.57	6.04*
Dung	10	7.45	7.67			7.56
	20	8.35	8.14			8.24
Sludge compost	10	7.40	7.28			7.34
	20	6.87	7.50			7.18
Sludge	10	7.11	6.81			6.96
	20	6.43	7.27			6.85
Vegetable compost	10	7.69	7.98			7.84
	20	7.81	7.62			7.72
Mean (±0.119)		7.39+	7.54+			7.25**
Leeks 1959-60. Percentage saleable (by number)						
None		98.4	98.7	98.8	99.2	98.6*
Dung	10	99.5	98.8			99.2
	20	98.9	99.1			99.0
Sludge compost	10	98.9	99.2			99.1
	20	98.3	98.5			98.4
Sludge	10	99.4	98.7			99.0
	20	98.5	98.8			98.6
Vegetable compost	10	99.5	99.6			99.6
	20	99.0	99.2			99.1
Mean		99.0+	99.0+			99.0**
Early potatoes. Total tubers: tons per acre						
			(±0.400)			(±0.282)
None		6.25	7.16	8.35	9.27	6.70*
Dung	10	9.40	10.80			10.10
	20	10.39	10.69			10.54
Sludge compost	10	8.68	8.96			8.82
	20	9.41	9.20			9.30
Sludge	10	8.19	8.78			8.48
	20	9.22	9.25			9.23
Vegetable compost	10	8.87	10.78			9.83
	20	9.32	9.52			9.42
Mean (±0.141)		9.19+	9.75+			9.12**

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

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Globe beet

Organic manures	Level of manuring: tons per acre	N: cwt per acre None	0.3	0.6	0.9	Mean
Saleable bulbs: tons per acre						
			(±0.711)			(±0.503)
None		1.46	3.31	5.60	4.23	2.39*
Dung	10	5.62	8.66			7.14
	20	10.64	11.01			10.82
Sludge compost	10	4.98	6.93			5.95
	20	7.20	7.75			7.47
Sludge	10	6.42	5.19			5.80
	20	5.20	8.14			6.67
Vegetable compost	10	6.80	8.60			7.70
	20	8.34	10.90			9.62
Mean (±0.252)		6.90+	8.40+			6.85**
Total produce (whole plants): tons per acre						
None		3.61	7.04	10.52	8.34	5.33*
Dung	10	8.86	14.39			11.62
	20	17.45	17.52			17.49
Sludge compost	10	9.31	13.18			11.24
	20	13.79	13.54			13.66
Sludge	10	11.57	10.33			10.95
	20	11.47	15.89			13.68
Vegetable compost	10	11.26	13.36			12.30
	20	12.70	17.97			15.34
Mean		12.05+	14.52+			12.10**
Plant number: thousands per acre						
None		86.6	116.8	119.3	113.5	101.7*
Dung	10	80.4	126.2			103.3
	20	117.8	105.7			111.8
Sludge compost	10	83.7	137.5			110.6
	20	133.9	68.4			101.2
Sludge	10	92.3	92.1			92.2
	20	131.7	134.5			133.1
Vegetable compost	10	102.3	97.0			99.7
	20	62.7	102.8			82.8
Mean		100.6+	108.0+			105.3**

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

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60/B/7.1.

IRRIGATION EXPERIMENT

Revised 1960 (the 10th year)

The effects of irrigation and nitrogen - Woburn Butt Close 1960.

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

The 3 course rotation is now as follows:-
1st year: early potatoes (following 1959 sugar beet).
2nd year: barley (following 1959 spring beans).
3rd year: winter beans (following 1959 spring wheat).

The fourth series carries a long term ryegrass ley for cutting.

Area of each whole plot (acres): Winter beans: 0.0555.
Sub plots (acres): Grass: 0.0264; remainder: 0.0277.
Area harvested (acres): Early potatoes: 0.0075; barley: 0.0110; winter beans: 0.0177; grass: 0.0165.

Design: 4 series (1 in each crop) each containing 12 whole plots.
The bean plots are no longer split for the application of dung.

Treatments.
Early potatoes: all combinations of:-
Whole plots: Irrigation: None (0); full (C).
Weed control: normal cultivations after planting (no spray); simazine spray at 2 lb in 40 gallons per acre (used as pre-emergence weedkiller) without cultivations.
Sub plots: Nitrogen*: None, 0.6 cwt N per acre as sulphate of ammonia.

Note: After the early potatoes are lifted certain plots are sown with trefoil as a green manure for barley. Provision is made for a comparison of none v. irrigation applied to the trefoil. No irrigation was applied in 1960.

Barley: All combinations of:-
Whole plots: Irrigation: None (0), full (C).
Sub plots: Nitrogen*: None, 0.2 cwt N per acre as 'Nitro-Chalk'.

Winter beans:
Whole plots: Irrigation: None (0), three systems (A, B, C - see below).

Grass: all combinations of:-
Whole plots: Irrigation: None (0), full (C).
Potash*: None, 0.6 cwt K_2O per acre as muriate of potash applied after the 1st cut and once again in mid-season.
Sub plots: Nitrogen*: None, 0.3 cwt N per acre as 'Nitro-Chalk' in spring and after each cut except the last.

*Note: In addition to basal dressing.

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Rainfall and Irrigation: inches

Week ending	Rain-fall	Grass C	Barley C	Potatoes C	Beans A	Beans B	Beans C
May 2	0.13	0.50	0.50	0.50	-	0.50	0.50
9	0.02	0.50	-	-	-	0.50	0.50
16	0.89	0.62	-	-	-	0.50	0.50
23	0.23	-	0.50	-	-	0.50	0.50
30	0.01	0.50	0.50	0.50	-	0.67	0.67
June 6	-	0.67	0.50	0.50	0.67	0.67	0.67
13	1.26	-	-	-	-	-	-
20	0.68	-	-	-	0.20	-	0.20
27	1.68	0.50	-	0.75	-	-	-
July 4	0.01	-					
11	1.23	-					
18	1.19	-					
25	0.37	-					
Aug 1	0.38	-					
8	0.23	-					
15	0.88	-					
22	0.16	-					
29	0.87	0.50					
Sept 5	1.60	-					
12	0.16	-					
19	1.52	-					
26	(0.63)	-					
Oct 3	(0.64)	-					
Total	14.77	3.79	2.00	2.25	0.87	3.34	3.54

Basal dressings (per acre):

Early potatoes: 0.60 cwt N as sulphate of ammonia; 0.75 cwt P_2O_5 and 1.50 cwt K_2O as compound fertiliser (14% P_2O_5, 28% K_2O).

Barley: 0.2 cwt N, 0.2 cwt P_2O_5 and 0.3 cwt K_2O as compound fertiliser (12% N, 12% P_2O_5, 18% K_2O).

Winter beans: 0.3 cwt P_2O_5, 0.6 cwt K_2O placement drilled as compound fertiliser (10% P_2O_5, 20% K_2O).

Grass: 0.3 cwt N as 'Nitro-Chalk' in spring and again after each cut except the last, and 0.6 cwt P_2O_5 and 1.2 cwt K_2O as compound fertiliser (14% P_2O_5, 28% K_2O).

Cultivations, etc.:

Early potatoes: Ploughed: Nov 20, 1959. PK compound applied: Apr 4, 1960. Sulphate of ammonia applied: Apr 6. Machine planted: Apr 7. Appropriate plots sprayed with simazine: Apr 15. Earthed up (except simazine plots): June 4. Haulm destroyed mechanically: July 13. Lifted: July 15. Trefoil sown at 30 lb per acre: July 21. Variety: Arran Pilot.

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Barley: Ground chalk applied at 3 tons per acre: Sept 8, 1959. Ploughed: Sept 9 and Nov 21. Seed drilled at 2¼ bushels per acre: Mar 19, 1960. Fertilisers applied: Mar 21. Sprayed with DNBP at 10 pints in 80 gallons per acre: May 16. Combine harvested: Aug 13. Variety: Proctor.

Winter beans: Ploughed: Sept 7, 1959. Seed placement drilled at 275 lb per acre with PK compound: Nov 5. Harvested: Aug 10 and Aug 26, 1960. Variety: Rothamsted S.Q.

Grass: Ground chalk applied at 18 cwt per acre: Sept 23, 1959. Seed sown at 30 lb per acre: Oct 20. 'Nitro-Chalk' and PK compound applied: Apr 1, 1960. Cut 8 times (all plots): May 10, May 31, June 22, July 18, Aug 8, Aug 30, Sept 23, Nov 8. 'Nitro-Chalk' applied after each cut except the last. Muriate of potash applied to appropriate plots after 1st and 4th cuts. Variety: S22 Italian ryegrass.

Standard errors per plot.

Early potatoes. Total tubers
- Whole plot: 0.708 tons per acre or 7.2% (4 d.f.)
- Sub plot: 0.630 tons per acre or 6.4% (8 d.f.)

Barley, (grain at 85% dry matter)
- Whole plot: 2.51 cwt per acre or 10.2% (8 d.f.)
- Sub plot: 2.25 cwt per acre or 9.1% (10 d.f.)

Winter bean, (grain at 85% dry matter)
- Whole plot: 2.80 cwt per acre or 9.5% (6 d.f.)

Cut grass, dry matter

1st cut:
- Whole plot: 0.58 cwt per acre or 7.3% (6 d.f.)
- Sub plot: 1.44 cwt per acre or 18.2% (8 d.f.)

Total of cuts 2-4
- Whole plot: 2.03 cwt per acre or 4.2% (6 d.f.)
- Sub plot: 1.98 cwt per acre or 4.1% (8 d.f.)

Total of cuts 5-8
- Whole plot: 1.48 cwt per acre or 3.7% (6 d.f.)
- Sub plot: 2.59 cwt per acre or 6.6% (8 d.f.)

Total of all 8 cuts
- Whole plot: 2.55 cwt per acre or 2.7% (6 d.f.)
- Sub plot: 3.96 cwt per acre or 4.1% (8 d.f.)

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Summary of Results

Early potatoes, Total tubers: tons per acre

Weed control	Irrigation 0	Irrigation C	Weed control: Normal cultivation	Weed control: Simazine spray	Mean
Normal cultivation	9.73	11.97			
Simazine spray	7.88	9.56			
N: cwt per acre including basal					
	(±0.483)**		(±0.257)*		
0.6	8.12	9.65	9.98	7.79	8.89
1.2	9.50	11.88	11.71	9.66	10.69
Mean	8.81	10.76	10.85	8.72	9.79
	(±0.289)				
Difference (±0.364)	1.38	2.23	1.73	1.87	1.80 (±0.257)

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

N: cwt per acre including basal	Irrigation 0	Irrigation C	Mean
	(±1.21)		
0.2	19.2	23.3	21.3
0.4	26.8	29.4	28.1
Mean (±1.03)	23.0	26.4	24.7
Difference (±1.30)	7.6	6.1	6.8 (±0.92)

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

Irrigation 0	A	B	C	Mean
22.6	26.3	34.5	34.2	29.4
	(±1.61)			

* For use in vertical and interaction comparisons only.

** For use in horizontal and diagonal comparisons only.

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Cut grass, Dry matter: cwt per acre

1st cut

K_2O: cwt per acre (including basal) in 1959	Irrigation 0	Irrigation C	K_2O: cwt per acre including basal 1.2	K_2O: cwt per acre including basal 2.4	Mean
	(±0.33)				
1.2	7.4	7.5			
2.4	4.8	11.8			
N: cwt per acre			(±0.48)*	(±0.48)*	
0.3	5.8	9.5	8.0	7.3	7.7
0.6	6.4	9.7	6.9	9.2	8.0
Mean (±0.24)	6.1	9.6	7.4	8.3	7.9
Difference (±0.83)	+0.6	+0.2	-1.1	+1.9	+0.3 (±0.59)

Total of cuts 2 - 4

K_2O: cwt per acre including basal	Irrigation 0	Irrigation C	K_2O: cwt per acre including basal 1.2	K_2O: cwt per acre including basal 1.8	Mean
	(±1.17)				
1.2	41.4	51.5			
1.8	44.5	55.7			
N: cwt per acre			(±1.01)*	(±1.01)*	
0.3	41.7	48.7	44.2	46.3	45.2
0.6	44.1	58.4	48.6	53.9	51.3
Mean (±0.83)	42.9	53.6	46.4	50.1	48.3
Difference (±1.14)	2.4	9.7	4.4	7.6	6.1 (±0.81)

*For use in horizontal and diagonal comparisons only.

Mean dry matter % as cut:

1st cut:	20.9
Total of cuts 2 - 4:	19.0

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Cut grass, Dry matter: cwt per acre

Total of cuts 5 - 8

K_2O: cwt per acre including basal	Irrigation 0	Irrigation C	K_2O: cwt per acre including basal 1.2	K_2O: cwt per acre including basal 2.4	Mean
	(±0.85)				
1.2	38.9	35.4			
2.4	40.8	43.1			
N: cwt per acre					
	(±0.96)*		(±0.96)*		
0.3	36.7	36.9	35.0	38.7	36.8
0.6	43.0	41.5	39.3	45.2	42.3
Mean (±0.60)	39.9	39.2	37.2	41.9	39.5
Difference (±1.50)	+6.3	+4.6	+4.3	+6.5	+5.5 (±1.06)

Total of cuts 1 - 8

K_2O: cwt per acre including basal	Irrigation 0	Irrigation C	K_2O: cwt per acre including basal 1.2	K_2O: cwt per acre including basal 2.4	Mean
	(±1.47)				
1.2	87.7	94.3			
2.4	90.1	110.6			
N: cwt per acre					
	(±1.55)*		(±1.55)*		
0.3	84.2	95.2	87.1	92.3	89.7
0.6	93.5	109.7	94.9	108.3	101.6
Mean (±1.04)	88.9	102.5	91.0	100.3	95.7
Difference (±2.29)	9.3	14.5	7.8	16.0	11.9 (±1.62)

*For use in horizontal and diagonal comparisons only.

Mean dry matter % as cut:
Total of cuts 5 - 8: 15.0
Total of cuts 1 - 8: 17.3

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60/B/8.1

CONCENTRATED FERTILISER ROTATION

Concentrated compound fertiliser and forms of N - West Barnfield I 1960.

Rotation: Kale, ryegrass, barley.

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

Area of each plot (acres): 0.0174. Area harvested: Kale - 0.0086, Ryegrass - 0.0056, 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 0.1 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: Oct 30 - Nov 2, 1959. Fertilisers broadcast for barley, barley drilled at 2½ bushels per acre: Mar 26, 1960. Fertilisers broadcast for ryegrass: Mar 31. Ryegrass sown at 30 lb per acre; fertilisers applied for kale: Apr 1. Kale drilled at 3 lb per acre: Apr 8. Barley sprayed with CMPP at 6 pints in 40 gallons per acre: May 23. Grass cut: July 20. Barley combine harvested: Aug 17. Grass cut second time: Oct 3. Kale harvested: Nov 8 - 16. Varieties: Kale - Thousand head; ryegrass - S22; barley - Proctor. Previous crop: Oats.

Standard errors per plot.
- Kale, fresh weight: 1.339 tons per acre or 6.0% (13 d.f.)
- Ryegrass dry matter:
  - 1st cut 2.59 cwt per acre or 9.2% (13 d.f.)
  - 2nd cut 1.95 cwt per acre or 15.9% (13 d.f.)
  - Total of 2 cuts 3.31 cwt per acre or 8.2% (13 d.f.)
- Barley, grain (at 85% dry matter): 1.38 cwt per acre or 3.8% (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
	(±0.946)	(±1.83)	(±1.38)	(±2.34)	(±0.98)	
0	12.21	7.1	6.4	13.5	27.9	15.7
B	14.91	11.3	6.9	18.2	28.0	16.0
F_1	22.18	30.8	9.5	40.3	34.8	21.8
F_2	26.56	34.5	17.4	51.9	40.6	29.2
P_1	22.44	27.7	9.5	37.2	35.3	20.5
P_2	25.21	33.8	18.7	52.5	38.5	22.9
S_1	21.58	25.2	9.5	34.7	37.1	25.2
S_2	24.82	33.3	18.2	51.5	39.0	22.8
C_1	23.71	30.7	8.3	39.0	35.1	22.8
C_2	24.43	31.0	18.1	49.0	38.2	24.3
U_1	21.45	27.2	8.1	35.3	34.1	21.2
U_2	24.49	32.9	13.6	46.5	38.0	25.9
A_1	22.04	32.5	10.3	42.8	35.1	23.4
A_2	24.75	34.8	17.7	52.5	39.9	27.3
Mean	22.20	28.0	12.3	40.3	35.8	22.8
Mean dry matter % as harvested:		16.3	20.7	18.5	82.2	69.2

Treatments

0 = No fertiliser
B = P_2O_5 and K_2O each at 0.3 cwt to barley and each at 0.1 cwt 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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60/B/9.1

RESIDUAL PHOSPHATE ROTATIONS

The long term and residual effects of a number of phosphate fertilisers compared with superphosphate - Great Field IV and Sawyers I 1960.

Design: Great Field IV: 1 randomised block of 12 plots per crop.
Sawyers I: 2 randomised blocks of 12 plots each 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):
Phosphate fertilisers applied: Sept 23 - 24, 1959. Ploughed: Sept 25 - 26. Balancing potassium sulphate applied: Nov 3. Ploughed second time: Nov 9 - 27. Rotary hoed twice: Mar 7 - 8, 1960.

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Potatoes: Basal fertilisers and spring superphosphate applied: Apr 8, 1960. Planted: Apr 13. Earthed up: June 20 - 21. Sprayed with copper fungicide at 5 lb in 40 gallons per acre: July 16. Sawyers I sprayed with sulphuric acid, 15% BOV, at 100 gallons per acre: Aug 31; and again, 10% BOV, at 100 gallons per acre: Sept 13. Great Field IV sprayed with sulphuric acid, 15% BOV, at 100 gallons per acre: Sept 13. Haulm on Great Field IV destroyed mechanically: Sept 19. Lifted: Oct 4 - 5. Variety: Majestic.

Barley: Basal fertilisers and spring superphosphate applied, seed drilled at 2¼ bushels per acre: Mar 18, 1960. Sawyers I sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 10. Great Field IV sprayed with CMPP at 6 pints in 40 gallons per acre: May 25. Combine harvested: Aug 17. Variety: Proctor.

Swedes: Basal fertilisers and spring superphosphate applied: May 10 - 11, 1960. Hand drilled at 3 lb per acre: May 16. Singled: June 16 - 19. Lifted: Oct 28 - 31. Variety: Wilhelmsburger.

Previous crop (both fields): Fallow.

Standard errors per plot.

Sawyers I

Potatoes, Total tubers: 0.927 tons per acre or 5.9% (13 d.f.)

Barley, Grain (at 85% dry matter): 2.06 cwt per acre or 5.6% (13 d.f.)

Swedes, roots: 3.597 tons per acre or 18.4% (13 d.f.)

Summary of Results

Potatoes

Phosphate	Total tubers: tons per acre				Percentage ware (1½" riddle)			
	Great Field IV		Sawyers I		Great Field IV		Sawyers I	
	Mean	Increase	Mean	Increase	Mean	Increase	Mean	Increase
			(±0.655)	(±0.757)				
None (1,4,5)	15.52		13.63(1)		95.8		95.4	
2	15.38	-0.14	13.69	+0.06	94.0	-1.8	93.4	-2.0
3	18.04	+2.52	14.20	+0.57	91.7	-4.1	94.5	-0.9
6	19.66	+4.14	17.80	+4.17	91.9	-3.9	92.7	-2.7
7	19.28	+3.76	17.38	+3.75	92.2	-3.6	92.1	-3.3
8	20.27	+4.75	17.97	+4.34	92.9	-2.9	93.1	-2.3
9	18.64	+3.12	15.90	+2.27	91.7	-4.1	93.8	-1.6
10	21.09	+5.57	16.67	+3.04	91.2	-4.6	93.2	-2.2
11	20.36	+4.84	17.44	+3.81	93.6	-2.2	94.2	-1.2
12	19.59	+4.07	17.85	+4.22	94.7	-1.1	92.9	-2.5
Mean	18.24		15.81		93.4		93.8	

(1) (±0.378)

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Phosphate	Great Field IV Mean	Great Field IV Increase	Sawyers I Mean	Sawyers I Increase	Great Field IV Mean	Great Field IV Increase	Sawyers I Mean	Sawyers I Increase
	Barley							
	Grain (at 85% dry matter) cwt per acre				Straw (at 85% dry matter) cwt per acre			
			(±1.46)	(±1.69)				
None (1,4,5)	31.3		30.2(1)		30.6		18.9	
2	33.0	+1.7	35.4	+5.2	28.3	-2.3	21.1	+2.2
3	33.1	+1.8	36.1	+5.9	29.7	-0.9	20.7	+1.8
6	33.9	+2.6	37.7	+7.5	31.9	+1.3	23.5	+4.6
7	37.5	+6.2	35.5	+5.3	35.7	+5.1	26.9	+8.0
8	33.5	+2.2	39.0	+8.8	37.4	+6.8	27.3	+8.4
9	35.4	+4.1	41.4	+11.2	37.1	+6.5	22.8	+3.9
10	35.0	+3.7	42.6	+12.4	36.8	+6.2	25.3	+6.4
11	37.7	+6.4	41.5	+11.3	35.3	+4.7	24.1	+5.2
12	40.2	+8.9	39.8	+9.6	39.6	+9.0	24.0	+5.1
Mean	34.4		36.6		33.6		22.7	
Mean dry matter % as harvested:	82.4		79.7		62.8		67.4	

(1) (±0.84)

Swedes, Roots: tons per acre

			(±2.543)	(±2.937)
None (1,4,5)	10.97		10.53(1)	
2	19.08	+8.11	15.18	+4.65
3	18.97	+8.00	18.40	+7.87
6	20.06	+9.09	23.41	+12.88
7	23.09	+12.12	23.81	+13.28
8	22.09	+11.12	21.54	+11.01
9	24.12	+13.15	24.13	+13.60
10	19.23	+8.26	27.17	+16.64
11	23.71	+12.74	25.25	+14.72
12	24.00	+13.03	24.57	+14.04
Mean	18.94		19.59	

(1) (±1.468)

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60/B/10.1

N LEVELS AND RESIDUES ROTATION

Direct and residual effects of sulphate of ammonia - Long Hoos III
1960 (preliminary year).

Rotation: Wheat, potatoes.

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

Area of each plot (acres): 0.0212. Area harvested: Wheat - 0.0141;
Potatoes - 0.0035.

Treatments:
Nitrogen (applied as sulphate of ammonia).
To wheat: None; 0.5; 1.0 cwt per acre.
To potatoes: None; 0.75; 1.5 cwt per acre.
(Three plots per block for each treatment in 1960.)

Basal dressing (per acre):
To wheat: $2\frac{1}{2}$ cwt compound fertiliser, 12% P_2O_5, 24% K_2O combine drilled.
To potatoes: 6 cwt compound fertiliser, 12% P_2O_5, 24% K_2O, broadcast on the flat.

Cultivations, etc.: All land ploughed: Nov 3, 1959.
Wheat: Combine drilled with basal fertiliser, sulphate of ammonia broadcast by hand: Mar 19, 1960. Sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 10. Combine harvested: Sept 13. Variety: Jufy I. Previous crop: Spring wheat.

Potatoes: Basal fertiliser and sulphate of ammonia broadcast on flat: Apr 13, 1960. Ridged, potatoes planted: Apr 14. Earthed up: June 21. Sprayed with copper fungicide at 5 lb in 40 gallons per acre: July 15 and Aug 9. Sprayed with undiluted BOV at 15 gallons per acre: Aug 31. Haulm destroyed mechanically: Sept 21. Lifted: Dec 1.* Variety: Ulster Supreme. Previous crop: Spring wheat.

*Hand dug. Harvested area very much reduced, because of wet conditions.

Standard errors per plot.
Wheat, grain (at 85% dry matter): 2.48 cwt per acre or 10.4% (22 d.f.)
Potatoes, total tubers: 0.942 tons per acre or 6.1% (22 d.f.)

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Summary of Results

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

N: cwt per acre			
None	0.5	1.0	Mean
16.4	24.8 (±0.83)	30.3	23.8

Mean dry matter % as harvested: 82.3

Potatoes

N: cwt per acre			
None	0.75	1.50	Mean
	Total tubers: tons per acre		
11.99	16.33 (±0.314)	17.71	15.34
	Percentage ware (1½" riddle)		
96.1	97.5	98.0	97.2

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60/B/11.1

TRIAZINE WEEDKILLER ROTATIONS

The direct and residual effects of triazine weedkillers - Rothamsted (R) Great Knott II and Woburn (W) Great Hill I and II 1960.

Owing to the unsuitability of the Rothamsted site this experiment is discontinued. The Woburn experiment will be continued in 1961 in an altered form.

Rotations: Great Knott II (R): Winter beans, winter wheat, potatoes, barley.
Great Hill I and II (W): Potatoes, barley.

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

Area of each plot (acres):
Great Knott II (R): 0.0636
Great Hill I and II (W): 0.0482

Area harvested (acres):
Winter beans - 0.0139, winter wheat - 0.0150, potatoes - 0.0035, barley - 0.0139.
Potatoes - 0.0107, barley - 0.0115.

Treatments.

Great Knott II (R): All plots were ploughed and received normal cultivations before planting. The potato plots were also rotary cultivated. Cultivations described below were carried out after planting.

To potatoes and beans:
- No cultivations (0)
- Normal weed control cultivations (N)
- No cultivations, 1 lb simazine+ (1)
- No cultivations, 2 lb simazine+ (2)

To potatoes only:
- 2 lb simazine+, then potatoes grubbed and earthed up (2E)
- Potatoes grubbed and earthed up and later 2 lb simazine+ applied before crop emergence (2L)

To beans only:
- Normal weed control cultivations, 1 lb simazine+ in autumn and 1 lb simazine+ in spring (2D)

The barley and wheat plots were split* for 0 v. hormone spray for weed control.

Great Hill I and II (W):

To potatoes only:
As above (excluding treatment 2D) except that the plots were not rotary cultivated.

The barley plots were split* for 0 v. hormone spray for weed control.

*1 plot per block was not split, but received hormone spray only. It was intended that it should be followed by a "No weed control" treatment. The yields from these plots are not presented.

+In 40 gallons per acre

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Note: 2 plots for each of treatments 1, 2, N, 2D were included in each block to accommodate a comparison between ploughing and no ploughing in later seasons.

Basal dressings per acre:

Great Knott II (R):

Beans: 4½ cwt compound fertiliser (12% P_2O_5, 24% K_2O) placement drilled.

Wheat: 2½ cwt compound fertiliser (6% N, 15% P_2O_5, 15% K_2O) combine drilled: 3½ cwt sulphate of ammonia top dressed.

Potatoes: 10 tons dung: 8 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.

Great Hill I and II (W):

Potatoes: 14 tons dung: 12 cwt compound fertiliser (10% N, 10% P_2O_5, 18% K_2O).

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

Cultivations, etc.:

Great Knott II (R):

Beans: Ground chalk applied at 2 tons per acre: Oct 1, 1959. Ploughed: Oct 3. Seed placement drilled at 275 lb per acre with basal fertiliser: Oct 16. Simazine applied to appropriate plots: Oct 30 and Mar 22, 1960. Treatment N harrowed: Apr 4. Treatment N horse-hoed: Apr 12, Apr 29, May 2. Combine harvested: Aug 20. Variety S.Q. The crop was poor and on one block certain plots were discarded.

Wheat: Ground chalk applied at 2 tons per acre: Oct 1, 1959. Ploughed: Oct 3. Seed combine drilled at 2¾ bushels per acre with basal fertiliser: Oct 16. Top dressed with sulphate of ammonia: Apr 14, 1960. Appropriate sub plots sprayed with CMPP at 6 pints in 40 gallons per acre: Apr 22. Combine harvested: Aug 30. Variety: Cappelle.

Potatoes: Ploughed: Oct 3, 1959. Dung applied: Jan 15 - Feb 9, 1960. Ploughed 2nd time: Feb 10. Basal fertiliser applied: Mar 28. Rotary cultivated: Apr 14. Potatoes planted: Apr 19. Simazine applied (excluding treatment 2L): Apr 30. Treatments N and 2L tractor weeded: May 16 and May 25. Treatments N and 2L grubbed: May 26. Treatment 2L earthed up and sprayed with simazine: May 27. Treatments N and 2E grubbed: June 17. Treatments N and 2E earthed up: June 20. Sprayed with copper fungicide at 5 lb in 40 gallons per acre: July 16 and Aug 10. Sprayed with undiluted BOV at 15 gallons per acre: Aug 31. Haulm destroyed mechanically: Sept 22. Lifted*: Nov 30. Variety: Ulster Supreme.

*Hand dug. Harvested area much reduced owing to wet condition.

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Barley: Ploughed: Oct 3, 1959. Seed combine drilled at 2 bushels per acre with basal fertiliser: Mar 7, 1960. Appropriate sub plots sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 10. Combine harvested: Aug 16. Variety: Proctor. Previous crop (whole area): Spring wheat

Great Hill I and II (W):

Potatoes: Dung applied at 14 tons per acre; ploughed: Feb 24, 1960. Basal fertiliser applied: Apr 19. Potatoes planted: Apr 20. Simazine applied (excluding 2L plots): May 2. Treatments N, 2L tractor weeded: May 7. Treatment 2L grubbed and earthed up and simazine applied: May 23. Treatment N tractor weeded: May 31. Treatment N grubbed: June 14. Treatment 2E grubbed, treatments N, 2E earthed up: June 18. Sprayed with zineb at 2 lb in 40 gallons per acre: July 15. Sprayed with copper fungicide at 5 lb in 40 gallons: July 26. Sprayed with undiluted BOV at 15 gallons per acre: Sept 8. Haulm destroyed mechanically: Sept 15. Lifted: Sept 26. Variety: Ulster Supreme. Previous crop: Barley

Barley: Ploughed: Jan 4 - 5, 1960. Seed combine drilled at 2¼ bushels per acre with basal fertiliser: Mar 25. Appropriate sub plots sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 7. Combine harvested: Aug 22. Variety: Proctor. Previous crop: Potatoes.

Standard errors per plot.

Great Knott II (R).

Winter wheat, grain (at 85% dry matter): 3.23 cwt per acre or 8.3% (13 d.f.)

Potatoes, total tubers: 0.615 tons per acre or 5.3% (11 d.f.)

Barley, grain (at 85% dry matter): 0.87 cwt per acre or 2.5% (15 d.f.)

Great Hill I and II (W).

Potatoes, total tubers: 2.142 tons per acre or 10.0% (11 d.f.)

Barley, grain (at 85% dry matter): 1.33 cwt per acre or 6.0% (15 d.f.)

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Summary of Results

Winter beans Great Knott II (R)

Treatment 0	N	1	2	2D	Mean
Grain (at 85% dry matter): cwt per acre					
24.4	26.8	28.1	23.0	25.2	25.6

Mean dry matter % as harvested: 79.1

Winter wheat Great Knott II (R)

Hormone None	Sprayed	Mean	Difference
Grain (at 85% dry matter): cwt per acre			
38.8	39.3	39.0	+0.5 (±1.22)

Mean dry matter % as harvested: 79.7

Potatoes

	Treatment 0	N	1	2	2E	2L	Mean
Total tubers: tons per acre Great Knott II (R)							
Mean	8.71 (±0.435)	14.16	9.86 (±0.307)	11.86	11.84 (±0.435)	12.14	11.61
Increase		+5.45	+1.15 (±0.533)	+3.15	+3.13 (±0.615)	+3.43	
Total tubers: tons per acre Great Hill I and II (W)							
Mean	21.61 (±1.514)	24.24	19.56 (±1.071)	21.01	22.38 (±1.514)	19.15	21.42
Increase		+2.63	-2.05 (±1.906)	-0.60	+0.77 (±2.201)	-2.46	

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Potatoes

	Treatment 0	N	1	2	2E	2L	Mean
Percentage ware ($1\frac{1}{2}$" riddle) Great Knott II (R)							
Mean	96.0	97.8	96.4	97.0	96.8	98.0	97.0
Increase		+1.8	+0.4	+1.0	+0.8	+2.0	
Percentage ware ($1\frac{3}{8}$" riddle) Great Hill I and II (W)							
Mean	99.5	99.4	99.4	99.6	99.6	99.1	99.4
Increase		-0.1	-0.1	+0.1	+0.1	-0.4	

Barley

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

Hormone None	Sprayed	Mean	Difference
Great Knott II (R)			
34.8	33.9	34.3	-0.9 (±0.31)
Great Hill I and II (W)			
21.9	22.6	22.3	+0.7 (±0.47)

Mean dry matter % as harvested: Great Knott II (R) 81.2
Great Hill I and II (W) 79.0

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60/Ca/1.1

WINTER WHEAT

Sowing dates, seed rates and levels of nitrogen (after non-cereal crop) - Great Knott III 1960.

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

Area of each sub plot: 0.0193 acres. Area harvested: 0.0126 acres.

Treatments. All combinations of:-

Whole plots. Sowing dates: Oct 2; Oct 21; Nov 23; Dec 18, 1959.
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 Feb 17 and Apr 28.

Basal dressing: 3 cwt compound fertilizer (10% P_2O_5, 20% K_2O) per acre broadcast in seed bed, 3 cwt compound fertilizer (5% N, 12½% P_2O_5, 12½% K_2O) per acre combine drilled with seed.

Cultivations, etc.: Ploughed: Sept 8, 1959. Compound fertilizer applied: First sowing - Sept 28; second sowing - Oct 20; third sowing - Nov 17; fourth sowing - Dec 17. Sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: Apr 22, 1960. Combine harvested: Aug 30. Variety: Cappelle. Previous crops: 1957 - Spring wheat; 1958 - Spring beans; 1959 - Early potatoes.

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

Standard errors per plot, Grain (at 85% dry matter):
Whole plot: 1.93 cwt per acre or 4.0% (22 d.f.)
Sub plot: 2.00 cwt per acre or 4.1% (24 d.f.)

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60/Ca/1.2

Summary of Results

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

Seed rate: bushels per acre	Date of sowing: Oct 2nd	Oct 21st	Nov 23rd	Dec 18th	N: cwt per acre (including basal) 0.6	1.1	Diff.	Mean
	(±1.11)				(±0.69)*		(±0.82)	(±0.56)
2	50.8	48.6	47.8	44.8	47.4	48.5	+1.1	48.0
3	51.4	48.9	48.8	46.4	48.5	49.2	+0.7	48.9
4	52.0	43.5	47.4	50.5	48.8	47.9	-0.9	48.3
				Date of sowing	(±0.80)*		(±0.94)	(±0.64)
				Oct 2nd	50.3	52.5	+2.2	51.4
				Oct 21st	47.5	46.4	-1.1	47.0
				Nov 23rd	49.1	46.9	-2.2	48.0
				Dec 18th	46.0	48.4	+2.4	47.2
				Mean	48.2	48.5	+0.3 (±0.47)	48.4

*For use in vertical and diagonal comparisons only.

Mean dry matter % as harvested: 78.6

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60/Ca/2.1

WINTER WHEAT

Sowing dates, seed rates and levels of nitrogen (after cereal crop) - Great Knott III 1960.

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

Area of each sub plot: 0.0148 acres. Area harvested: 0.0096 acres.

Treatments. All combinations of:-

Whole plots. Sowing dates: Oct 2; Oct 21; Nov 23; Dec 18, 1959.
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 Feb 18 and Apr 28.

Basal dressing: 3 cwt compound fertilizer (10% P_2O_5, 20% K_2O) per acre broadcast in seed bed, 3 cwt compound fertilizer (5% N, 12½% P_2O_5, 12½% K_2O) per acre combine drilled with seed.

Cultivations, etc.: Sprayed with 2-4D at 1¾ pints in 40 gallons per acre: Aug 28, 1959. Ploughed: Sept 9. Compound fertilizer applied: First sowing - Sept 28; second sowing - Oct 20; third sowing - Nov 17; fourth sowing - Dec 17. Sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: Apr 22, 1960. Combine harvested: Aug 30. Variety: Cappelle. Previous crops: 1957 - Spring wheat; 1958 - Barley; 1959 - 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: 1.83 cwt per acre or 5.5% (14 d.f.)
Sub plot: 1.95 cwt per acre or 5.9% (16 d.f.)

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Summary of Results

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

Seed rate: bushels per acre	Date of sowing: Oct 2nd	Oct 21st	Nov 23rd	Dec 18th	N: cwt per acre (including basal) 0.6	1.1	Diff.	Mean
	(±1.06)				(±0.66)*		(±0.80)	(±0.53)
2	31.2	35.0	34.9	30.9	29.3	36.6	7.3	33.0
4	33.1	31.7	34.4	35.2	31.3	35.9	4.6	33.6

Date of sowing	(±0.94)*		(±1.13)	(±0.75)
Oct 2nd	28.5	35.7	7.2	32.1
Oct 21st	30.6	36.1	5.5	33.3
Nov 23rd	31.2	38.1	6.9	34.6
Dec 18th	30.9	35.1	4.2	33.0
Mean	30.3	36.3	6.0 (±0.56)	33.3

*For use in vertical and diagonal comparisons only.

Mean dry matter % as harvested: 80.0

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60/Ca/3.1

WINTER WHEAT

Row spacing, seed rates and nitrogen - Highfield Drive 1960.

Design: 2 replicates of a 3 × 2 × 3 experiment arranged in 6 blocks of 6 plots each, certain interactions being confounded with block differences.

Area of each plot: 0.0148 acres. Area harvested: 0.0100 acres.

Treatments. All combinations of:-
Row spacing: 7"; 14"; 7" with every 4th row blank (7B).
Seed rate bushels per acre: 2; 4 when all coulters sowing.
Levels of nitrogen (excluding basal): 0.5; 1.0; 1.5 cwt N per acre as 'Nitro-Chalk' 21.

Basal dressing: $2\frac{1}{2}$ cwt compound fertiliser (6% N, 15% P_2O_5, 15% K_2O) per acre combine drilled.

Cultivations, etc.: Ploughed: Sept 4, 1959. Ground chalk applied at 4.6 tons per acre: Sept 30. Seed combine drilled: Oct 10. 'Nitro-Chalk' applied: Feb 29, 1960. Sprayed with CMPP at 6 pints in 40 gallons per acre: Apr 21. Combine harvested: Aug 31. Variety: Cappelle. Previous crop: Beans.

Standard error per plot.
Grain (at 85% dry matter): 2.032 cwt per acre or 5.5% (13 d.f.)

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

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Summary of Results

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

Seed rate: bushels per acre	Row spacing: inches 7	14	7B
		(±0.83)	
2	40.3	36.5	37.8
4	35.1	37.0	36.1
Diff (±1.17)	-5.2	+0.5	-1.7

N cwt per acre including basal	Row spacing: inches 7	14	7B	Seed rate: bushels per acre 2	4	Mean	Diff.
		(±1.06)		(±0.83)		(±0.59)	(±1.17)
.65	41.9	38.4	38.8	40.5	38.9	39.7	-1.6
1.15	37.6	36.0	35.2	37.5	35.0	36.3	-2.5
1.65	33.8	35.8	36.8	36.6	34.3	35.4	-2.3
Mean (±0.59)	37.7	36.7	36.9	38.2	36.1	37.1	-2.1 (±0.68)

Mean dry matter % as harvested: 80.9

B = Every 4th row blank.

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WINTER WHEAT

The comparison of clover and grass leys as a preparation for wheat - West Barnfield II 1960.

Design: 4 randomised blocks of 16 plots each.

Area of each plot: 0.0146 acres.

Treatments. All combinations of:-

Nitrogen to Leys 1959:-

To clover: None (C_0)
To ryegrass: None (R_0), R1 and R2
Where R_1 = 0.6 cwt N per acre in spring, 0.15 cwt N after 1st hay cut.
R_2 = 1.2 cwt N per acre in spring, 0.30 cwt N after 1st hay cut.

Nitrogen to Wheat 1960:-

None; 0.25, 0.50, 0.75 cwt N per acre as top dressing, half in March and half in April.
The nitrogenwas applied as 'Nitro-Chalk'.

Basal dressings per acre:
To barley nurse crop 1958: 3 cwt compound fertiliser (10% P_2O_5, 20% K_2O) combine-drilled; 2 cwt sulphate of ammonia in seedbed.
To leys combine-drilled 1958: 1 cwt superphosphate.
To wheat 1960: 2 cwt compound fertiliser (16% P_2O_5, 16% K_2O) combine-drilled.

Cultivations, etc.: Ploughed: Aug 19, 1959. Seed combine-drilled at 180 lb per acre: Oct 16. Nitrogen applied: Mar 7 and Apr 27, 1960. Sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: Apr 29. Combine-harvested: Aug 30. Variety: Cappelle.

Standard error per plot.
Grain (at 85% dry matter) cwt per acre: 1.89 cwt per acre or 4.8% (45 d.f.)

Note: For details of the previous year's results see 'Results of the Field Experiments' 59/Cg/4.

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Summary of Results

Treatment in 1959

N in 1960: cwt per acre	C_0	R_0	R_1	R_2	Mean
Grain (at 85% dry matter): cwt per acre					
		(±0.94)			(±0.46)
None	34.3	29.7	31.4	32.7	32.0
0.25	38.4	38.1	37.9	36.7	37.8
0.50	42.9	44.2	40.9	42.1	42.5
0.75	45.3	47.9	44.5	43.5	45.3
Mean (±0.46)	40.2	40.0	38.7	38.7	39.3
Straw (at 85% dry matter): cwt per acre					
None	27.9	20.7	25.9	23.0	24.4
0.25	26.5	26.5	23.3	26.1	25.6
0.50	33.7	30.6	26.0	29.7	30.0
0.75	35.2	31.1	31.3	27.7	31.3
Mean	30.8	27.2	26.6	26.6	27.8

Treatment in 1959

To clover C_0 = None
To ryegrass R_0 = None
R_1 = 0.6 cwt N per acre in spring, 0.15 cwt N after 1st hay cut.
R_2 = 1.2 cwt N per acre in spring, 0.30 cwt N after 1st hay cut.

Mean dry matter % as harvested: Grain 80.6
Straw 87.8

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60/Ca/5

WINTER WHEAT

Comparison of the standard with the precision drill - Great Knott I 1960.

Design: 4 randomised blocks of 6 plots each.

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

Treatments. All combinations of:-
Drills: Standard; precision.
Seed rates: 1; 2; 3 bushels per acre.

Basal dressing: 3 cwt compound fertiliser (6% N, 15% P_2O_5, 15% K_2O) per acre broadcast in seed bed and 5 cwt per acre sulphate of ammonia applied in spring.

Cultivations, etc.: Ploughed: Oct 13, 1959. Seed drilled, basal fertiliser applied: Oct 24. Sulphate of ammonia applied: Apr 8, 1960. Sprayed with CMPP at 6 pints in 40 gallons per acre: Apr 22. Combine harvested: Aug 30. Variety: Cappelle. Previous crop: Beans.

Note. Plant counts were made shortly after germination.

Standard error per plot.
Grain (at 85% dry matter): 1.40 cwt per acre or 2.7% (15 d.f.)

Summary of Results

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

Drill	Seed rate bushels per acre 1	2	3	Mean
		(±0.70)		(±0.40)
Standard	51.0	53.2	53.7	52.6
Precision	51.6	53.6	52.5	52.6
Mean (±0.49)	51.3	53.4	53.1	52.6

Mean dry matter % as harvested: 80.0

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60/Ca/6.1

SPRING WHEAT

Forms of N and methods of application - Little Knott I 1960.

Design: 4 × 2 × 4 in 6 blocks of 16, with certain high order interactions partially confounded with block differences, plus 2 control plots per block.

Area of each plot: 0.0097 acres.

Treatments: No nitrogen and all combinations of:-

Forms of N: Ammonium sulphate 21% N (S)
Calcium nitrate 15.5% N (C)
Ammonium nitrate 23% N (A)
or Urea 45.6% N (U)

Levels of N: 0.4; 0.8 cwt N per acre.

Methods of application: Broadcast (B), combine drilled (D), side band placed (P), top dressed (T).

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

Cultivations, etc.: Ploughed: Nov 11, 1959. Ground chalk applied at 23 cwt per acre: Feb 24 - Mar 2, 1960. Seed drilled at 3 bushels per acre and seedbed fertilisers applied: Mar 22. Nitrogen top dressings applied: May 2. Sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 10. Combine harvested: Sept 13. Variety: Jufy II Previous crop: Oats.

Standard error per plot.
Grain (at 85% dry matter): 2.01 cwt per acre or 5.8% (67 d.f.)

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Summary of Results

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

	Form of N				
	S	C	A	U	Mean
Mean (±0.41)	34.6	36.0	35.4	35.4	35.4 (±0.21)
N: cwt per acre					
0.4 (±0.58)	33.8	35.3	34.4	34.9	34.6
0.8 (±0.58)	35.3	36.8	36.4	35.9	36.1
Diff. (±0.82)	+1.5	+1.5	+2.0	+1.0	+1.5 (±0.41)
Method of application					
B (±0.82)	34.0	34.2	34.1	35.2	34.4
D (±0.82)	34.5	36.4	36.2	35.9	35.7 (±0.41)
P (±0.82)	36.3	37.5	35.4	34.9	36.0
T (±0.82)	33.4	36.0	36.0	35.8	35.3

	Method of application			
	B	D	P	T
N: cwt per acre				
0.4 (±0.58)	33.1	35.3	35.4	34.6
0.8 (±0.58)	35.6	36.2	36.7	36.0
Diff. (±0.82)	+2.5	+0.9	+1.3	+1.4

Control: 29.9 (±0.58)

General Mean 34.8

Mean dry matter % as harvested (all plots): 84.4

Form of N
S = Ammonium sulphate 21% N
C = Calcium nitrate 15.5% N
A = Ammonium nitrate 23% N
U = Urea 45.6% N

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

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60/Ca/7.1

SPRING WHEAT

Combine drilling of nitrogen - Rothamsted (R) Little Knott I and Woburn (W) Lansome Field 1960.

Design (each field): 4 randomised blocks of 7 plots each.

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

Treatments:

No nitrogen. 0.41 cwt N per acre (N_1); 0.82* cwt N per acre (N_2) either broadcast as sulphate of ammonia or combine drilled as part of a compound fertiliser.

0.41 cwt N per acre as above plus 0.35 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.

*Note: 0.88 on Lansome Field, Woburn.

Basal dressing per acre: combine drilled

(a) on the plots receiving drilled nitrogen, as compounds N_1, N_2:-
Little Knott I (R): 0.46 cwt P_2O_5; 0.46 cwt K_2O.
Lansome Field (W): 0.49 cwt P_2O_5; 0.49 cwt K_2O.

(b) on the no nitrogen and broadcast nitrogen plots: as compound 16% P_2O_5, 16% K_2O:-
Little Knott I (R): 0.46 cwt P_2O_5; 0.46 cwt K_2O.
Lansome Field (W): 0.60 cwt P_2O_5; 0.60 cwt K_2O.

Note: The rates of application aimed at were N_1, 0.45; N_2, 0.8; N top-dressed, 0.35 cwt per acre; basal P_2O_5 and K_2O, 0.45 cwt per acre. The discrepancies were due to machine application.

Cultivations, etc.:

Little Knott I (R): Ploughed: Nov 10, 1959. Ground chalk applied at 23 cwt per acre: Feb 24 - Mar 2, 1960. Seed combine drilled at 2¾ bushels per acre, sulphate of ammonia applied: Mar 21. 'Nitro-Chalk' top dressings applied: Apr 22. Sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 10. Combine harvested: Sept 13. Variety: Jufy I. Previous crop: Oats.

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Lansome Field (W): Sprayed twice with sodium trichloroacetate at 15 lb in 40 gallons per acre: Nov 17 and Dec 29, 1959. Ground chalk applied at 46 cwt per acre: Feb 16, 1960. Seed combine drilled at 2¾ bushels per acre, sulphate of ammonia applied: Mar 22. Sprayed with 2,4-D butoxyethyl ester at ½ pint in 40 gallons per acre: May 7. Combine harvested: Sept 10. Variety: Jufy I. Previous crop: Potatoes.

Note: Plant counts at germination were made.

Standard errors per plot, Grain (at 85% dry matter):
Little Knott (R): 2.06 cwt per acre or 6.5% (18 d.f.)
Lansome Field (W): 1.58 cwt per acre or 8.4% (18 d.f.)

Summary of Results

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

N: cwt per acre

	Broadcast			Drilled			
None	0.41	0.82*	0.41 & 0.35+	0.41	0.82	0.41 & 0.35+	Mean
Little Knott I (R)							
26.9	31.5	33.3	32.5 (±1.03)	31.4	33.1	34.8	31.9

Mean dry matter % as harvested: 83.2

Lansome Field (W)							
14.2	17.9	19.9	20.8 (±0.79)	19.5	20.7	18.5	18.8

Mean dry matter % as harvested: 80.3

*0.88 at Woburn

+Top dressing.

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BARLEY

Direct and residual effects of N fertilisers - Harwoods Piece 1960.

Design: 2 × 8 × 2 factorial in 4 randomised blocks of 16 plots each, with certain high order interactions partially confounded with block differences.

Area of each plot: 0.0087 acres. Area harvested: 0.0078 acres.

Treatments. All combinations of:-
N (applied 1960): None; 0.5 cwt per acre applied as 'Nitro-Chalk'.
Residuals of N fertilisers applied in 1958 and 1959 to grass. See 'Results of the Field Experiments' 58/Cg/1 and 59/Cg/1.

Basal manuring per acre: 2 cwt compound fertiliser (14% P_2O_5, 28% K_2O) combine drilled.

Cultivations, etc.: Ploughed: Dec 2, 1959. N applied, seed combine drilled at 2 bushels per acre: Mar 28, 1960. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 24. Combine harvested: Aug 18. Variety: Proctor. Previous crop: Italian ryegrass.

Standard error per plot.
Grain (at 85% dry matter): 2.59 cwt per acre or 8.0% (29 d.f.)

https://doi.org/10.23637/ERADOC-1-180

Summary of Results

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

	Fertiliser: Ureaformaldehyde applied				'Nitro-Chalk' applied				
	None	1958	1959	1958 & 1959	As single dressing spring 1959	1958	1959	1958 & 1959	Mean
Mean (±0.91)	29.6	32.0	32.4	33.0	32.0	32.1	33.2	33.9	32.3
N: cwt per acre in 1960					(±1.29)				
None	22.6	28.3	27.5	29.4	26.5	28.8	28.6	30.5	27.8
0.5	36.7	35.8	37.2	36.7	37.4	35.4	37.8	37.3	36.8
Diff. (±1.83)	+14.1	+7.5	+9.7	+7.3	+10.9	+6.6	+9.2	+6.8	+9.0 (±0.65)
N: cwt per acre in 1959					(±1.29)				
1.0		32.4	32.1	31.8	30.9	32.1	31.8	32.8	32.0 (±0.49)
2.0		31.7	32.6	34.3	33.0	32.1	34.6	35.0	33.3
Diff. (±1.83)		-0.7	+0.5	+2.5	+2.1	0.0	+2.8	+2.2	+1.3 (±0.69)

Mean dry matter % as harvested: 80.2

60/Cb/1.2

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

	Fertiliser								
		Ureaformaldehyde applied			'Nitro-Chalk' applied				
	None	1958	1959	1958 & 1959	As single dressing spring 1959	1958	1959	1958 & 1959	Mean
Mean	21.2	23.2	24.7	21.6	21.9	22.8	22.5	23.8	22.7
N: cwt per acre in 1960									
None	16.1	21.1	20.9	19.5	19.3	19.4	18.7	21.8	19.6
0.5	26.4	25.4	28.5	23.7	24.5	26.1	26.3	25.8	25.8
Diff.	+10.3	+4.3	+7.6	+4.2	+5.2	+6.7	+7.6	+4.0	+6.2
N: cwt per acre in 1959									
1.0		22.6	22.4	21.3	20.9	22.1	21.9	24.2	22.2
2.0		23.9	26.9	22.0	22.9	23.4	23.1	23.4	23.7
Diff.		+1.3	+4.5	+0.7	+2.0	+1.3	+1.2	-0.8	+1.5

Mean dry matter % as harvested: 81.9

60/Cb/1.3

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60/Cb/2

BARLEY

Effects of green manures, N and straw - Stackyard 1960.

Design: 6 randomised blocks of 9 plots each.

Area of each plot: 0.0212 acres. Area harvested: 0.0152 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.

Note: The straw treatment was not applied for the first crop.

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

Cultivations, etc.: Ploughed: Nov 12 - 17, 1959. Rotary cultivated twice to kill couch (Agropyron repens): Mar 22, 1960 and Apr 13. Seed combine drilled at 2½ bushels per acre with basal fertiliser, N applied: Apr 14. Ryegrass drilled at 40 lb per acre: Apr 19. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 25. Combine harvested: Aug 22. Variety: Proctor; Ryegrass - S22 Italian. Previous crop: wheat.

Standard error per plot.
Grain (at 85% dry matter): 1.336 cwt per acre or 4.1% (43 d.f.)

Summary of Results

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

Undersown		N: cwt per acre None	0.3	0.6	Mean
None	(±0.55)	32.1	34.2	33.4	33.2 (±0.31)
Ryegrass	(±0.39)	30.0	33.2	33.1	32.1 (±0.22)
Mean	(±0.31)	30.7	33.5	33.2	32.4
Diff.	(±0.67)	-2.1	-1.0	-0.3	-1.1 (±0.39)

Mean dry matter % as harvested: 81.3

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BARLEY

Forms of N and methods of application - Butt Close Woburn 1960.

Design: 4 × 2 × 4 in 6 blocks of 16, with certain high order interactions partially confounded with block differences, plus 2 control plots per block.

Area of each plot: 0.0146 acres.

Treatments: No nitrogen and all combinations of:-

Forms of N:	Ammonium sulphate 21% N	(S)
	Calcium nitrate 15.5% N	(C)
	Ammonium nitrate 23% N	(A)
	or Urea 45.6% N	(U)

Levels of N: 0.3; 0.6 cwt N per acre.

Methods of application: Broadcast (B), combine drilled (D), side band placed (P), top dressed (T).

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

Cultivations, etc.: Ploughed Jan 27 - Feb 8, 1960. Seed drilled at 2 bushels per acre and seedbed fertilisers applied: Mar 24. Nitrogen top dressings applied: Apr 29. Sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 9. Combine harvested: Aug 23. Variety: Proctor. Previous crop: Sugar beet.

Standard error per plot.
Grain (at 85% dry matter): 1.95 cwt per acre or 7.7% (67 d.f.)

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Summary of Results

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

	Form of N				
	S	C	A	U	Mean
Mean (±0.40)	26.2	26.1	26.2	26.0	26.1 (±0.20)
N: cwt per acre					
0.3 (±0.56)	23.3	24.4	24.0	24.4	24.0
0.6 (±0.56)	29.1	27.8	28.5	27.7	28.3
Diff. (±0.80)	+5.8	+3.4	+4.5	+3.3	+4.3 (±0.40)
Method of application					
B	25.4	24.3	25.6	25.4	25.2
D (±0.80)	26.3	26.0	25.3	25.5	25.7 (±0.40)
P	24.5	25.8	24.6	24.9	24.9
T	28.4	28.3	29.6	28.4	28.7

	Method of application			
	B	D	P	T
N: cwt per acre				
0.3 (±0.56)	22.8	23.8	23.1	26.3
0.6 (±0.56)	27.5	27.7	26.8	31.0
Diff. (±0.80)	+4.7	+3.9	+3.7	+4.7

Control: 18.0 (±0.56)

General mean: 25.2

Mean dry matter % as harvested (all plots): 81.4

Form of N
S = Ammonium sulphate 21% N
C = Calcium nitrate 15.5% N
A = Ammonium nitrate 23% N
U = Urea 45.6% N

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

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60/Cc/1

SPRING OATS

Frit fly study (sowing dates) - Geescroft 1960.

Design: 2 randomised blocks of 3 plots each.

Area of each plot: 0.3342 acres. Area harvested: 0.0298 acres.

Treatments: Sowing dates: Mar 17; Apr 7; Apr 21, 1960.

Basal dressing: 3 cwt compound fertiliser (16% N, 9% P_2O_5, 9% K_2O) per acre combine drilled with seed.

Cultivations, etc.: Ploughed: Sept 14, 1959. Seed combine drilled at 3 bushels per acre: Mar 17, Apr 7 and Apr 21, 1960. Sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: first sowing - May 10; second and third sowing - May 24. Combine harvested: first sowing - Aug 15; second sowing - Aug 17; third sowing - Sept 5. Variety: Blenda. Previous crop: Spring wheat.

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 21	Mean
27.5	16.2	4.5	16.0

Mean dry matter % as harvested: 74.7

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OATS

Trap cropping of eelworm - Woburn, Butt Furlong 1960.

Design: 6 randomised blocks of 6 plots each.

Area of each plot: 0.0106 acres. Area harvested: 0.0071 acres.

Treatments. All combinations of:-
Trap crop 1958 and 1959. Spring oats; Spring rye; Fallow. (all plots ploughed in May or June)
Green manure: None; mustard sown in June and ploughed in in autumn.
The whole experiment was sown to spring oats in 1960.

Note: Mustard failed in 1959 and was ploughed in and resown on July 24.

Basal dressings per acre:
1958: 5 cwt compound fertiliser (12% N; 9% P_2O_5; 9% K_2O) combine drilled with oats and rye and broadcast on the plots to be sown only with mustard. 2 cwt 'Nitro-Chalk' (15.5% N) to all plots at time of sowing mustard.
1959: Compound fertiliser as in 1958. $1\frac{1}{2}$ cwt 'Nitra-Shell' to all plots at time of sowing mustard.
1960: 4 cwt compound fertiliser (16% N; 9% P_2O_5; 9% K_2O) combine drilled..

Cultivations, etc.:
1958: Ploughed: Aug 29 - 30, 1957. Sprayed twice with TCA at 20 lb in 40 gallons per acre: Sept 30 and Dec 9. Dung applied at 12 tons per acre: Jan 21 - 24. Ploughed: Mar 5 - 7, 1958. Oats and rye combine drilled with basal fertiliser: Mar 25. Basal compound fertiliser applied to mustard only plots: Apr 3. All plots ploughed: May 30. 'Nitro-Chalk' applied: June 3. Mustard sown: June 5. All plots ploughed: July 19. All mustard plots ploughed: Oct 28.

1959: Basal compound fertiliser applied to mustard only plots, oats and rye combine drilled with basal compound fertiliser: Mar 17, 1959. Extra 'Nitro-Chalk' applied to all plots to improve the crop: Apr 25. Oats and rye plots ploughed: June 2. 'Nitra-Shell' applied and mustard sown: June 3. Owing to failure of mustard following oats and rye, all mustard cut and removed, and all plots ploughed: July 17. Mustard resown: July 24. All mustard plots ploughed: Sept 2.

1960: Ploughed: Jan 9, 1960. Oats combine drilled at 4 bushels per acre with basal compound fertiliser: Mar 8. Sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 7. Combine harvested: Aug 19. Varieties: Oats; 1958 and 1959 - Sun II, 1960 - Condour; Rye: King II. Previous crop: Oats (1957).

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Note: Periodic estimates of eelworm population were made.

Standard error per plot.
Grain (at 85% dry matter): 3.19 cwt per acre or 11.4% (25 d.f.)

Summary of Results

Trap crops 1958 and 1959

Green manure	Oats	Rye	Fallow	Mean
Grain (at 85% dry matter): cwt per acre				
		(±1.30)		
None	27.7	31.7	23.8	27.7
Mustard	28.1	30.9	25.9	28.3
Mean (±0.91)	27.9	31.3	24.9	28.0
Diff. (±1.84)	+0.4	-0.8	+2.1	+0.6 (±1.06)

Mean dry matter % as harvested: 80.4

Straw (at 85% dry matter): cwt per acre				
None	22.6	24.7	19.1	22.1
Mustard	23.9	26.0	24.0	24.6
Mean	23.2	25.3	21.6	23.3
Diff.	+1.3	+1.3	+4.9	+2.5

Mean dry matter % as harvested: 46.1

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CEREALS AND BEANS ROTATIONS

The effect of crop sequences on the incidence of cereal foot and root rot diseases - Great Field I 1960 - the 4th 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: 0.0305 acres. Area harvested (acres): Winter wheat, series starting 1957 - 0.0096; series starting 1958, Spring wheat, Oats, Barley and Beans - 0.0200.

Treatments:

Crop sequences for each series:

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

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 1957 falling due for this treatment this year, and receiving N at 0.5, 1.0 cwt per acre in 2 doses on Mar 7 and May 2, 1960 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.

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 oats and barley, all in seedbed. 0.93 cwt N as 'Nitro-Chalk' 21 per acre to winter wheat in the series started in 1959 as spring top dressing, half applied in March and half in May.

Cultivations, etc.: Ploughed: Sept 10, 1959. Winter wheat combine drilled at 2½ bushels per acre; beans placement drilled at 275 lb per acre: Oct 14. 'Nitro-Chalk' applied to oats: Mar 4, 1960. Oats combine drilled at 4 bushels per acre: Mar 5. 'Nitro-Chalk' applied to spring wheat, barley and winter wheat, barley combine drilled at 2 bushels per acre: Mar 7. Spring wheat combine drilled at 3 bushels per acre: Mar 8. Winter wheat sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: Apr 21. 2nd application of 'Nitro-Chalk' to winter wheat: May 2. Spring wheat, barley and oats sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: May 6. Combine harvested: Oats and barley - Aug 16; beans - Aug 19; winter wheat - Aug 31; spring wheat - Sept 12. Varieties: Beans - S.Q; winter wheat - Cappelle; spring wheat - Koga II; barley - Proctor; oats - Sun II.

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

For details of the previous years' results etc. see 'Results of the Field Experiments' 57/Cd/1, 58/Cd/1 and 59/Cd/1.

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

Series starting:

1957 Winter wheat
Whole plot 2.38 cwt per acre or 7.8% (10 d.f.)
Sub plot 2.83 cwt per acre or 9.2% (12 d.f.)

1958 Spring wheat 1.71 cwt per acre or 6.2% (6 d.f.)

1959 Winter wheat 2.11 cwt per acre or 6.8% (6 d.f.)

Summary of Results

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

Series starting in 1957

Winter wheat

Crop in 1957 1958 1959	WW WW SW	SW WW SW	0 WW SW	WW 0 SW	B WW B	WW 0 Be	Mean
N cwt per acre			(±1.64)(1)	(±1.79)(2)			
0.5	27.7	20.8	21.7	18.8	33.8	48.4	28.5
1.0	27.3	32.9	28.3	21.3	34.6	51.4	32.6
Mean (±1.36)	27.5	26.8	25.0	20.0	34.2	49.9	30.5
Diff. (±2.31)	-0.4	+12.1	+6.6	+2.5	+0.8	+3.0	+4.1 (±0.94)

Mean dry matter % as harvested: 79.1

(1) for use in vertical and interaction comparisons

(2) for use in horizontal and diagonal comparisons

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

Series starting in 1958

Crop in 1958 / 1959	Spring wheat W / W	Spring wheat SW / WW	Spring wheat O / WW	Spring wheat W / O	Mean	Barley B / W	Winter beans W / O
	28.7	26.4	24.7	31.3	27.8	43.5	20.9
		(±0.99)					
Mean dry matter % as harvested:		81.4				82.1	74.8

Series starting in 1959

Crop in 1959	Winter wheat W	Winter wheat SW	Winter wheat B	Winter wheat O	Mean	Oats WW
	25.2	21.2	30.2	47.5	31.0	38.5
		(±1.21)				
Mean dry matter % as harvested:		78.3				83.7

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WHEAT, BARLEY AND MULTIPLE CROPS

Residual effects of triazine weedkillers - Rothamsted (R) Great Field I and Great Knott I and Woburn (W) Broad Mead I and Great Hill 1960.

Design: Strip cropping on sites of 1959 experiments:-
Great Field I (R), Great Knott I (R) and Broad Mead I (W): Winter wheat, kale, sugar beet, barley and oats.
Great Hill (W): Spring wheat, kale, sugar beet, barley and oats.

Area of each plot (acres):
Great Field I (R) and Great Knott I (R) - winter wheat; Broad Mead I (W) - winter wheat: 0.0318. Area harvested: 0.0152. All other crops on above fields: 0.0079. Area harvested: 0.0035 - 0.0053.
Great Hill (W) - Barley: 0.0393. Area harvested: 0.0170. Other crops on Great Hill: 0.0098. Area harvested: Oats - 0.0043, Sugar beet - 0.0051.

Treatments: Applied in 1959. See 'Results of the Field Experiments' 1959 pages 59/Ce/2 and 59/Cf/5.

Basal dressings per acre:
Oats, barley and spring wheat (all fields): 3 cwt compound fertiliser (16% N, 9% P_2O_5, 9% K_2O) combine drilled.
Kale and sugar beet (all fields): 10 cwt compound fertiliser (10% N, 10% P_2O_5, 18% K_2O).
Winter wheat:- Great Field I (R): 1½ cwt compound fertiliser (6% N, 15% P_2O_5, 15% K_2O) combine drilled and 4 cwt sulphate of ammonia top dressed. Great Knott I (R): 2½ cwt compound fertiliser (6% N, 15% P_2O_5, 15% K_2O) combine drilled and 5 cwt sulphate of ammonia top dressed. Broad Mead I (W): 2½ cwt compound fertiliser (6% N, 15% P_2O_5, 15% K_2O) combine drilled and 3 cwt 'Nitro-Chalk' 21 top dressed.

Cultivations, etc.:
Rothamsted. Great Field I (F) and Great Knott I (K). Ploughed: (K) - Oct 9, 1959, (F) - Oct 21. Winter wheat combine drilled at 2¾ bushels per acre: (K) - Oct 23, (F) - Oct 26. Barley combine drilled at 2 bushels per acre: Mar 7, 1960. Basal fertiliser applied for kale and sugar beet: Mar 24. Sugar beet drilled at 19 lb per acre: (K) - Apr 6, (F) - Apr 7. Kale drilled at 3 lb per acre: (K) - Apr 8, (F) - Apr 9. Top dressing of sulphate of ammonia applied to winter wheat: (K) - Apr 8, (F) - Apr 12. Winter wheat sprayed with CMPP at 6 pints in 40 gallons per acre: (F) - Apr 21, (K) - Apr 22. Barley and oats sprayed with TCB/MCPA at 4 pints in 40 gallons per acre: (F) - May 6, (K) - May 10. Sugar beet singled: (F) - May 23, (K) - May 25. Sugar beet sprayed with demeton methyl at 12 fluid oz in 60 gallons per acre: May 30. Barley and oats combine harvested: Aug 16. Winter wheat combine harvested: (F) - Aug 23, (K) - Aug 28. Sugar beet lifted: Oct 25. Kale harvested: (F) - Oct 25, (K) - Nov 24.

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Woburn. Broad Mead I (B) and Great Hill (G): Ploughed: (B) - Nov 2, 1959. Winter wheat combine drilled at 3 bushels per acre: Nov 11. Ploughed: (G) - Jan 5, 1960. Seed combine drilled: Barley at 2¼ bushels, oats at 4 bushels per acre: (B) - Mar 19, (G) - Mar 26; spring wheat at 2¾ bushels per acre: (G) - Mar 26. 'Nitro-Chalk' applied to winter wheat: Apr 5. Basal fertiliser applied to kale and sugar beet: (B) - Apr 11, (G) - Apr 14. Kale and sugar beet seed drilled: Apr 14. Kale and sugar beet sprayed with miscible DDT (against flea beetle) at 3 pints in 40 gallons per acre: May 6. Sugar beet singled: May 30. Sugar beet sprayed with demeton methyl at 12 fluid oz in 40 gallons per acre: June 1. Spring wheat, barley and oats combine harvested: (G) - Aug 22. Winter wheat, barley and oats combine harvested: (B) - Sept 8. Sugar beet lifted: Oct 5. Kale harvested: Nov 2.

Varieties (all fields): Winter wheat: Cappelle; spring wheat: Jufy I; barley: Proctor; oats: Condor; sugar beet: Klein E; kale: Thousand head.

Previous crops: Great Field I (R) and Great Hill (W): Potatoes. Great Knott I (R) and Broad Mead I (W): Spring beans.

Note: Owing to damage by birds, no yields were taken for kale and spring wheat on Great Hill (W), nor for barley and oats on Broad Mead I (W).

Summary of Results

Great Field I (R)

	Spray in 1959					
	None	S1	S2	S3	A2	Mean
	Wheat, grain (at 85% dry matter): cwt per acre					
Mean	53.1	51.4	52.5	49.7	52.8	51.9
	Barley, grain (at 85% dry matter): cwt per acre					
Mean	46.1	44.2	47.5	42.3	44.5	45.1
	Oats, grain (at 85% dry matter): cwt per acre					
Mean	35.3	39.8	39.2	37.1	38.0	38.3
	Kale, fresh weight: tons per acre					
Mean	20.96	26.18	27.82	24.67	25.42	25.56

Mean dry matter % as harvested: Wheat 81.2
Barley 81.3
Oats 82.6

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	Spray in 1959 None	S1	S2	S3	A2	Mean
Great Field I (R)						
Sugar beet. Roots (washed): tons per acre						
Mean	19.79	22.22	20.00	19.64	16.80	19.68
Sugar beet. Sugar percentage						
Mean	17.0	16.4	16.2	16.3	16.9	16.5
Sugar beet. Total sugar: cwt per acre						
Mean	67.2	72.6	64.9	63.9	57.0	65.0
Great Knott I (R)						
Wheat, grain (at 85% dry matter): cwt per acre						
Mean	50.2	53.7	50.8	52.0	52.3	51.5
Barley, grain (at 85% dry matter): cwt per acre						
Mean	36.1	37.6	38.2	37.6	40.0	37.6
Oats, grain (at 85% dry matter): cwt per acre						
Mean	32.3	32.0	30.1	30.6	33.5	31.8
Kale, fresh weight: tons per acre						
Mean	25.19	23.32	21.72	18.78	22.60	22.80
Sugar beet. Roots (washed): tons per acre						
Mean	17.88	17.02	15.48	16.58	15.64	16.74
Sugar beet. Sugar percentage						
Mean	16.9	16.7	16.7	16.6	16.6	16.7
Sugar beet. Total sugar: cwt per acre						
Mean	60.3	56.8	51.8	55.2	51.8	56.0

Mean dry matter % as harvested: Wheat 80.0
Barley 81.8
Oats 84.5

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Broad Mead I (W)

	Spray in 1959				
	None	S1	S2	S3	A2	Mean
Wheat, grain (at 85% dry matter): cwt per acre						
Mean	36.6	38.2	36.7	37.6	40.5	37.9
Kale, fresh weight: tons per acre						
Mean	20.92	24.36	22.79	20.92	21.80	22.16
Sugar beet. Roots (washed): tons per acre						
Mean	15.83	17.80	13.75	16.27	16.32	15.99
Sugar beet. Sugar percentage						
Mean	14.9	15.6	14.2	15.1	15.2	15.0
Sugar beet. Total sugar: cwt per acre						
Mean	47.1	55.5	39.0	49.0	49.6	48.0
Sugar beet. Tops: tons per acre						
Mean	23.47	24.75	24.46	22.10	23.57	23.67

Mean dry matter % as harvested: Wheat 76.3

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60/Cd/2.5

Great Hill (W)

	Spray and treatment in 1959							
	None	S1	S2	S3	S4	A2	M	Mean
Barley, grain (at 85% dry matter): cwt per acre								
Mean	22.4	23.4	24.2	21.4	20.3	18.0	20.2	21.4
Oats, grain (at 85% dry matter): cwt per acre								
Mean	10.9	10.4	11.2	8.9	7.2	8.4	6.9	9.1
Sugar beet. Roots (washed): tons per acre								
Mean	15.26	17.72	13.35	15.88	9.47	16.76	17.48	15.13
Sugar beet. Sugar percentage								
Mean	15.9	16.8	16.0	16.2	16.2	16.2	16.9	16.3
Sugar beet. Total sugar: cwt per acre								
Mean	48.6	59.4	42.6	51.4	30.7	54.2	59.2	49.4
Sugar beet. Tops: tons per acre								
Mean	14.00	13.65	13.48	17.39	8.87	13.39	14.35	13.59

Mean dry matter % as harvested: Barley 81.5
Oats 73.0

Sprays

S = Simazine
A = Atrazine

Levels

1 = 1 lb in 40 gallons per acre
2 = 2 lb in 80 gallons per acre
3 = 3 lb in 120 gallons per acre
4 = 4 lb in 160 gallons per acre

50% active material

M = Normal mechanical weed control.

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60/Ce/1.1

SPRING BEANS

Effect of seed rates and spraying on aphids (Aphis fabae) - Rothamsted (R) Long Hoos V and Woburn (W) Warren Field N 1960.

Design (each field): 4 randomised blocks of 7 plots each, blocks and plots being split into 2 strips for the application of spray.

Area of each sub plot: 0.0118 acres. Area harvested: 0.0074 acres.

Treatments. All combinations of:-
Whole plots. Seed rate, lb per acre: 50; 100; 200; 300; 400; 600, all at 22 inch row spacing; and 600 at 11 inch.
Sub plots. Spray: None; demeton-methyl at 12 fluid oz (50% active ingredients) in 40 gallons per acre.

Basal dressing: 412 lb compound fertiliser (10% P_2O_5, 20% K_2O) per acre placement drilled with the seed.

Cultivations, etc.:
Long Hoos V (R): Ploughed: Nov 5, 1959. Seed drilled: Mar 17, 1960. Sprayed with simazine at 2 lb in 40 gallons per acre: Mar 22. Appropriate sub plots sprayed with demeton-methyl: June 13. Combine harvested: Sept 5. Variety: Garton's Tick. Previous crop: Oats.
Warren Field N (W): Ploughed: Oct 22 - 26, 1959. Ground chalk applied at 18 cwt per acre: Mar 12, 1960. Seed drilled: Mar 23. Sprayed with simazine at 2 lb in 40 gallons per acre: Mar 25. Appropriate sub plots sprayed with demeton-methyl: June 15. Combine harvested: Sept 21. Variety: Garton's Tick. Previous crop: Spring wheat.

Standard errors per plot, Grain (at 85% dry matter)
Long Hoos V (R), Whole plot: 2.21 cwt per acre or 14.3% (18 d.f.)
Sub plot: 4.21 cwt per acre or 27.3% (21 d.f.)
Warren Field N (W), Whole plot: 2.28 cwt per acre or 14.0% (18 d.f.)
Sub plot: 3.75 cwt per acre or 23.1% (21 d.f.)

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Summary of Results

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

Seed rate: lb per acre

	at 22"						at 11"	
	50	100	200	300	400	600	600	Mean
Long Hoos V (R)								
Spray	(±1.85)(1)							
None	8.8	7.7	9.2	11.1	12.7	16.0	20.4	12.3
Demeton-methyl	15.1	16.5	20.5	18.6	19.6	19.2	20.7	18.6
Mean (±1.10)	11.9	12.1	14.9	14.8	16.1	17.6	20.6	15.4
Diff (±2.98)(2)	6.3	8.8	11.3	7.5	6.9	3.2	0.3	6.3

Mean dry matter % as harvested: 69.3

Warren Field N (W)								
Spray	(±1.74)(1)							
None	2.2	2.4	2.7	5.9	12.0	17.3	22.2	9.2
Demeton-methyl	12.1	19.8	22.7	24.5	24.6	26.8	32.2	23.2
Mean (±1.14)	7.1	11.1	12.7	15.2	18.3	22.0	27.2	16.2
Diff (±2.65)(2)	9.9	17.4	20.0	18.6	12.6	9.5	10.0	14.0

Mean dry matter % as harvested: 68.9

(1) For use in horizontal comparisons only

(2) For use only in testing the difference of two differences.

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60/Ce/2.1

SPRING BEANS

Control of weeds by triazine sprays - Rothamsted (R) Deacons Field and Woburn (W) Warren Field 1960.

Design: 4 randomised blocks of 6 plots each.

Area of each plot (acres):
Deacons Field (R): 0.0333. Area harvested: 0.0139.
Warren Field (W): 0.0303. Area harvested: 0.0126.

Treatments:
Simazine (2-chloro-4-6-bis-ethylamino-s-triazine - 50% active material):
Without inter row cultivations:
None; (S_0)
1 lb per acre; (S_1)
2 lb per acre; (S_2)
3 lb per acre; (S_3)
With normal inter row cultivations:
None; (MS_0)
2 lb per acre; (MS_2)

Basal dressing per acre: Deacons (R): $2\frac{3}{4}$ cwt compound fertiliser (12% P_2O_5, 24% K_2O) placement drilled. Warren Field (W): $3\frac{1}{2}$ cwt compound fertiliser (14% P_2O_5, 28% K_2O) placement drilled.

Cultivations, etc.:-
Deacons Field (R): Ploughed: Oct 13 - 26, 1959 and Mar 1 - 7, 1960. Seed placement drilled at 200 lb per acre, with basal fertiliser: Mar 19. Sprays applied to appropriate plots: Mar 25. Sprayed with demeton-methyl at 12 fluid oz in 40 gallons per acre: June 13. Combine harvested: Sept 8. Variety: Gartons Spring Tick. Previous crop: Barley.
Warren Field (W): Ploughed: Oct 22 - 26, 1959. Ground chalk applied at 18 - 20 cwt per acre: Mar 8 - 12, 1960. Seed placement drilled at 200 lb per acre, with basal fertiliser: Mar 24. Sprays applied to appropriate plots: Mar 25. Sprayed with demeton-methyl at 12 fluid oz in 40 gallons per acre: June 15. Combine harvested: Sept 21. Variety: Gartons Spring Tick. Previous crop: Spring wheat.

Note: Weed counts were made in July.

Standard errors per plot, Grain (at 85% dry matter):
Deacons Field (R): 4.09 cwt per acre or 16.5% (15 d.f.)
Warren Field (W): 1.83 cwt per acre or 13.4% (15 d.f.)

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Summary of Results

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

Treatment						
S_0	S_1	S_2	S_3	MS_0	MS_2	Mean
		Deacons Field (R)				
25.0	23.6	26.2	26.6	23.8	23.3	24.7
		(±2.04)				
		Warren Field (W)				
11.3	13.0	12.1	12.6	17.0	16.0	13.6
		(±0.91)				

Mean dry matter % as harvested:
Deacons Field (R): 73.9
Warren Field (W): 73.6

Treatments

Simazine without inter row cultivations
S_0 = None
S_1 = 1 lb per acre
S_2 = 2 lb per acre
S_3 = 3 lb per acre
Simazine with normal inter row cultivations
MS_0 = None
MS_2 = 2 lb per acre

Note. Deacons (R): It is suspected that certain plots in each block were affected by gross soil differences and this matter is under investigation.

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BEANS

Time of sowing, spraying and K - Deacons 1960.

Design: 4 randomised blocks of 8 plots each.

Area of each plot: 0.0404 acres. Area harvested: 0.0126 acres.

Treatments. All combinations of:-
Time of sowing: Autumn; spring.
Spray*: None; demeton-methyl of 12 fluid oz (50% active ingredients) in 40 gallons per acre.
Potash: None; 0.74 cwt K_2O per acre placement drilled.

*Note: To avoid serious mechanical damage to the tall grown winter beans by tractor spraying in a year of slight aphid infestation, these were not sprayed.

Basal dressing: 0.37 cwt P_2O_5 per acre placement drilled either with K in the compound fertiliser (10% P_2O_5, 20% K_2O) or as granular superphosphate.

Cultivations, etc.: Ploughed: Oct 13 - 20, 1959. Winter beans placement drilled at 275 lb per acre: Oct 29. Spring beans placement drilled at 250* lb per acre: Mar 19, 1960. Appropriate spring sown plots sprayed with demeton-methyl: June 13. Combine harvested: Winter beans - Aug 20; spring beans - Sept 8.
Variety: Winter beans - S.Q.; spring beans - Albyn Tick.
Previous crop: Spring wheat and barley.

Standard error per plot.
Grain (at 85% dry matter): 2.31 cwt per acre or 8.2% (23 d.f.)

*Increased from the normal 200 to allow for poor germination.

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Summary of Results

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

Time of sowing / Spray	Autumn None	Spring None	Spring Demeton methyl	Mean
K_2O cwt per acre	(±0.82)	(±1.16)		
None	34.1	19.6	23.9	27.9
0.74	34.6	21.5	23.5	28.5
Mean (±0.82)	34.3 (1)	20.5	23.7	28.2
Difference (±1.64)	+0.5 (2)	+1.9	-0.4	+0.6 (±0.82)

(1) ±0.58

(2) ±1.16

Mean dry matter % as harvested: Autumn sown 75.6
Spring sown 72.2

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60/Cf/1.1

POTATOES

Control of blight (Phytophthora infestans) by copper and zinc fungicide sprays and times of spraying - Delharding 1960.

Design: 4 × 4 Latin square.

Area of each plot: 0.1270 acres. Area harvested: 0.0035 acres.

Treatments: 0, 1, 2, 3 as follows:-

	Stage			
Treatment	I	II	III	IV
0	-	-	-	-
1	-	C	C	-
2	-	Z	C	C
3	Z	C	C	-

where stage I = sprayed at closure of leaf canopy, July 14, 1960.
II = sprayed on issue of blight forecast, July 25, 1960.
III = sprayed on blight outbreak, Aug 13, 1960.
IV = sprayed when the deposit from the previous spray had gone, Aug 27, 1960.
C = sprayed with copper oxychloride (15% copper) at 5 lb in 40 gallons per acre.
Z = sprayed with zineb (zinc ethylene bis dithiocarbamate - 65 % active ingredient) at 2 lb in 40 gallons per acre.

Basal dressing: 12 cwt compound fertiliser (10% N, 10% P_2O_5, 18% K_2O) per acre.

Cultivations, etc.: Ground chalk applied at 63 cwt per acre: Sept 14 - 18, 1959. Ploughed: Nov 3 - 12. Ridged, basal dressing applied: Apr 20, 1960. Potatoes machine planted: Apr 22. Earthed up: June 27. Sprayed with undiluted BOV at 15 gallons per acre: Sept 13. Haulm destroyed mechanically: Oct 18. Lifted*: Oct 30. Variety: Majestic. Previous crop: Wheat.

*Hand dug. Harvested area very much reduced, owing to wet conditions.

Note: Fortnightly estimates of yield by sampling, and estimates of foliage destroyed by blight were made commencing early August; also estimates of blight on the tubers at the times of sampling and at harvest.

Standard error per plot.
Total tubers: 0.770 tons per acre or 4.6% (6 d.f.)

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Summary of Results

		Spray 0	1	2	3	Mean
Total tubers: tons per acre						
Mean	(±0.385)	14.43	16.66	16.76	18.46	16.58
Increase	(±0.544)		+2.23	+2.33	+4.03	
Percentage ware (1½" riddle)						
Mean		92.8	95.2	94.6	96.0	94.6
Increase			+2.4	+1.8	+3.2	

Sprays

0 = None.
1 = Copper oxychloride (15% copper) at 5 lb in 40 gallons per acre after issue of blight forecast.
2 = Zineb (zinc ethylene bis dithiocarbamate - 65% active ingredient) at 2 lb in 40 gallons per acre after issue of blight forecast plus copper oxychloride when the previous deposit had been removed.
3 = Zineb after closure of leaf canopy plus copper oxychloride after issue of blight forecast.

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60/Cf/2.1

POTATOES

Forms and levels of K - Rothamsted (R) Sawyers I and Woburn (W) Lansome Field 1960.

Design (each field): 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: (R) - 0.0071, (W) - 0.0141 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 sulphate of ammonia.

Basal dressing (each field): 0.75 cwt P_2O_5 per acre as triple superphosphate.

Cultivations, etc.:

Sawyers I (R): Ploughed: Nov 28, 1959. Ridged, fertilisers applied: Apr 25, 1960. Potatoes hand planted: Apr 26. Earthed up: June 21. Sprayed with zineb at 2 lb in 40 gallons per acre: July 14. Sprayed with copper fungicide at 3 lb in 40 gallons per acre: July 25, and at 5 lb in 40 gallons per acre: Aug 15. Sprayed with undiluted BOV at 15 gallons per acre: Aug 31. Haulm destroyed mechanically: Sept 22. Lifted: Oct 7. Variety: King Edward. Previous crop: Fallow.

Lansome Field (W): Ploughed twice: Sept 8, 1959 and Jan 7, 1960. Ridged: Apr 28. Fertilisers applied, potatoes hand planted: Apr 29. Earthed up: June 14. Sprayed with copper fungicide at 5 lb in 40 gallons per acre: July 23 and Aug 8. Sprayed with undiluted BOV at 15 gallons per acre: Sept 8. Lifted: Sept 28. Variety: Majestic. Previous crop: Spring wheat.

Standard errors per plot. Total tubers tons per acre:

Sawyers I (R): 1.279 tons per acre or 9.5% (15 d.f.)
Lansome Field (W): 1.547 tons per acre or 10.5% (15 d.f.)

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Summary of Results

Total tubers: tons per acre

	Form of K				
	0	C	S	M	Mean
Sawyers I (R)					
Mean (±0.452)	10.96	14.09	14.11	14.60	13.44*
K_2O: cwt per acre					
1.25 (±0.640)	-	13.66	13.74	15.22	14.21 (±0.369)
2.50	-	14.52	14.48	13.99	14.33
Diff. (±0.904)	-	+0.86	+0.74	-1.23	+0.12 (±0.522)
N: cwt per acre					
0.75 (±0.640)	10.21	13.32	13.29	14.71	12.88
1.50	11.70	14.86	14.92	14.50	13.99
Diff. (±0.904)	+1.49	+1.54	+1.63	-0.21	+1.11 (±0.452)
Lansome Field (W)					
Mean (±0.547)	16.00	14.64	14.52	14.04	14.80*
K_2O: cwt per acre					
1.25 (±0.774)	-	15.12	14.84	14.66	14.87 (±0.447)
2.50	-	14.15	14.21	13.42	13.93
Diff. (±1.094)	-	-0.97	-0.63	-1.24	-0.94 (±0.632)
N: cwt per acre					
0.75 (±0.774)	15.88	13.66	13.70	13.29	14.13
1.50	16.12	15.62	15.35	14.80	15.47
Diff. (±1.094)	+0.24	+1.96	+1.65	+1.51	+1.34 (±0.547)

*General mean

Forms of K

0 = No potash
C = Potassium bi-carbonate, $KHCO_3$
S = Potassium sulphate, K_2SO_4
M = Potassium chloride, KCl

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60/Cf/2.3

Percentage ware

	Form of K				
	0	C	S	M	Mean
		Sawyers I (R)			
Mean	87.8	93.4	93.6	93.1	93.4
K_2O: cwt per acre					
1.25	-	92.5	92.8	93.8	93.0
2.50	-	94.4	94.4	92.4	93.7
Diff.	-	+1.9	+1.6	-1.4	+0.7
N: cwt per acre					
0.75	84.8	92.8	93.7	93.0	91.1
1.50	90.8	94.0	93.5	93.2	92.9
Diff.	+6.0	+1.2	-0.2	+0.2	+1.8
		Lansome Field (W)			
Mean	96.2	94.8	95.4	95.6	95.3
K_2O: cwt per acre					
1.25	-	95.6	95.3	95.8	95.6
2.50	-	94.0	95.5	95.4	95.0
Diff.	-	-1.6	+0.2	-0.4	-0.6
N: cwt per acre					
0.75	96.0	94.2	94.7	95.1	95.0
1.50	96.4	95.4	96.0	96.1	96.0
Diff.	+0.4	+1.2	+1.3	+1.0	+1.0

Riddle size:
Sawyers I (R): $1\frac{1}{2}$";
Lansome Field (W): $1\frac{5}{8}$".

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60/Cf/3.1

POTATOES

Control of blight (Phytophthora infestans) by copper, tin and zinc fungicides - Long Hoos VII 1960.

Design: 4 randomised blocks of 8 plots each.

Area of each plot: 0.0128 acres. Area harvested: 0.0077 acres.

Treatments:-
Unsprayed (0) (2 plots per block) together with all combinations of:-
Spray 50% copper oxychloride at 5 lb in 100 gallons per acre (C);
Triphenyltin acetate (25% active material) at 3 lb in 100 gallons per acre (T); Zineb (65% zinc ethylene bis dithiocarbamate) at 2 lb in 100 gallons per acre (Z).
No. of sprays: 2 (July 21 and Aug 8); 3 (July 21, Aug 8 and Aug 25).

Basal dressing per acre: 15 tons of dung; and 10 cwt compound fertiliser (10% N, 10% P_2O_5, 18% K_2O) applied over ridges before machine planting.

Cultivations, etc.: Ploughed twice: Nov 5 - 7, 1959 and Feb 10, 1960, (dung applied Feb 8). Ridged, basal fertiliser applied: Apr 13. Machine planted: Apr 14. Earthed up: June 16. Sprayed with 15 gallons of undiluted BOV per acre: Sept 13. Haulm destroyed mechanically: Sept 20. Lifted: Oct 18. Variety: Ulster Supreme. Previous crop: ~~Barley~~. Winter Wheat.

Note: An assessment was made of the destruction of foliage during the blight epidemic, and counts were made from harvest samples to calculate the percentage of numbers and weight of infected tubers.

Standard error per plot.
Total tubers: 1.293 tons per acre or 8.7% (22 d.f.)

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Summary of Results

No. of sprays	Spray 0	C	T	Z	Mean
	Total tubers: tons per acre				
			(±0.647)		(±0.373)
2		14.87	16.67	13.89	15.14
3		15.13	16.01	15.57	15.57
Mean (±0.457)	13.53	15.00	16.34	14.73	14.89+
Diff. (±0.915)		+0.26	-0.66	+1.68	+0.43 (±0.528)
	Percentage ware ($1\frac{1}{2}$" riddle)				
2		96.0	96.5	97.5	96.7
3		97.7	96.7	97.2	97.2
Mean	96.7	96.9	96.6	97.3	96.8+
Diff.		+1.7	+0.2	-0.3	+0.5

Sprays

0 = Unsprayed
C = 50% copper oxychloride at 5 lb in 100 gallons per acre
T = Triphenyltin acetate (25% active material) at 3 lb in 100 gallons per acre
Z = Zineb (65% zinc ethylene bis dithiocarbamate) at 2 lb in 100 gallons per acre.

\+ General mean.

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60/Cg/1.1

SUGAR BEET

Control of virus spread by insecticide spray - Fosters 1960.

Design: 4 × 4 Latin square.

Area of each plot: 0.0168 acres. Area harvested: 0.0084 acres.

Treatments.
Unsprayed (0);
Sprayed when the crop was 0.3% infested with Myzus persicae (May 23, 1960) (E);
Sprayed on receipt of spray warning on May 30, 1960 (2 plots per row or column*) (N);
The spray used was demeton-methyl at 12 fluid oz in 60 gallons of water per acre.

*Note. One treatment was to include a second spray, depending on the development of a sufficiently large aphid population; however, the population remained very small, and the spray was omitted.

Basal dressing per acre: 5 cwt salt, 6 cwt compound fertiliser (16% N, 9% P_2O_5, 9% K_2O).

Cultivations, etc.: Ploughed: Jan 7, 1960. Salt applied: Feb 24. Basal compound fertiliser applied: Apr 2. Seed drilled at 19 lb per acre: Apr 7. Singled: May 25. Lifted: Nov 8. Variety: Klein E. Previous crop: Kale and mangolds in strips with small plots of potatoes.

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

Standard error per plot.
Total sugar: 5.90 cwt per acre or 8.4% (7 d.f.)

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60/Cg/1.2

Summary of Results

	Spray			
	None	E	N	Mean
Roots (washed): tons per acre				
Mean	19.50	20.61	21.96	21.01
Increase		1.11	2.46	
Sugar percentage				
Mean	16.8	16.6	16.6	16.7
Increase		-0.2	-0.2	
Total sugar: cwt per acre				
Mean	65.4 (±2.95)	68.6	73.2 (±2.09)	70.1
Increase		3.2 (±4.17)	7.8 (±3.61)	

Sprays

0 = Unsprayed
E = Sprayed when the crop was 0.3% infested with Myzus persicae
N = Sprayed on receipt of spray warning on May 30, 1960 (2 plots per row or column)

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60/Ch/1

KALE

The control of weeds by thiotriazine sprays - Dell Piece 1960.

Design: 2 randomised blocks of 6 plots each.

Area of each plot: 0.0084 acres. Area harvested: 0.0042 acres.

Treatments: Thiotriazine sprays:-
Sprayed on May 25, 1960:
3 oz active ingredient in 40 gallons per acre (3 plots per block) (E1);
6 oz active ingredient in 40 gallons per acre (2 plots per block) (E2).
Sprayed on June 13, 1960:
3 oz active ingredient in 40 gallons per acre (1 plot per block) (L1).

Basal dressing: 9 cwt compound fertiliser (16% N, 9% P_2O_5, 9% K_2O) per acre.

Cultivations, etc.: Ploughed: Nov 30 - Dec 12, 1959. Basal fertiliser applied: Apr 8, 1960. Seed drilled at 3 lb per acre: Apr 11. 2 rows per plot cut and weighed: Dec 6. Variety: Thousand Head. Previous crop: Spring wheat.

Standard error per plot.
Fresh weight: 2.415 tons per acre or 13.6% (8 d.f.)

Summary of Results

Fresh weight: tons per acre

Spray			
E1	E2	L1	Mean
19.04 (±0.986)	18.08 (±1.207)	13.26 (±1.707)	17.76

Note: Unsprayed strips within the experimental area gave a mean yield of 8.51 tons per acre.

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GRASS

Levels of N and K - Harwoods Piece 1960 - the 3rd year.

Design: 4 randomised blocks of 12 plots each.

Area of each plot: 0.0087 acres. Area harvested: 0.0059 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 treatments 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.: Ploughed: Dec 2, 1959. 1st dressing of fertilisers applied, seed drilled at 30 lb per acre: Mar 28, 1960. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 24. Cut 3 times: July 21, Sept 13 and Nov 7. Variety: S22 Italian Ryegrass.

Standard errors per plot. Dry matter:

1st cut:	4.00 cwt per acre or 14.9%	(33 d.f.)
2nd cut:	1.51 cwt per acre or 7.2%	(33 d.f.)
3rd cut:	0.95 cwt per acre or 8.5%	(33 d.f.)
Total of 3 cuts:	5.29 cwt per acre or 9.0%	(33 d.f.)

Note: (3) For details for the previous years results see "Results of the Field Experiments" 58/Cg/2 and 59/Cg/2.

Errata to "Results of the Field Experiments" 1958 and 1959.
Pages 58/Cg/2.1 and 59/Cg/2.1.
Under 'Treatments' alter the last paragraph to read
"In addition 2 plots per block receiving 0.9 cwt N and 0.6 cwt K_2O per acre ....."

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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 (±2.00)	14.9	21.3	24.1	27.6	26.8	27.7	31.3	24.9	27.8	33.2	29.7	32.9	26.9
2nd cut (±0.75)	4.9	16.1	15.7	14.4	22.6	23.0	22.3	26.1	26.5	27.1	27.7	25.8	21.0
3rd cut (±0.48)	2.3	9.3	9.8	9.0	11.9	13.3	13.3	12.9	12.9	13.3	12.7	13.3	11.2
Total of 3 cuts (±2.64)	22.1	46.7	49.5	51.0	61.3	64.1	66.9	63.9	67.1	73.7	70.1	72.0	59.0

*For each cut.

Mean dry matter % as cut:

1st cut:	16.7	3rd cut:	13.4
2nd cut:	18.3	Total of 3 cuts:	16.1

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60/Ci/2.1

GRASS

Species and levels of nitrogen - Harwood's Piece 1960, the 3rd year.

Design: 4 randomised blocks of 12 plots each.

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

Treatments. All combinations of:-

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)

Levels of nitrogen: None; 0.3; 0.6 cwt N per acre as 'Nitro-Chalk', applied for each cut.

Basal dressing: 5 cwt compound fertiliser (10% P_2O_5, 20% K_2O) per acre.

Cultivations, etc.: Basal fertiliser applied: Mar 3, 1960. Nitrogen dressings applied: Mar 3 and June 1. Cut twice: May 31 and Aug 25.

Standard errors per plot. Dry matter:

1st cut:	2.95 cwt per acre or 9.6%	(33 d.f.)
2nd cut:	1.44 cwt per acre or 8.8%	(33 d.f.)
Total of 2 cuts:	3.93 cwt per acre or 8.4%	(33 d.f.)

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

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Summary of Results

Dry matter: cwt per acre

N: cwt per acre*	Species C	M	R	T	Mean
1st cut					
		(±1.48)			(±0.74)
None	8.4	11.8	14.5	15.4	12.5
0.3	32.4	31.9	31.8	39.9	34.0
0.6	48.8	41.7	41.8	50.3	45.6
Mean (±0.85)	29.9	28.4	29.3	35.2	30.7
2nd cut					
		(±0.71)			(±0.35)
None	4.6	3.9	1.8	4.1	3.6
0.3	21.2	15.0	6.4	17.9	15.1
0.6	36.7	26.7	21.3	35.4	30.0
Mean (±0.41)	20.8	15.2	9.8	19.1	16.2
Total of 2 cuts					
		(±1.96)			(±0.98)
None	13.0	15.7	16.3	19.6	16.1
0.3	53.6	46.9	38.2	57.8	49.1
0.6	85.5	68.4	63.0	85.7	75.6
Mean (±1.13)	50.7	43.7	39.2	54.3	47.0

Mean dry matter % as cut:

1st cut:	27.3
2nd cut:	24.6
Total of 2 cuts:	26.0

Species

C	S37 Cocksfoot
M	S215 Meadow Fescue
R	S24 Perennial Ryegrass
T	Timothy "Scotia"

*Applied for each cut.

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GRASS

K and Mg - Rothamsted (R) Sawyers I and Woburn (W) Stackyard Series C 1960.

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 and 1960): All combinations of:-
Mg: None; 29; 58 lb Mg per acre applied as sulphate of magnesia 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 1959: 1.0 cwt P_2O_5 as triple superphosphate, 0.5 cwt N as sulphate of ammonia. In spring 1960: 0.5 cwt N as sulphate of ammonia. After every cut except the last: 0.6 cwt N as sulphate of ammonia.
Stackyard Series C (W): In seedbed 1960: 1.0 cwt P_2O_5 as triple superphosphate, 0.5 cwt N as ammonium nitrate. Before 1st cut: 0.5 cwt N as ammonium nitrate. After every cut except the last: 1.0 cwt N as ammonium nitrate.

Cultivations, etc.:
Sawyers I (R) 1959: Part of ground chalk applied: Mar 25, 1959. Ploughed: Apr 1. Remainder of ground chalk applied: Apr 10. Sulphate of ammonia and triple superphosphate applied: Apr 29. Sulphate of magnesia and sulphate of potash applied: May 1. Seed drilled at 24 lb per acre: May 2. Sprayed with MCPA at 6 pints in 40 gallons per acre: June 17. Grass cut: July 16 and Sept 29. (There was insufficient grass in each case to weigh or cart off and therefore no sulphate of ammonia was applied.)
Sawyers I (R) 1960: Basal sulphate of ammonia applied: Mar 3, 1960. Sulphate of magnesia and sulphate of potash applied: Mar 4. Cut 3 times: May 13 - 20, July 4, Sept 26. Sulphate of ammonia applied: May 26 and July 14. Variety: S22 Italian ryegrass. Previous crop: Barley.

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Stackyard Series C (W): Ploughed: Oct 28, 1959. Rotavated twice, sulphate of potash, kieserite, triple superphosphate and ammonium nitrate applied, seed broadcast at 50 lb per acre: Mar 24, 1960. Ammonium nitrate applied at 0.5 cwt per acre: May 19. Cut 4 times: June 28, July 24, Sept 5, Oct 4. Ammonium nitrate applied after every cut except the last. Variety: S22 Italian ryegrass. Previous crop: Barley.

Standard errors per plot. Grass dry matter

Sawyers I (R)

1st cut	1.38 cwt per acre or 4.6%	(48 d.f.)
2nd cut	1.23 cwt per acre or 9.0%	(48 d.f.)
3rd cut	1.21 cwt per acre or 5.0%	(48 d.f.)
Total of 3 cuts	2.84 cwt per acre or 4.2%	(48 d.f.)

Stackyard Series C (W)

1st cut	0.90 cwt per acre or 4.3%	(24 d.f.)
2nd cut	0.86 cwt per acre or 3.7%	(24 d.f.)
3rd cut	1.10 cwt per acre or 4.6%	(24 d.f.)
4th cut	1.05 cwt per acre or 9.4%	(24 d.f.)
Total of 4 cuts	1.99 cwt per acre or 2.5%	(24 d.f.)

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60/Ci/3.3

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		(±0.40)*			(±0.40)*		
10	29.2	29.6	29.9	29.5	29.3	29.8	29.6
40	29.4	29.5	30.1	30.0	29.5	29.5	29.7
Diff.	+0.2	−0.1 (±0.56)**	+0.2	+0.5	+0.2 (±0.56)**	−0.3	+0.1
K: lb per acre		(±0.49)					(±0.28)
None				29.3	29.4	29.1	29.3
95				29.6	29.4	29.7	29.6
190				30.4	29.4	30.2	30.0
Mean				29.8	29.4 (±0.28)	29.7	29.6
2nd cut							
Calcium carbonate cwt per acre		(±0.35)*			(±0.35)*		
10	13.0	13.7	13.9	13.7	13.5	13.3	13.5
40	13.4	13.5	14.7	13.3	14.1	14.1	13.8
Diff.	+0.4	−0.2 (±0.50)**	+0.8	−0.4	+0.6 (±0.50)**	+0.8	+0.3
K: lb per acre		(±0.43)					(±0.25)
None				13.3	13.2	13.2	13.2
95				13.4	13.8	13.6	13.6
190				13.9	14.5	14.4	14.3
Mean				13.5	13.8 (±0.25)	13.7	13.7

*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 17.1
2nd cut 31.6

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Sawyers I (R)

Grass, Dry matter: cwt per acre

	K: lb per acre			Mg: lb per acre			Mean
	None	95	190	None	29	58	
3rd cut							
Calcium carbonate cwt per acre		(±0.35)*			(±0.35)*		
10	22.7	24.4	25.0	23.7	24.2	24.1	24.0
40	22.1	24.7	25.4	23.8	24.4	24.0	24.0
Diff.	-0.6	+0.3 (±0.49)**	+0.4	+0.1	+0.2 (±0.49)**	-0.1	0.0
K: lb per acre					(±0.43)		(±0.25)
None				22.1	22.4	22.6	22.4
95				23.9	25.0	24.7	24.5
190				25.2	25.5	24.9	25.2
Mean				23.7	24.3 (±0.25)	24.1	24.0
Total of 3 cuts							
Calcium carbonate cwt per acre		(±0.82)*			(±0.82)*		
10	64.9	67.6	68.8	67.0	67.1	67.3	67.1
40	64.8	67.7	70.1	67.1	67.9	67.6	67.5
Diff.	-0.1	+0.1 (±1.16)**	+1.3	+0.1	+0.8 (±1.16)**	+0.3	+0.4
K: lb per acre					(±1.00)		(±0.58)
None				64.7	65.0	64.9	64.9
95				66.9	68.1	67.9	67.6
190				69.5	69.4	69.5	69.5
Mean				67.0	67.5 (±0.58)	67.5	67.3

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

Mean dry matter % as cut: 3rd cut 27.8
Total of 3 cuts 25.5

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60/Ci/3.5

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				2nd cut			
		(±0.45)		(±0.25)		(±0.43)		(±0.25)
None	17.5	18.1	18.6	18.1	22.2	22.4	22.1	22.2
95	20.8	22.1	21.6	21.5	23.0	22.8	23.2	23.0
190	21.6	23.2	23.0	22.6	24.0	24.1	24.0	24.0
Mean	20.0	21.1	21.1	20.7	23.0	23.1	23.1	23.0
		(±0.25)				(±0.25)		
	3rd cut				4th cut			
		(±0.55)		(±0.31)		(±0.53)		(±0.30)
None	22.1	22.9	23.4	22.8	9.4	10.0	10.1	9.8
95	23.8	23.6	23.7	23.7	10.3	12.1	11.0	11.1
190	26.2	26.1	25.1	25.8	12.2	12.4	12.7	12.4
Mean	24.0	24.2	24.0	24.0	10.6	11.5	11.3	11.1
		(±0.31)				(±0.30)		

	Total of 4 cuts			
		(±0.99)		(±0.58)
None	71.1	73.4	74.2	72.9
95	77.8	80.6	79.4	79.3
190	83.9	85.8	84.8	84.8
Mean (±0.58)	77.6	79.9	79.4	78.9

Mean dry matter % as cut:

1st cut	18.1
2nd cut	14.1
3rd cut	13.8
4th cut	12.3
Total of 4 cuts	14.6

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METEOROLOGICAL RECORDS 1960 - 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.	37 (-16.4)	37.9 (+0.6)	36.5	39.9	44.3	18	2.78 (+0.25)	24	2.33	5.1
Feb.	86 (+16.8)	38.7 (+0.5)	35.4	39.0	42.8	14	2.63 (+0.70)	16	1.97	5.1
Mar.	59 (-57.9)	42.4 (+1.1)	38.7	42.8	43.3	9	1.70 (-0.20)	10	0.75	5.9
Apr.	153 (-3.0)	47.1 (+1.3)	41.0	47.2	45.4	8	0.57 (-1.35)	11	0.04	5.5
May	175 (-21.5)	54.3 (+2.4)	47.2	53.7	48.7	2	1.58 (-0.56)	9	0.30	3.9
June	261 (+58.4)	59.7 (+2.4)	51.7	60.7	53.7	0	1.80 (-0.40)	13	-	4.3
July	144 (-50.9)	58.7 (-2.1)	53.5	60.1	56.3	0	3.20 (+0.64)	20	0.58	3.8
Aug.	164 (-19.6)	58.5 (-1.7)	53.6	60.4	57.5	0	3.58 (+0.98)	17	0.91	3.0
Sept.	132 (-13.7)	55.5 (-0.6)	51.7	57.9	57.5	0	3.93 (+1.56)	13	2.19	3.5
Oct.	66 (-38.2)	50.1 (+1.1)	47.9	51.7	54.5	2	6.51 (+3.55)	28	4.96	4.4
Nov.	58 (-3.7)	44.2 (+1.7)	42.6	45.3	50.3	7	4.44 (+1.65)	28	3.94	4.5
Dec.	42 (-2.6)	38.8 (+0.1)	36.8	40.7	46.5	18	3.65 (+1.05)	26	3.24	4.1
Year*	1377(-152.3)	48.8 (+0.5)	44.7	49.9	50.1	78	36.37 (+7.87)	215	21.21	4.4

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

*Mean or total

60/E/1.1

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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

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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

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