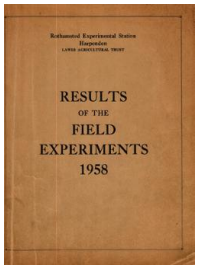
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ROTHAMSTED RESEARCH

Yields of the Field Experiments 1958

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Rothamsted Experimental Station
Harpenden
LAWES AGRICULTURAL TRUST

RESULTS
OF THE
FIELD
EXPERIMENTS
1958

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Rothamsted Experimental Station

Harpenden

Lawes Agricultural Trust

RESULTS

of the

FIELD

EXPERIMENTS

1958

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), H.V. Garner (Secretary), G.W. Cooke, P.H. Gregory, J.R. Moffatt, C.A. Thorold, R.G. Warren, D.J. Watson.).

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*At Rothamsted unless otherwise stated.

P.T.O.

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WHEAT - BROADBALK 1958

The 115th year

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

Cultivations, etc.:

Cropped sections. Dung applied: Sept 4, 1957. Ploughed: Sept 3-17. Ground chalk applied: Sept 9-16. Autumn fertilizers applied, seed drilled at 2¾ bushels per acre: Nov 20. Section 1A under continuous wheat sprayed with CMPP at 6 pints in 40 gallons per acre, spring fertilizers applied: Apr 30, 1958. Second dressing of nitrate of soda applied to plot 16: May 15. Combine harvested: Sept 9. Variety: Squarehead's Master 13/4.

Fallow section. (V) Ploughed: Sept 3-17, 1957, May 7-9, 1958, July 29-31.

On a few plots an estimate was made of the chaff, cavings, dust, etc., not picked up by the baler.

Broadbalk Wilderness. N.

Cultivations, etc.: Shrubs grubbed out: Dec 2-6, 1957. Part mown: Apr 17, 1958, May 1, May 20, June 11, July 16, Aug 8, Oct 1.

Summary of Results

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

Section	II	IB	III	IV	IA	
Years after fallow	1	2	3	4	7	Mean
2A	23.4	21.7	21.1	22.7	24.2	22.4
2B	24.1	23.5	27.6	26.5	27.7	25.8
3	20.5	11.5	11.7	12.8	17.3	14.7
5	14.1	7.5	14.8	18.6	21.0	15.0
6	18.9	13.3	19.8	21.5	22.3	19.3
7	21.8	21.9	23.5	21.6	25.0	22.4
8	24.9	24.7	24.7	23.3	26.0	24.4
9	26.1	20.7	19.2	19.6	24.1	20.7
10	18.5	21.1	18.1	18.9	19.0	18.9
11	14.5	19.5	16.0	17.8	15.9	16.6
12	15.5	21.8	17.4	20.2	21.2	18.5
13	26.1	22.3	21.0	20.5	22.0	22.5
14	16.8	22.0	19.0	20.4	22.7	19.5
15	27.8	19.3	19.7	16.9	20.9	21.1
16	24.9	21.3	22.5	20.9	20.3	22.4
17	27.2	18.4	22.8	22.4	25.8	23.4
18	21.4	10.5	11.8	12.4	11.7	14.3
19	25.3	20.9	17.4	15.5	20.3	19.7
20	21.2	17.3	-	-	21.0	19.7

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

Section	II	IB	III	IV	IA	
Years after fallow	1	2	3	4	7	Mean
2A	42.6	30.8	30.3	29.9	23.1	33.0
2B	54.4	38.6	38.6	38.3	14.0	41.1
3	23.1	14.6	18.0	16.5	42.1	19.7
5	20.4	16.5	16.2	18.7	23.2	18.5
6	34.1	19.6	26.0	29.0	26.8	28.1
7	36.0	41.3	32.2	34.8	20.5	34.4
8	25.5	43.1	37.8	39.5	17.2	34.3
9	46.8	20.5	31.2	29.6	48.8	33.3
10	22.7	26.3	23.3	23.2	23.5	23.7
11	20.2	23.3	19.5	22.2	18.0	21.0
12	22.8	27.7	21.5	28.3	25.3	24.7
13	43.1	35.0	28.8	33.6	29.8	34.8
14	21.1	19.6	23.1	27.7	32.8	23.9
15	43.5	32.0	30.3	34.3	31.0	35.2
16	37.1	34.4	33.2	30.2	24.3	33.0
17	41.4	24.8	31.6	31.4	37.2	33.6
18	33.6	17.5	19.7	20.6	14.8	21.9
19	34.3	31.5	27.7	28.7	24.6	30.0
20	27.9	26.0	-	-	27.2	27.1

Mean dry matter % as harvested: Grain 77.5
Straw 84.6

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BARLEY - HOOSFIELD 1958

The 107th year

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

Cultivations, etc.: Ploughed: Sept 9 and again Nov 22, 1957. Dung applied: Nov 25. Fertilizers applied: Apr 17, 1958. Seed drilled at 2¾ bushels per acre: Apr 21. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 28. Combine harvested: Sept 9. Variety: Plumage Archer.

In 1958 the plots were combine harvested for the first time, a single cut being made down the centre of each plot (including plots 1N and 5 - 0) for the full length, except on strips 1 and 3, where five combine cuts were taken per plot and weighed separately. The yields shown were estimated from the totals of these cuts.

Summary of Results

Plot	Grain (at 85% dry matter): cwt per acre	Straw (at 85% dry matter): cwt per acre
1 0	4.1	6.0
2 0	6.7	6.9
3 0	5.3	7.4
4 0	6.6	10.6
5 0	8.8	8.9
1 A	7.7	9.9
2 A	17.3	15.0
3 A	9.2	12.6
4 A	16.3	14.4
5 A	15.7	20.1
1 AA	10.1	13.5
2 AA	22.0	20.8
3 AA	11.5	16.1
4 AA	15.5	15.7
1 AAS	19.8	21.1
2 AAS	25.5	22.7
3 AAS	18.4	19.8
4 AAS	19.6	18.3
1 C	18.1	17.2
2 C	18.8	16.4
3 C	16.8	14.0
4 C	17.4	14.6
7 - 1	9.7	11.8
7 - 2	27.2	19.6
6 - 1	4.3	6.9
6 - 2	6.4	6.1
1 N	7.8	12.6
2 N	15.0	16.2
Mean dry matter % as harvested:	79.5	81.7

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58/A/3.1

WHEAT AFTER FALLOW - HOOSFIELD 1958

Without manure 1851 and since

For history, treatments, etc. see "Details of the Classical and Long Term Experiments" 1956. In 1957 the original plots were reduced in size to 0.0337 acres to provide additional land for the study of Wheat Bulb Fly.

Area harvested: 0.0335 acres.

Cultivations, etc.:

Cropped plots. Ploughed: Sept 2, 1957. Seed sown at 3 bushels per acre: Oct 15. Combine harvested: Sept 5, 1958. Variety: Squareheads Master 13/4.

Fallowed plots. Ploughed: Sept 2, 1957

Summary of Results

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

Plot	A_3	A_4	A_1	Mean
No. of years of fallow	1	1	3	
	8.2	8.3	11.6	9.4

Mean dry matter % as harvested: 72.4

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58/A/3.2

GRASS - AGDELL 1958

Measurement of fertilizer residues

For history, treatments, etc. see "Details of the Classical and Long Term Experiments" 1956. In 1958 each plot was split into two for grass and bare fallow and manured with nitrogenous fertilizers only.

Area harvested: 0.0092 acres.

Basal dressing: None to fallow. To grass: 0.8 cwt N per acre as 'Nitro-Chalk' in spring and for each silage cut.

Cultivations, etc.: Ploughed: Nov 22, 1957. Nitrogen fertilizer applied: Apr 23, 1958. Seed sown at 60 lb per acre: Apr 24. The whole field sprayed with MCPA at 4 pints in 40 gallons per acre: May 27, and at 6 pints in 40 gallons per acre: July 8. Cut twice: July 31 and Oct 28. Nitrogenous fertilizer applied: Aug 1. Fallow plots ploughed: Aug 8. Variety: Italian Ryegrass S22.

Summary of Results

Dry matter: cwt per acre

Manure to turnips until 1948	None since 1848		Mineral manure* No nitrogen		Mineral* and nitrogenous manure+		
Plot rotation	5 Fallow	6 Clover	3 Fallow	4 Clover	1 Fallow	2 Clover	Mean
1st cut	5.1	4.2	15.3	14.3	23.4	22.4	14.1
2nd cut	29.0	27.2	30.6	29.4	30.4	30.0	29.4
Total of 2 cuts	34.1	31.4	45.9	43.7	53.8	52.4	43.5

*P, K, Na, Mg.

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

Mean dry matter % as cut, 1st cut: 20.4
2nd cut: 16.3

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MANGOLDS AND SUGAR BEET - BARNFIELD

The 83rd and 13th years

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

Cultivations, etc.: Dung applied, ploughed: Nov 25, 1957. Fertilizers applied: May 5, 1958. Sugar beet drilled at 18 lb per acre, mangolds drilled at 8 lb per acre: May 8. Singled: June 11 to July 5. Sprayed with demeton methyl at 12 oz in 40 gallons per acre: July 7. Top dressings applied: July 14. Lifted: Oct 11 - Nov 21. Varieties: Mangolds - Yellow Globe, sugar beet - Klein E.

Summary of Results

Strip	Cross Dressing 0	N	A	AC	C
	Mangolds, roots: tons per acre				
1	12.74	31.56	28.54	24.15	17.27
2	17.06	36.47	30.34	30.34	25.70
4	6.38	(a) 26.80*	22.13	28.63	20.34
		(b) 27.47*			
5	4.93	20.44	16.17	18.64	14.51
6	4.82	19.73	19.68	26.63	20.84
7	5.84	21.52	20.44	26.87	21.06
8	1.93	16.34	13.95	19.70	15.27
9	19.80				
	Mangolds, leaves: tons per acre				
1	2.42	5.69	5.59	6.23	4.01
2	2.69	6.62	5.54	8.04	5.67
4	1.32	(a) 5.52*	3.64	6.77	4.27
		(b) 5.01*			
5	0.98	4.03	3.35	3.83	3.15
6	1.00	3.76	3.15	4.67	4.23
7	1.34	4.79	3.96	5.64	4.93
8	0.81	3.93	3.76	4.20	4.52
9	3.81				
	Mangolds, plant number: thousands per acre				
1	18.9	19.7	19.1	18.0	17.7
2	23.6	20.8	20.5	19.5	20.7
4	21.8	(a) 21.8*	20.3	19.7	20.2
		(b) 21.1*			
5	21.6	21.3	21.9	20.7	21.5
6	20.5	21.5	20.7	20.2	21.0
7	20.9	21.8	21.0	20.4	21.3
8	19.0	20.5	21.5	21.4	21.6
9	24.0				

*No nitrate of soda. Nitrogen applied as calcium and potassium nitrates.

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Strip	Cross Dressing 0	N	A	AC	C
	Sugar beet, roots (washed): tons per acre				
1	9.04	13.41	13.47	14.26	10.84
2	6.85	12.69*	12.62	13.65	12.47
4	2.08	(b) 11.37	10.43	14.31	12.75
5	2.77	8.76	9.29	10.76	9.84
6	1.89	9.95	10.32	13.65	11.83
7	2.43	10.30	10.60	12.64	10.81
8	1.89	7.41	7.56	11.24	9.22
9	8.39				
	Sugar beet, tops: tons per acre				
1	6.64	13.14	16.61	17.00	15.29
2	6.20	14.85*	14.36	18.76	13.48
4	1.81	(b) 12.02	6.50	14.70	11.92
5	1.61	10.11	7.82	15.88	10.11
6	1.66	10.60	6.55	15.09	10.70
7	1.91	13.24	9.62	17.05	11.14
8	1.86	9.67	7.57	15.24	11.87
9	7.43				
	Sugar beet, plant number: thousands per acre				
1	23.7	22.7	23.4	22.8	22.9
2	24.3	22.8*	23.5	24.4	24.3
4	22.3	(b) 24.0	24.5	23.6	24.9
5	23.0	23.7	23.5	22.2	23.9
6	22.7	24.3	24.9	24.8	25.2
7	22.3	24.3	23.9	23.3	23.3
8	22.4	23.0	24.4	25.0	25.0
9	22.6				
	Sugar beet, sugar percentage				
1	17.9	17.2	17.0	17.0	16.8
2	17.7	17.0*	16.6	16.4	17.0
4	18.0	(b) 17.4	18.4	17.4	17.6
5	17.7	16.9	17.8	16.5	17.1
6	17.4	17.2	18.2	17.0	17.4
7	17.8	17.6	18.3	16.9	17.5
8	17.4	17.3	18.0	17.2	17.3
9	17.9				

*No nitrate of soda. Nitrogen applied as calcium and potassium nitrates.

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58/A/5

HAY - THE PARK GRASS PLOTS 1958

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

Cultivations, etc.: Mineral fertilizers applied: Dec 23, 1957.
Nitrogenous fertilizers applied: 1st dressing - May 1, 1958;
2nd dressing - May 15. Cut twice: July 7 and Dec 22 - 30.

Note: The 2nd crop was cut under very unfavourable conditions and there was some soil contamination, particularly on plots 1L, 2U, 2L, 3U, 3L, 4-1U, 4-1L.

Summary of Results

Yield of hay: cwt per acre

Plot	Not limed			Limed		
	1st crop	2nd crop	Total	1st crop	2nd crop	Total
1	14.0	22.1	36.1	19.8	28.5	48.3
2	13.7	24.1	37.8	16.3	31.0	47.3
3	11.2	19.8	31.0	15.9	19.8	35.7
4-1	20.2	23.4	43.6	19.4	25.9	45.3
4-2	24.5	20.1	44.6	28.3	20.8	49.1
5-1	10.9	18.6	29.5			
5-2	22.5	21.8	44.3			
6	28.2	26.5	54.7			
7	28.3	25.0	53.3	38.3	20.1	58.4
8	22.0	25.2	47.2	18.8	19.6	38.4
9	35.8	25.1	60.9	45.0	26.2	71.2
10	30.6	22.0	52.6	33.8	20.4	54.2
11-1	36.8	40.5	77.3	43.6	38.5	82.1
11-2	39.8	45.5	85.3	50.5	42.1	92.6
12	14.5	19.9	34.4			
13	28.5	34.5	63.0	30.6	30.1	60.7
14	46.2	31.8	78.0	45.2	37.8	83.0
15	23.9	15.2	39.1	36.6	25.4	62.0
16	33.8	31.5	65.3	45.6	51.0	96.6
17	23.7	25.2	48.9	25.8	33.6	59.4
18	24.4	31.2	55.6	30.8*	17.6*	48.4*
				34.5+	22.1+	56.6+
19	30.1	32.9	63.0	33.9*	33.5*	67.4*
				31.4+	37.9+	69.3+
20	39.0	33.8	72.8	43.1*	32.1*	75.2*
				33.4+	36.2+	69.6+

* Heavy liming. +Light liming.

Note: The second crop was carted green; hay yields were estimated from the dry matter.

Mean dry matter % as weighed: 1st crop 87.8; 2nd crop 18.6

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58/A/6.1

BARLEY 1958 AND MULTIPLE CROPPING x PK 1957 and 1958 - HOOSFIELD EXHAUSTION LAND

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

On the western halves - plots 2, 4, 6, 8, 10 - the land fallowed in 1957 was sown to barley in 1958, the remaining 90 links, cropped in 1957, was bare fallowed in 1958.

In 1957, on the eastern half of the field, a modified scheme of cropping was introduced to evaluate manurial residues under 6 different crops in 1957 and again on fresh land in 1958.

The original strips 1, 3, 5, 7, 9 were divided into 12 cross strips of 5 main plots, each main plot being divided into 4 sub plots. In 1957 alternate cross strips were cropped, the remaining cross strips being fallowed, serving as headlands. These uncropped headlands carried the test crops in 1958.

Area of each sub plot:
1957: 0.0035 acres.
1958: 0.0032 acres.

Treatments.
Crops: Potatoes, sugar beet, kale, spring wheat, barley, swedes.
Fertilizer treatments to plots, combinations of:-
Superphosphate: None; 0.25 (P_1); 0.5 (P_2); 1.0 (P_4) cwt P_2O_5 per acre, for all crops.
Sulphate of potash: None; 0.15 (K_1); 0.3 (K_2); 0.6 (K_4) cwt K_2O per acre, for wheat, barley and swedes.
Sulphate of potash: None; 0.3 (K_2); 0.6 (K_4); 1.2 (K_8) cwt K_2O per acre for potatoes, sugar beet and kale.
The above combinations of treatments vary according to the original manurial treatments on wheat and potatoes.

Basal dressing:
Rates of N per acre, as sulphate of ammonia:

Potatoes	1.0	
Sugar beet	1.0	
Kale	0.6	in seedbed, followed later by two top-dressings each of 0.6 as 'Nitro-Chalk'.
Spring wheat	0.6	
Barley	0.5	
Swedes	0.6	in 1957
	0.4	in 1958

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Cultivations, etc.:

Western half 1958.

Cropped section. Barley. Ploughed: Dec 31, 1957. Seed drilled at 2¾ bushels per acre: Apr 12, 1958. Sulphate of ammonia applied at 2½ cwt per acre: Apr 17. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 28. Combine harvested: Sept 7. Variety: Plumage Archer.

Fallow section. Ploughed: Dec 31, 1957 and June 16, 1958.

Eastern half.

1957. Ploughed: Sept 26, 1956.

Potatoes: Fertilizers applied, potatoes hand planted: Apr 29, 1957. Earthed up: July 6. Sprayed with copper fungicide at 5 lb in 40 gallons per acre: Aug 3 and Aug 21. Harvested: Sept 30. Variety: Majestic.

Sugar beet: Fertilizers applied: Apr 4. Seed drilled at 12 lb per acre: Apr 15. Sprayed with miscible DDT at 3 pints in 20 gallons per acre: May 29. Singled: June 19. Sprayed with demeton methyl at 12 fluid oz in 80 gallons per acre: July 9. Harvested: Nov 7. Variety: Klein E.

Kale: Seedbed N and PK applied: Apr 4. Seed drilled at 6 lb per acre: Apr 27. Thinned: June 28. Nitrogen top-dressings applied: July 2 and Sept 13. Harvested: Dec 2. Variety: Thousand Head.

Spring wheat: Fertilizers applied: Mar 19. Seed drilled at 3½ bushels per acre: Mar 21. Harvested: Aug 19. Variety: Koga II.

Barley: Fertilizers applied: Mar 18. Seed drilled at 2¾ bushels per acre: Mar 21. Harvested: Aug 1. Variety: Plumage Archer.

Swedes: Fertilizers applied: Apr 17. Seed drilled at 6 lb per acre: Apr 27. Singled: June 21. Harvested: Nov 15. Variety: Wilhelmsburger.

1958. Ploughed: Dec 31, 1957. All varieties as in 1957.

Potatoes: Fertilizers applied: Apr 23, 1958. Potatoes hand planted: Apr 25. Earthed up: July 8. Sprayed 3 times with copper fungicide, 5 lb in 40 gallons per acre: July 12, and 3 lb and 1 pint spreader in 40 gallons per acre: Aug 6 and 16. Harvested: Sept 9.

Sugar beet: Fertilizers applied, seed drilled at 19 lb per acre: Apr 14. Singled: June 6. Sprayed with demeton methyl at 12 fluid oz in 40 gallons per acre: July 7. Harvested: Nov 18.

Kale: Seedbed N and PK applied: Apr 14. Seed drilled at 3 lb per acre: Apr 15. Thinned: June 10. Nitrogen top dressings applied: July 5 and Aug 27. Harvested: Dec 3.

Spring wheat: Fertilizers applied: Apr 11. Seed drilled at 3¼ bushels per acre: Apr 12. Harvested: Sept 1.

Barley: Fertilizers applied: Apr 11. Seed drilled at 2¾ bushels per acre: Apr 12. Harvested: Aug 13.

Swedes: Fertilizers applied, seed drilled at 5 lb per acre: May 15. Singled: June 10. Harvested: Oct 5.

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Summary of Results

Barley

Manuring to potatoes 1876-1901*	Yield (at 85% dry matter): cwt per acre Grain	Straw
2 Unmanured after dung 1876-81	10.4	12.3
4 Dung	27.1	24.1
6 Nitrate of soda	11.5	12.8
8 Nitrate of soda and complete minerals	22.4	21.8
10 Complete minerals	23.6	26.2
Mean dry matter % as threshed	74.6	80.7

*For certain changes see history.

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Strip	Treatment 1957	Potatoes Total tubers: tons per acre	Sugar beet Roots (washed): tons/acre	Sugar beet Total Sugar: cwt/acre	Sugar beet Tops: tons/acre	Kale Total yield: tons per acre
1	P_1 -	4.7	8.3	25.9	14.5	17.3
	P_1K_2	7.9	6.8	20.8	12.4	16.5
	P_1K_4	11.5	9.9	30.7	16.3	19.8
	P_4K_8	10.9	8.3	26.3	12.4	17.4
3	P_1 -	9.9	9.0	28.7	12.0	17.1
	P_1K_4	12.8	11.0	34.2	14.5	18.2
	P_4K_8	14.1	11.1	36.6	13.8	18.3
	$-K_8$	8.8	9.4	29.7	11.2	15.9
5	$-K_8$	5.0	6.1	18.3	10.0	13.2
	P_1K_8	11.4	8.6	27.6	12.0	15.8
	P_2K_8	11.8	9.1	28.7	12.6	17.4
	P_4K_8	12.7	9.6	29.4	14.9	19.2
7	P_1 -	10.0	9.5	31.2	12.6	18.0
	P_1K_2	11.4	9.6	30.5	11.4	18.4
	P_1K_4	14.0	9.8	30.6	12.8	18.4
	P_4K_8	14.1	9.0	27.9	11.0	20.9
9	$-K_8$	9.3	9.0	29.6	9.6	15.2
	P_1K_8	9.6	11.0	36.0	11.8	16.5
	P_2K_8	11.4	9.1	29.0	10.6	17.6
	P_4K_8	12.9	9.9	32.5	12.0	17.7

Strip	Treatment 1957	Barley Grain cwt per acre	Barley Straw cwt per acre*	Wheat Grain cwt per acre	Wheat Straw cwt per acre*	Swedes Roots tons per acre	Swedes Tops tons per acre
1	P_1 -	26.7	22.4	25.6	36.0	10.7	2.6
	P_1K_1	22.7	19.6	21.4	32.4	11.9	2.5
	P_1K_2	22.2	21.3	28.8	43.8	11.8	2.2
	P_4K_4	30.2	27.0	23.6	33.7	11.5	2.4
3	$-K_4$	29.1	23.7	24.1	30.5	11.1	2.1
	P_2K_4	28.3	26.1	25.2	35.3	12.1	2.2
	P_1K_4	28.9	23.2	24.6	34.0	14.0	2.7
	P_4 -	27.7	22.2	23.9	30.7	13.2	2.5
5	$-K_4$	20.4	19.7	19.3	23.0	6.9	1.0
	P_1K_4	22.1	19.7	20.3	26.3	8.4	1.4
	P_2K_4	22.8	22.4	21.2	29.6	11.1	1.8
	P_4K_4	26.2	21.1	23.2	33.0	12.2	1.8
7	P_1 -	29.3	25.0	22.5	31.2	12.4	2.3
	P_1K_1	27.5	22.9	24.4	32.9	12.7	2.2
	P_1K_2	28.9	25.3	24.7	35.2	12.9	2.5
	P_4K_4	28.4	23.1	20.5	28.8	12.9	2.2
9	$-K_4$	27.2	23.0	21.2	27.3	10.4	1.8
	P_1K_4	25.1	22.0	24.1	32.4	11.6	2.0
	P_2K_4	26.4	25.0	23.8	31.9	11.8	2.2
	P_4K_4	26.0	22.9	22.6	30.8	12.2	2.0
Mean D.M. %		82.4	71.8	81.0	81.0		

*At 85% dry matter

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Strip	Treatment 1958	Potatoes Total tubers: tons per acre	Sugar beet Roots (washed): tons/acre	Sugar beet Total Sugar: cwt/acre	Sugar beet Tops: tons/acre	Kale Total yield: tons per acre
1	P_4 -	8.8	16.4	51.8	16.2	23.1
	P_4K_2	9.7	18.2	58.6	14.8	21.1
	P_4K_4	12.1	19.7	63.2	14.6	22.6
	P_4K_8	13.9	20.3	64.2	14.8	19.1
3	P_4 -	11.0	19.8	64.6	16.1	22.4
	P_4K_4	13.7	21.3	68.9	15.9	25.7
	P_4K_8	14.4	22.5	72.1	15.9	28.0
	$-K_8$	10.8	18.8	60.8	13.7	22.4
5	$-K_8$	5.2	13.5	42.8	14.2	16.3
	P_1K_8	11.6	18.2	57.5	15.6	22.7
	P_2K_8	13.6	18.8	61.4	15.3	22.8
	P_4K_8	13.3	19.0	61.8	15.4	21.0
7	P_4 -	12.1	20.2	66.7	12.7	24.2
	P_4K_2	13.8	19.3	62.8	14.0	23.3
	P_4K_4	14.9	19.9	65.2	13.1	23.0
	P_4K_8	15.2	17.9	58.7	12.8	24.6
9	$-K_8$	7.4	18.4	60.8	12.2	23.1
	P_1K_8	11.0	17.1	56.0	12.0	23.5
	P_2K_8	11.0	17.2	55.5	10.6	24.9
	P_4K_8	13.2	19.9	63.1	13.2	25.2

Strip	Treatment 1958	Barley Grain cwt per acre*	Barley Straw cwt per acre*	Wheat Grain cwt per acre*	Wheat Straw cwt per acre*	Swedes Roots tons per acre	Swedes Tops tons per acre
1	P_4 -	26.4	37.5	27.1	43.6	19.4	3.8
	P_4K_1	26.8	40.2	26.7	44.3	21.9	4.3
	P_4K_2	26.5	38.6	26.8	46.1	20.9	4.4
	P_4K_4	26.5	39.8	27.8	50.9	20.6	4.1
3	$-K_4$	23.1	37.2	28.2	49.6	23.2	4.2
	P_2K_4	29.7	37.5	29.1	55.0	22.7	4.5
	P_4K_4	32.6	42.0	31.9	55.8	25.6	4.3
	P_4 -	29.5	39.9	29.3	54.5	24.8	5.0
5	$-K_4$	12.1	26.6	18.7	28.4	10.1	2.5
	P_1K_4	20.2	33.5	24.2	41.6	19.8	4.5
	P_2K_4	24.6	37.2	27.4	48.6	20.8	4.8
	P_4K_4	29.4	39.6	29.1	51.2	23.4	4.7
7	P_4 -	27.0	39.5	25.0	45.0	24.9	4.0
	P_4K_1	26.3	42.7	25.9	49.3	25.3	4.4
	P_4K_2	28.6	39.2	27.2	49.4	24.8	4.3
	P_4K_4	28.3	41.3	27.0	50.1	25.0	4.2
9	$-K_4$	24.0	38.4	23.7	46.6	20.6	4.0
	P_1K_4	25.8	38.1	24.5	42.4	21.5	3.3
	P_2K_4	27.5	39.3	24.7	45.7	20.5	4.2
	P_4K_4	29.4	38.1	25.5	48.1	23.6	4.1
Mean D.M. %		80.2	77.1	77.6	61.0		

*At 85% dry matter

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58/A/7

CLOVER - ROTHAMSTED GARDEN 1958

The 105th year

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

Cultivations, etc.: Muriate of potash applied: Nov 26, 1957. Resowed all blank patches: May 2, 1958. Cut 3 times: July 9, Aug 30, Nov 7.

Summary of Results

Dry matter: cwt per acre

Muriate of potash: cwt per acre	Cuts 1st	2nd	3rd	Total
None	37.8	6.1	2.0	45.9
2	56.1	8.2	3.1	67.4

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WHEAT - WOBURN STACKYARD 1958

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

On account of poor development, particularly of the winter sown crops, it was decided to plough out the whole area of this experiment on May 28, 1958.

Cultivations, etc.: Ploughed: Nov 20, 1956, Apr 16, and July 29, 1957. Ground chalk applied: Aug 8. Winter sown wheat and barley drilled: Nov 19. Spring sown wheat and barley drilled: Mar 21, 1958. Varieties: Winter sown wheat - Squarehead's Master 13/4; spring sown wheat - Peko; winter sown barley - Pioneer; spring sown barley - Plumage Archer.

BARLEY - WOBURN STACKYARD 1958

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

On account of poor development, particularly of the winter sown crops, it was decided to plough out the whole area of this experiment on May 27, 1958.

Cultivations, etc.: Ploughed: Nov 21, 1956, Apr 17, and July 30, 1957. Ground chalk applied: Aug 8. Winter sown wheat and barley drilled: Nov 19. Spring sown wheat and barley drilled: Mar 21, 1958. Varieties: Winter sown wheat - Squarehead's Master 13/4; spring sown wheat - Peko; winter sown barley - Pioneer; spring sown barley - Plumage Archer.

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58/Ba/1.1

THREE COURSE ROTATION EXPERIMENT

7th year of revised scheme

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

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

Cultivations, etc.:

Potatoes.

Straw applied, all plots ploughed: Dec 11 - 31, 1957. Fertilizers applied: Apr 15, 1958. Potatoes machine planted: Apr 17. Earthed up: July 7. Sprayed four times with copper fungicide; at 5 lb in 40 gallons per acre: July 12; at 3 lb and 1 pint of spreader in 40 gallons per acre: Aug 1, 6 and 16. Sprayed with sulphuric acid, 20% BOV at 100 gallons per acre: Sept 9. Lifted: Sept 23. Variety: Majestic.

Barley.

Ground chalk applied at 23 cwt per acre: Nov 23, 1957. Straw applied, all plots ploughed: Dec 11 - 31. Fertilizers applied: Mar 21, 1958. Seed drilled at 2¾ bushels per acre: Mar 22. Sprayed with MCPA at 4 pints in 40 gallons per acre: June 4. Harvested: Aug 26. Variety: Plumage Archer.

Sugar beet.

Straw applied, all plots ploughed: Dec 11 - 31, 1957. Fertilizers applied, seed drilled at 19 lb per acre: Apr 14,1958. Singled: June 5. Sprayed with demeton methyl at 12 oz in 40 gallons per acre: July 7. Lifted: Nov 24. Variety: Klein E.

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Summary of Results

Potatoes

Treatments applied: 1950	1951	1953, 1955 and 1957 / 1952, 1954, 1956 & 1958	0 –	0 K	0.4N –	0.4N K	St + 0.2N –	St + 0.2N K	St + 0.6N –	St + 0.6N K	K_s –	K_s K	K_s + 0.4N –	K_s + 0.4N K
			Total tubers: tons per acre											
	Ar	0			8.30	8.64								
		0.4N	11.00	10.23										
Ar		0			8.16	8.40								
		0.4N	9.80	10.46										
	St1 St2	0			7.92	9.26			9.60	9.43			9.71	10.48
		0.4N	11.07	10.99			12.88	12.48			12.33	11.98		
St1 St2		0			9.05	9.33								
		0.4N	11.59	11.25										
		St+ 0.2N			9.10	8.94								
		St+ 0.6N	11.52	11.90										
		K_s			8.86	9.53								
		K_s + 0.4N	11.19	12.02										
	Ad	0			8.48	9.13			9.78	10.00			9.15	8.52
Ad		0.4N	11.25	11.69										
		St+ 0.6N	11.35	11.65										
		K_s + 0.4N	10.04	11.91										

58/Ba/1.2

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Potatoes

Treatments applied: 1950	1951	1953, 1955 and 1957 / 1952, 1954, 1956 & 1958	0 –	0 K	0.4N –	0.4N K	St + 0.2N –	St + 0.2N K	St + 0.6N –	St + 0.6N K	K_s –	K_s K	K_s + 0.4N –	K_s + 0.4N K
			Percentage ware ($1\frac{1}{2}$" riddle)											
	Ar	0			82.8	87.0								
		0.4N	88.2	90.9										
Ar		0			83.9	87.6								
		0.4N	85.2	86.8										
	St1 St2	0			82.5	83.2			87.1	88.4			88.3	85.8
		0.4N	84.0	85.4			87.2	87.3			89.3	87.6		
St1 St2		0			86.4	88.1								
		0.4N	92.1	91.1										
		St+ 0.2N			81.1	86.4								
		St+ 0.6N	90.7	91.0										
		K_s			88.4	89.4								
		K_s + 0.4N	87.7	90.5										
	Ad	0			84.2	87.5			88.2	86.8			85.4	87.4
Ad		0.4N	89.4	92.9										
		St+ 0.6N	88.6	90.1										
		K_s + 0.4N	87.3	88.4										

58/Ba/1.3

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Barley

Treatments applied: 1950	1951	1953, 1955 and 1957 (1952, 1954, 1956 & 1958)	0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
Grain (at 85% dry matter): cwt per acre								
	Ar	0		20.0				
		0.4N	27.1					
Ar		0		21.2				
		0.4N	25.8					
	St1 St2	0		23.7		21.7		19.5
		0.4N	22.8		28.2		26.7	
St1 St2		0		22.3				
		0.4N	22.4					
		St+ 0.2N		23.5				
		St+ 0.6N	26.8					
		K_s		22.6				
		K_s+ 0.4N	29.4					
	Ad	0		21.5		21.0		20.9
Ad		0.4N	30.0					
		St+ 0.6N	30.0					
		K_s+ 0.4N	24.8					
Straw (at 85% dry matter): cwt per acre								
	Ar	0		19.0				
		0.4N	26.1					
Ar		0		19.1				
		0.4N	25.2					
	St1 St2	0		20.7		24.4		16.5
		0.4N	29.3		32.2		30.7	
St1 St2		0		19.5				
		0.4N	25.2					
		St+ 0.2N		21.1				
		St+ 0.6N	25.3					
		K_s		21.0				
		K_s+ 0.4N	27.3					
	Ad	0		19.5		17.8		19.1
Ad		0.4N	29.5					
		St+ 0.6N	32.6					
		K_s+ 0.4N	25.2					

Mean dry matter % as harvested Grain: 81.2
Straw: 79.3

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58/Ba/1.5

Sugar beet

Treatments applied: 1953, 1955 and 1957			0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
1950	1951	1952, 1954, 1956 & 1958						
Roots (washed): tons per acre								
	Ar	0		14.20				
		0.4N	15.47					
Ar		0		13.46				
		0.4N	15.51					
	St1 St2	0		12.57		15.25		13.95
		0.4N	16.80		17.53		15.84	
St1 St2		0		13.57				
		0.4N	15.20					
		St+ 0.2N		12.12				
		St+ 0.6N	16.29					
		K_s		13.56				
		K_s + 0.4N	17.08					
	Ad	0		13.99		13.70		14.78
Ad		0.4N	15.11					
		St+ 0.6N	14.06					
		K_s + 0.4N	16.72					
Sugar percentage								
	Ar	0		17.4				
		0.4N	17.2					
Ar		0		17.7				
		0.4N	17.4					
	St1 St2	0		17.4		17.3		18.0
		0.4N	17.4		17.3		17.6	
St1 St2		0		17.6				
		0.4N	17.4					
		St+ 0.2N		17.6				
		St+ 0.6N	17.1					
		K_s		17.8				
		K_s + 0.4N	17.3					
	Ad	0		17.4		17.4		16.6
Ad		0.4N	17.7					
		St+ 0.6N	17.8					
		K_s + 0.4N	17.0					

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Sugar beet

Treatments applied: 1950	1951	1952, 1954, 1956 & 1958	0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
Total sugar: cwt per acre								
	Ar	0		49.6				
		0.4N	53.3					
Ar		0		47.8				
		0.4N	54.1					
	St1 St2	0		43.7		52.8		50.3
		0.4N	58.6		60.7		55.7	
St1 St2		0		47.8				
		0.4N	52.9					
		St+ 0.2N		42.7				
		St+ 0.6N	55.8					
		K_s		48.2				
		K_s + 0.4N	59.0					
	Ad	0		48.6		47.7		49.1
Ad		0.4N	53.5					
		St+ 0.6N	50.0					
		K_s + 0.4N	56.7					
Tops: tons per acre								
	Ar	0		10.18				
		0.4N	9.44					
Ar		0		8.28				
		0.4N	10.64					
	St1 St2	0		7.93		11.80		9.16
		0.4N	11.41		10.58		10.93	
St1 St2		0		9.68				
		0.4N	10.10					
		St+ 0.2N		7.74				
		St+ 0.6N	10.21					
		K_s		9.29				
		K_s + 0.4N	11.67					
	Ad	0		9.94		9.33		9.53
Ad		0.4N	11.06					
		St+ 0.6N	9.40					
		K_s + 0.4N	13.33					

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58/Ba/1.7

Sugar beet

Treatments applied: 1950	1951	1953, 1955 and 1957 / 1952, 1954, 1956 & 1958	0	0.4N	St + 0.2N	St + 0.6N	K_s	K_s + 0.4N
		Plant number: thousands per acre						
	Ar	0		32.4				
		0.4N	32.2					
Ar		0		32.1				
		0.4N	32.0					
	St1 St2	0		31.5		32.5		34.2
		0.4N	32.6		31.3		33.1	
St1 St2		0		32.1				
		0.4N	31.0					
		St+ 0.2N		31.7				
		St+ 0.6N	31.2					
		K_s		31.6				
		K_s+ 0.4N	32.9					
	Ad	0		33.2		32.4		31.1
Ad		0.4N	32.4					
		St+ 0.6N	33.1					
		K_s+ 0.4N	33.0					

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58/Ba/2.1

SIX COURSE ROTATION EXPERIMENT

The 29th year

Seasonal effects of fertilizers - Rothamsted Long Hoos IV and Woburn Stackyard 1958.

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

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

Cultivations, etc.:

Rothamsted

Sugar beet.
Ploughed twice: Aug 22 and Nov 2, 1957. Fertilizers applied, seed drilled at 19 lb per acre: Apr 14, 1958. Singled: June 4. Sprayed with demeton methyl, 12 oz in 40 gallons per acre: July 7. Lifted: Nov 24. Variety: Klein E.

Barley.
Sugar beet tops spread: Nov 21, 1957. Ploughed: Nov 22. Ground chalk applied at 23 cwt per acre: Nov 23. Fertilizers applied: Mar 21, 1958. Seed drilled at $2\frac{3}{4}$ bushels per acre: Mar 22. Clover seed undersown: Apr 25. Harvested: Aug 27. Variety: Plumage Archer.

Clover.
Seed undersown in barley at 40 lb per acre: May 20, 1957. Autumn fertilizers applied: Sept 23. Sulphate of ammonia applied: Apr 8, 1958. Cut: July 8. Variety: S123 Late Flowering Red.

Wheat.*
Ploughed twice: July 7 and Oct 9, 1957. Autumn fertilizers applied, seed drilled at $2\frac{3}{4}$ bu. per acre: Oct 14. Sulphate of ammonia applied: Apr 9, 1958. Sprayed with CMPP, 6 pints in 40 gallons per acre: Apr 30. Harvested: Sept 3 - 11. Variety: Yeoman.

Potatoes.
Ploughed twice: Aug 22 and Oct 9, 1957. Ridged, fertilizers applied, potatoes planted: Apr 19, 1958. Earthed up: July 8. Sprayed 4 times with copper fungicide, 5 lb in 40 gallons per acre: July 12 and at 3 lb and 1 pint of spreader in 40 gallons per acre: Aug 1, 6 and 16. Sprayed with sulphuric acid, 20% BOV at 100 gallons per acre: Sept 9. Lifted: Sept 25. Variety: Majestic.

Rye.
Ploughed: Oct 9, 1957. Ground chalk applied at 23 cwt per acre: Oct 14. Autumn fertilizers applied, seed drilled at 3 bushels per acre: Oct 15. Sulphate of ammonia applied: Apr 9, 1958. Sprayed with CMPP, 6 pints in 40 gallons per acre: Apr 30. Harvested: Aug 26. Variety: King II.

* Owing to severe lodging, yields from this crop were estimated from a 6 ft. wide sample cut from each plot (Area 0.0054 acres).

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Woburn

Sugar beet.
Ploughed twice: Aug 29 and Nov 30, 1957. Fertilizers applied, seed drilled at 10 lb per acre: Apr 17, 1958. Sprayed with miscible DDT at 3 pints in 40 gallons per acre: May 3. Singled: June 6. Sprayed with demeton methyl, 12 oz in 40 gallons per acre: June 26. Lifted: Oct 15. Variety: Klein E.

Barley.
Ploughed: Nov 29, 1957. Fertilizers applied: Mar 19, 1958. Seed drilled at 2½ bushels per acre: Mar 20. Harvested: Aug 25. Variety: Herta.

Clover.
Ploughed: Aug 9 and 17, 1957. PK fertilizers applied: Aug 30. Seed broadcast at 40 lb per acre: Sept 5. Ploughed: Mar 4, 1958. Nitrogen fertilizers applied: Mar 19. Resown: Mar 24. Cut: July 14. Variety: Crimson Clover.

Wheat.
Ploughed twice: July 8 and Aug 29, 1957. Autumn fertilizers applied: Oct 17. Seed drilled at 2½ bushels per acre: Oct 26. Sulphate of ammonia applied: Apr 21, 1958. Sprayed with CMPP, 6 pints in 40 gallons per acre: May 3. Harvested: Aug 26. Variety: Yeoman.

Potatoes.
Ploughed twice: Aug 29, 1957 and Jan 14, 1958. Fertilizers applied, and potatoes hand planted: Apr 21. Earthed up: June 18. Sprayed with copper fungicide, 5 lb in 80 gallons per acre: July 14. Twice sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 29 and Aug 16. Sprayed with arsenious compound, 1 gallon in 40 gallons per acre: Sept 12. Lifted: Oct 7. Variety: Majestic.

Rye.
Ploughed: Oct 5, 1957. Ground chalk applied at 20 cwt per acre: Oct 10. Fertilizers applied: Oct 17. Seed drilled at 2½ bushels per acre: Oct 26. Sprayed with CMPP, 6 pints in 40 gallons per acre: May 3, 1958. Sulphate of ammonia applied: Apr 21. Harvested: Aug 26. 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	14.24	8.77	24.5*	26.1*
Response to: N	+6.52	+4.22	+9.4	+4.0
P	+1.25	+7.69	-3.5	-7.9
K	-1.28	+1.02	+1.2	+3.3
Mean dry matter % as harvested:			78.9	81.1
	Sugar Beet sugar percentage		Barley, straw: cwt per acre	
Mean	17.4	16.6	29.6*	32.3*
Response to: N	-0.4	+0.2	+6.6	+14.9
P	-1.0	+0.1	+11.5	+1.7
K	+0.2	+0.4	-0.6	+0.6
Mean dry matter % as harvested:			72.2	83.2
	Sugar Beet, total sugar: cwt per acre		Clover, hay, dry matter: cwt per acre	
Mean	49.6	29.4	47.7	14.9
Response to: N	+21.3	+14.1	-7.0	+10.7
P	+1.5	+25.8	-5.9	+13.3
K	-3.6	+4.1	+1.2	-6.2
Mean dry matter % as cut:			60.2	17.9
	Sugar Beet, tops: tons per acre		Wheat, grain: cwt per acre	
Mean	9.17	7.10	18.7*	20.6*
Response to: N	+3.27	+4.42	-6.7	+19.3
P	-0.24	+5.93	-3.4	+1.8
K	+0.80	-1.40	+2.6	+0.6
Mean dry matter % as harvested:			77.2	80.1
	Sugar Beet, plant number: thousands per acre		Wheat, straw: cwt per acre	
Mean	31.1	**	46.9*	28.4*
Response to: N	+0.4		+14.1	+31.0
P	-0.3		-7.9	+3.4
K	-1.0		+8.0	+0.1
Mean dry matter % as harvested:			75.5	82.4

* (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	
Mean	7.75	6.48	23.2*	25.2*
Response to: N	+8.41	+4.04	+11.6	+14.4
P	+1.85	-2.91	-3.9	+3.3
K	+0.32	+3.23	+1.4	-0.6
Mean dry matter % as harvested:			81.2	80.4
	Potatoes, percentage ware		Rye, straw: cwt per acre	
	(1)	(2)		
Mean	87.2	75.0	41.5*	34.1*
Response to: N	+6.0	+0.2	+31.0	+19.8
P	-7.7	+10.0	-11.3	+6.4
K	+0.9	+5.8	+4.8	-3.3
Mean dry matter % as harvested:			83.4	82.3

* (At 85% dry matter)

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

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LEY AND ARABLE ROTATIONS

Highfield and Fosters Field 1958 - the 10th year.

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

Permanent and reseeded grass

The hay crops are now discontinued in favour of silage cuts, which are taken in alternate years not later than the end of May, the silage plots being grazed immediately afterwards.

Revised PK dressings

	P_2O_5	K_2O	
Wheat, barley and oats	0.15	0.3	combine drilled
2nd and 3rd year leys, permanent and reseeded grass, all grazed	0.3	0.6	broadcast in winter
Permanent and reseeded grass (silage plots)	0.6	1.2	broadcast in winter
2nd and 3rd year cut grass	1.2	1.2	broadcast in winter as compound fertilizer (16% P_2O_5, 16% K_2O)
		0.15 v.0.3	for every cut as compound fertilizer (16% N, 16% K_2O)
Treatment potatoes and 2nd and 3rd year lucerne	0.9	1.8	in ridges or broadcast in winter for lucerne.

Note: Unless otherwise stated all the above dressings are applied as compound fertilizer (10% P_2O_5, 20% K_2O). All other dressings remain unchanged, except as described below.

Revised N dressings

	N	
Permanent and reseeded grass (silage plots)	0.075 v. 0.15	as 'Nitro-Chalk' in early spring for silage cut; another equal dose in late July.

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58/Bb/1.2

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

Crop	Year of cycle	Field etc.	Rate	
Wheat (following lucerne)	"1st test"	Highfield	1.8	(3 years previous lucerne)
		Fosters	2.4	
Wheat (following cut grass)	"1st test"	Highfield	3.6	(3 years previous cutting)
		Fosters	3.0	
Cut grass	"1st treatment"		3.0	(3 years previous cutting)
	"2nd treatment"		2.4	(received supplement in 1957)
	"3rd treatment"	Highfield	3.6	(received supplement in 1957)
		Fosters	3.0	
Lucerne	"1st treatment"		3.0	(3 years previous lucerne)
	"2nd treatment"		1.2	(received supplement in 1957)
	"3rd treatment"		1.2	(received supplement in 1957)
Permanent and reseeded grass	"1st treatment"	Highfield (blocks 1 & 4) Fosters (blocks 1 & 3)	2.4	(2 previous hay crops taken)
	"2nd treatment"	Highfield (blocks 9 & 12) Fosters (blocks 6 & 11)	1.2	(1 previous hay crop taken)

The following should be added to the list for 1957:

Wheat (following 3rd year lucerne)	"1st test"	Highfield	3.7	(3 years previous lucerne)
		Fosters	4.0	
Wheat (following 3rd year cut grass)	"1st test"		4.2	(3 years previous cutting)

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Cultivations, etc.:

HIGHFIELD

1st year Treatment Crops

Cut grass. Ploughed twice: Aug 27, 1957 and Oct 24. 1st dressing of supplementary K applied: Dec 28. 'Nitro-Chalk' and basal PK applied: Apr 21, 1958. Seeds sown at 33 lb per acre: Apr 22. Sprayed with MCPB at 5 pints in 40 gallons per acre: May 31. 2nd and 3rd dressings of supplementary K applied: June 20 and Oct 7. Cut 5 times: June 20, July 16, Aug 8, Oct 3, Oct 31. 'Nitro-Chalk' applied after every cut, except the last.

Grazed ley. Ploughed twice: Aug 27, 1957 and Oct 24. 'Nitro-Chalk' and basal PK applied: Apr 21, 1958. Seed sown at 44 lb per acre: Apr 22. Sprayed with MCPB at 5 pints in 40 gallons per acre: May 31. 'Nitro-Chalk' applied: July 29. Grazed: 7 circuits, June 20 - Oct 24.

Lucerne. Ploughed twice: Aug 27, 1957 and Oct 24. 1st dressing of supplementary K applied: Dec 28. Basal PK applied: Apr 21. 1958. Seed drilled at 28 lb per acre: Apr 22. 2nd and 3rd dressings of supplementary K applied: Aug 2 and Nov 3. Cut twice: July 31 and Oct 31. Variety: Du Puits.

Hay. Seeds undersown in barley at 28 lb per acre: May 10, 1957. Basal PK applied: Feb 7, 1958. 'Nitro-Chalk' applied: Apr 10. Cut: June 11

2nd year Treatment Crops

Cut grass. Supplementary K applied: Dec 24, 1957. Basal PK applied: Feb 7, 1958. Nitrogen and potash applied as compound fertilizer (16% N, 16% K_2O): Apr 10 and after every cut, except the last. Cut 6 times: May 12, June 10, July 4, Aug 7, Oct 3, Oct 31.

Grazed ley. Basal PK applied: Feb 6, 1958. 'Nitro-Chalk' applied: May 23 and June 29. Grazed: 8 circuits, Apr 24 - Oct 10.

Lucerne. Supplementary K applied: Dec 24, 1957. Basal PK applied: Feb 6, 1958. Cut 3 times: June 20, Aug 7, Oct 31.

Potatoes. Ploughed 3 times: June 24, 1957, Oct 8 and Feb 7 - 17, 1958. Basal PK, sulphate of ammonia and dung applied, potatoes planted: Apr 29. For later cultivations see Potato Test Crop.

3rd year Treatment Crops

Cut grass. 1st dressing of supplementary K applied: Dec 24, 1957. Basal PK applied: Feb 7, 1958. Nitrogen and potash applied as compound fertilizer (16% N, 16% K_2O): Apr 10 and after every cut except the last. 2nd and 3rd dressings of supplementary K applied: June 11 and Oct 3. Cut 5 times: May 12, June 10, July 4, Aug 7, Oct 3.

Grazed ley. Basal PK applied: Feb 6, 1958. 'Nitro-Chalk' applied: May 20 and July 23. Grazed: 8 circuits, Apr 28 - Sept 26.

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Lucerne. Supplementary K applied: Dec 24, 1957. Sprayed with sodium trichloracetate at 20 lb in 80 gallons per acre: Jan 15, 1958. Basal PK applied: Feb 6. Plots 85 and 86 cut owing to crop failure: June 11 and ploughed June 16. Remaining plots cut 3 times: June 20, Aug 7, Oct 3.

Oats. Ploughed twice: Oct 11, 1957, Feb 17, 1958. Seed drilled at $3\frac{1}{2}$ bushels per acre with basal PK, 'Nitro-Chalk' applied: Mar 20. Combine harvested: Sept 1. Variety: Sun II.

1st Test Crop, Wheat

Ploughed after oats: Aug 28, 1957 and Oct 15. Ploughed leys: Oct 15. Seed drilled at $2\frac{3}{4}$ bushels per acre with basal PK: Oct 26. Supplementary K applied after cut grass and lucerne: Dec 27. 'Nitro-Chalk' applied: Apr 17, 1958. Sprayed with CMPP at 6 pints in 40 gallons per acre: Apr 30. Combine harvested: Sept 1. Supplementary K applied to stubble: Sept 4. Variety: Yeoman.

2nd Test Crop, Potatoes

Ploughed 3 times: Aug 28, 1957, Oct 8, Feb 7 - 17, 1958. Supplementary K applied after cut grass and lucerne: Dec 28, 1957. Ridged, dung, sulphate of ammonia, basal PK and additional PK applied, potatoes planted: Apr 29, 1958. Earthed up: July 8. Sprayed 3 times with copper fungicide, at 5 lb in 40 gallons per acre: July 12, and at 3 lb and 1 pint of spreader in 40 gallons per acre: Aug 6 and Aug 16. Sprayed with sulphuric acid, 20% BOV, at 100 gallons per acre: Sept 10. Lifted: Sept 22. Variety: Majestic.

3rd Test Crop, Barley

Ploughed twice: Oct 11, 1957 and Feb 17, 1958. Ground chalk applied to blocks 6 and 7: Nov 21, 1957. Supplementary K and additional P and K applied: Feb 19, 1958. 'Nitro-Chalk' applied: Mar 20. Seed drilled at 2 bushels per acre with basal PK: Mar 21. Combine harvested: Sept 1. Variety: Proctor.

Permanent grasses. Basal PK applied to all plots: Feb 6, 1958.

8th year reseeded, 8th experimental year of permanent grass, Blocks 9 - 12.

Blocks 10 and 12. Supplementary K applied: Dec 24, 1957. 'Nitro-Chalk' applied: May 23, 1958. 2nd dressing of 'Nitro-Chalk' applied to reseeded plots: July 25 and to permanent grass plots: Aug 5. Grazed: 8 circuits, May 2 - Oct 30.

Blocks 9 and 11. Supplementary K applied: Dec 24, 1957. 'Nitro-Chalk' applied: Apr 10, 1958. Cut for silage: May 22. 2nd dressing of 'Nitro-Chalk' applied to reseeded plots: July 23 and to permanent grass plots: July 25. Grazed: 5 circuits, June 19 - Oct 25.

9th year reseeded, 9th experimental year of permanent grass, Blocks 5 - 8.

Blocks 7 and 8. Ground chalk applied to block 7: Nov 21, 1957. 'Nitro-Chalk' applied: May 20, 1958. 2nd dressing of 'Nitro-Chalk' applied to reseeded plots: July 23 and to permanent grass plots: Aug 2. Grazed: 8 circuits, Apr 28 - Oct 28.

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Blocks 5 and 6. Ground chalk applied to block 6: Nov 21, 1957. 'Nitro-Chalk' applied: Apr 10, 1958. Cut for silage: May 22. 2nd dressing of 'Nitro-Chalk' applied to reseeded plots: July 23 and to permanent grass plots: July 29. Grazed: 5 circuits, June 18 - Oct 23.

10th year reseeded, 10th experimental year of permanent grass, Blocks 1-4.
Blocks 1 and 3. Supplementary K applied: Dec 24, 1957. 'Nitro-Chalk' applied: May 16, 1958. 2nd dressing of 'Nitro-Chalk' applied to reseeded plots: July 23 and to permanent grass plots: Aug 2. Grazed: 8 circuits, Apr 24 - Oct 21.

Blocks 2 and 4. Supplementary K applied: Dec 24, 1957. 'Nitro-Chalk' applied: Apr 10, 1958. Cut for silage: May 22. 2nd dressing of 'Nitro-Chalk' applied: July 23. Grazed: Reseeded plots 6 circuits, permanent grass plots 5 circuits, June 15 - Nov 1.

FOSTERS

1st year Treatment Crops

Cut grass. Ploughed twice: Aug 27, 1957 and Oct 22. 1st dressing of supplementary K applied: Dec 27. 'Nitro-Chalk' and basal PK applied: Apr 21, 1958. Seeds sown at 33 lb per acre: Apr 22. Sprayed with MCPB at 5 pints in 40 gallons per acre: May 31. 2nd and 3rd dressing of supplementary K applied: June 25 and Oct 7. Cut 5 times: June 24, July 17, Aug 8, Oct 7, Oct 31. 'Nitro-Chalk' applied after each cut except the last.

Grazed ley. Ploughed twice: Aug 27, 1957 and Oct 22. 'Nitro-Chalk' and basal PK applied, seeds sown: Apr 22, 1958. Sprayed with MCPB at 5 pints in 40 gallons per acre: May 31. 'Nitro-Chalk' applied: July 23. Grazed: Plots 1 and 27, 6 circuits, plots 2 and 28, 5 circuits, June 19 - Oct 16.

Lucerne. Ploughed twice: Aug 27, 1957 and Oct 22. 1st dressing of supplementary K applied: Dec 27. Basal PK applied: Apr 21, 1958. Seeds sown: Apr 22. 2nd and 3rd dressings of supplementary K applied: Aug 1 and Nov 3. Cut twice: July 31, Oct 31.

Hay. Seeds undersown in barley at 28 lb per acre: May 10, 1957. Basal PK applied: Feb 7, 1958. 'Nitro-Chalk' applied: Apr 9. Cut: June 9.

2nd year Treatment Crops

Cut grass. 1st dressing of supplementary K applied: Dec 27, 1957. Basal PK applied: Feb 7, 1958. Nitrogen and potash applied as compound fertilizer (16% N, 16% K_2O): Apr 9 and after all cuts except the last. 2nd dressing of supplementary K applied: June 9. Cut 6 times: May 12, June 9, July 3, Aug 8, Oct 7 and Oct 31.

Grazed ley. Basal PK applied: Feb 17, 1957. 'Nitro-Chalk' applied: May 23, 1958 and July 23. Grazed: 8 circuits, Apr 25 - Oct 15.

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Lucerne. Supplementary K applied: Dec 27, 1957. Basal PK applied: Feb 17, 1958. Cut 3 times: June 23, Aug 6, Oct 31.

Potatoes. Ploughed 3 times: June 13, 1957, Sept 23 and Jan 13 - Feb 6, 1958. Ridged, dung, sulphate of ammonia and basal PK applied, potatoes planted: Apr 28. For later cultivations see Potato Test Crop.

3rd year Treatment Crops

Cut grass. 1st dressing of supplementary K applied: Dec 27, 1957. Basal PK applied: Feb 7, 1958. Nitrogen and potash applied as compound fertilizer (16% N, 16% K_2O): Apr 9 and after each cut except the last. Cut 5 times: May 12, June 9, July 4, Aug 8, Oct 6. 2nd and 3rd dressing of supplementary K applied: June 9 and Oct 6.

Grazed ley. Basal PK applied: Feb 17, 1958. 'Nitro-Chalk' applied: May 20 and July 29. Grazed: 8 circuits, Apr 29 - Sept 25.

Lucerne. Supplementary K applied: Dec 27, 1957. Basal PK applied: Feb 17, 1958. Cut 3 times: June 23, Aug 6 and Oct 6.

Oats. Ploughed: Oct 10, 1957. 'Nitro-Chalk' applied, seed drilled at $3\frac{1}{2}$ bushels per acre with basal PK: Mar 20, 1958. Combine harvested: Aug 31. Variety: Sun II.

1st Test Crop, Wheat

Ploughed after oats: Aug 27, 1957 and Oct 14. Ploughed leys: Oct 14. Seed drilled at $2\frac{3}{4}$ bushels per acre with basal PK: Oct 26. Supplementary K to previous cut grass and lucerne plots: Dec 27. 'Nitro-Chalk' applied: Apr 16, 1958. Sprayed with CMPP at 6 pints in 40 gallons per acre: Apr 30. Combine harvested: Aug 27. Supplementary K applied: Sept 3. Variety: Yeoman.

2nd Test Crop, Potatoes

Ploughed 3 times: Aug 29, 1957, Oct 10 and Feb 6, 1958. Supplementary K applied: Dec 27, 1957. Ridged, dung, sulphate of ammonia, basal PK and additional P and K applied, potatoes planted: Apr 28, 1958. Earthed up: July 7. Sprayed 4 times with copper fungicide at 5 lbs in 40 gallons per acre: July 12, and at 3 lb and 1 pint of spreader in 40 gallons per acre: Aug 1, Aug 6, Aug 16. Sprayed with sulphuric acid, 20% BOV, at 100 gallons per acre: Sept 10. Lifted: Sept 18. Variety: Majestic.

3rd Test Crop, Barley

Ploughed: Oct 10, 1957. Supplementary K applied: Feb 13, 1958. 'Nitro-Chalk' applied: Mar 20. Seed drilled at 2 bushels per acre with basal PK: Mar 21. Combine harvested: Aug 26. Variety: Proctor.

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Permanent grasses. Basal PK applied to all plots: Feb 17, 1958.
8th year reseeded grass, Blocks 6, 10, 11, 12.
Blocks 6 and 10. Supplementary K applied: Dec 27, 1957. 'Nitro-Chalk' applied: May 23, 1958 and Aug 1. Grazed: 8 circuits, May 3 - Oct 17.
Blocks 11 and 12. Supplementary K applied: Dec 27, 1957. 'Nitro-Chalk' applied: Apr 9, 1958 and July 29. Cut for silage: May 23. Grazed: 5 circuits, June 17 - Oct 9.

9th year reseeded grass, Blocks 5, 7, 8, 9.
Blocks 5 and 9. 'Nitro-Chalk' applied: May 20, 1958 and July 30. Grazed: 8 circuits, Apr 29 - Oct 13.
Blocks 7 and 8. 'Nitro-Chalk' applied: Apr 9, 1958 and July 25. Cut for silage: May 23. Grazed: 5 circuits, June 21 - Oct 5.

10th year reseeded grass, Blocks 1 - 4.
Blocks 1 and 2. Supplementary K applied: Dec 27, 1957. 'Nitro-Chalk' applied: May 16, 1958 and July 23. Grazed: 8 circuits, Apr 25 - Oct 1.
Blocks 3 and 4. Supplementary K applied: Dec 27, 1957. 'Nitro-Chalk' applied: Apr 9, 1958 and July 23. Cut for silage: May 23. Grazed: 5 circuits, June 13 - Sept 27.

Standard errors per plot. Test Crops.

Wheat, grain (at 85% dry matter).		Highfield:	1.93 cwt per acre or 6.0% (14 d.f.)
		Fosters:	1.06 cwt per acre or 2.7% (14 d.f.)
Potatoes, total tubers.	Highfield	$\frac{1}{4}$ plot:	1.347 tons per acre or 10.2% (14 d.f.)
		$\frac{1}{8}$ plot:	0.961 tons per acre or 7.3% (20 d.f.)
	Fosters	$\frac{1}{4}$ plot:	1.239 tons per acre or 8.8% (14 d.f.)
		$\frac{1}{8}$ plot:	0.659 tons per acre or 4.7% (20 d.f.)
Barley, grain (at 85% dry matter).		Highfield:	2.27 cwt per acre or 6.2% (15 d.f.)
		Fosters:	1.57 cwt per acre or 3.9% (15 d.f.)

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Summary of Results

Wheat 1st test crop

N: cwt per acre	Treatment crops 1955-1957 Lucerne	Ley	Cut Grass	Arable with hay	Mean
Grain (at 85% dry matter): cwt per acre					
Highfield					
Mean	34.6	26.4	32.6	36.2	32.4
To test crop					
0.3	36.1	27.0	33.1	38.3	33.6
0.6	33.2	25.8	32.1	34.1	31.3
Difference (±1.37)	-2.9	-1.2	-1.0	-4.2	-2.3 (±0.68)
To treatment crops					
Single rate		26.4	32.3	36.8	31.8
Double rate		26.4	32.9	35.6	31.6
Difference (±1.37)		0.0	+0.6	-1.2	-0.2 (±0.79)
Fosters					
Mean	41.0	36.4	38.1	39.3	38.7
To test crop					
0.3	39.8	35.4	36.6	36.7	37.1
0.6	42.2	37.4	39.5	41.8	40.2
Difference (±0.75)	+2.4	+2.0	+2.9	+5.1	+3.1 (±0.37)
To treatment crops					
Single rate		36.5	37.5	39.0	37.7
Double rate		36.3	38.6	39.6	38.1
Difference (±0.75)		-0.2	+1.1	+0.6	+0.4 (±0.43)

Note: Lodging was severe on the plots receiving the high rate of N.

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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 1956: tons per acre: None	Arable with hay only: Dung to potatoes 1956: tons per acre: 12	Arable with hay only: Mean
Grain (at 85% dry matter): cwt per acre						
Highfield						
To test crop	(±0.79)		(±0.56)	(±1.37)		(±0.97)
0.3	32.8	32.8	32.8	39.1	37.4	38.3
0.6	30.9	30.4	30.6	35.0	33.2	34.1
Mean	31.8	31.6	31.7			
	(±0.56)					
To previous treatment crops				(±1.37)		(±0.97)
Single rate				37.4	36.3	36.8
Double rate				36.7	34.4	35.6
Mean				37.1	35.3	36.2
				(±0.97)		
Mean dry matter % as harvested: 82.1						
Fosters						
To test crop	(±0.43)		(±0.31)	(±0.75)		(±0.53)
0.3	35.8	36.6	36.2	35.5	38.0	36.7
0.6	39.5	39.6	39.6	40.6	43.1	41.8
Mean	37.7	38.1	37.9			
	(±0.31)					
To previous treatment crops				(±0.75)		(±0.53)
Single rate				38.5	39.6	39.0
Double rate				37.6	41.6	39.6
Mean				38.0	40.6	39.3
				(±0.53)		
Mean dry matter % as harvested: 75.6						

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Wheat 1st test crop

N: cwt per acre	Treatment crops 1955-1957 Lucerne	Ley	Cut grass	Arable with hay	Mean
Straw (at 85% dry matter): cwt per acre					
		Highfield			
Mean	57.6	62.9	41.7	46.4	52.1
To test crop					
0.3	57.2	55.7	39.0	47.0	49.7
0.6	57.9	70.0	44.5	45.8	54.5
Difference	+0.7	+14.3	+5.5	-1.2	+4.8
To treatment crops					
Single rate		65.8	40.6	46.3	50.9
Double rate		59.9	42.9	46.5	49.8
Difference		-5.9	+2.3	+0.2	-1.1
		Fosters			
Mean	48.7	52.1	45.5	44.6	47.7
To test crop					
0.3	44.3	49.1	41.8	39.9	43.8
0.6	53.1	55.1	49.3	49.4	51.7
Difference	+8.8	+6.0	+7.5	+9.5	+7.9
To treatment crops					
Single rate		54.6	43.6	45.2	47.8
Double rate		49.6	47.5	44.1	47.1
Difference		-5.0	+3.9	-1.1	-0.7

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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 1956: tons per acre: None	Arable with hay only: Dung to potatoes 1956: tons per acre: 12	Arable with hay only: Mean
Straw (at 85% dry matter): cwt per acre						
Highfield						
To test crop						
0.3	49.6	44.9	47.2	46.1	47.9	47.0
0.6	52.2	54.6	53.4	44.8	46.7	45.8
Mean	50.9	49.8	50.3			
To previous treatment crops						
Single rate				45.7	46.9	46.3
Double rate				45.2	47.7	46.5
Mean				45.5	47.3	46.4

Mean dry matter % as harvested: 82.6

Fosters

To test crop						
0.3	45.0	42.3	43.6	36.6	43.2	39.9
0.6	50.7	51.9	51.3	46.0	52.7	49.4
Mean	47.8	47.1	47.4			
To previous treatment crops						
Single rate				45.9	44.5	45.2
Double rate				36.7	51.5	44.1
Mean				41.3	48.0	44.6

Mean dry matter % as harvested: 87.9

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

	Treatment crops 1954-1956				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	12.78	13.98	13.32	12.62	13.17
N: cwt per acre					
0.5	11.78	13.43	12.88	12.44	12.63
1.0	13.78	14.54	13.76	12.80	13.72
Difference (±0.952)	+2.00	+1.11	+0.88	+0.36	+1.09 (±0.476)
Dung: tons per acre					
None	13.14	13.61	13.82	11.30	12.97
12	12.42	14.35	12.82	13.95	13.38
Difference (±0.952)	-0.72	+0.74	-1.00	+2.65	+0.41 (±0.476)
P_2O_5: cwt per acre*					
0.9	12.28	13.41	13.00	13.13	12.95
1.8	13.28	14.56	13.64	12.11	13.40
Difference (±0.481)	+1.00	+1.15	+0.64	-1.02	+0.45 (±0.240)
K_2O: cwt per acre*					
0.9	12.93	13.60	13.60	12.25	13.09
1.8	12.63	14.37	13.04	12.99	13.26
Difference (±0.481)	-0.30	+0.77	-0.56	+0.74	+0.17 (±0.240)
Fosters					
Mean	14.13	14.12	14.80	13.42	14.12
N: cwt per acre					
0.5	12.91	13.36	13.65	11.60	12.88
1.0	15.36	14.89	15.95	15.23	15.36
Difference (±0.876)	+2.45	+1.53	+2.30	+3.63	+2.48 (±0.438)
Dung: tons per acre					
None	13.12	12.78	13.93	12.69	13.13
12	15.15	15.47	15.68	14.14	15.11
Difference (±0.876)	+2.03	+2.69	+1.75	+1.45	+1.98 (±0.438)
P_2O_5: cwt per acre*					
0.9	13.95	13.76	14.61	12.96	13.82
1.8	14.31	14.49	15.00	13.87	14.42
Difference (±0.330)	+0.36	+0.73	+0.39	+0.91	+0.60 (±0.165)
K_2O: cwt per acre*					
0.9	14.12	13.74	15.02	13.59	14.12
1.8	14.15	14.51	14.59	13.24	14.12
Difference (±0.330)	+0.03	+0.77	-0.43	-0.35	0.00 (±0.165)

*Including basal dressing

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

	Dung: tons per acre		P_2O_5: cwt per acre*		K_2O: cwt per acre*	
	None	12	0.9	1.8	0.9	1.8
Highfield						
N: cwt per acre	(±0.476)		(1) and (2)		(1) and (2)	
0.5	12.39	12.87	12.30	12.96	12.53	12.73
1.0	13.55	13.89	13.61	13.83	13.65	13.79
Dung: tons per acre			(1) and (2)		(1) and (2)	
None			12.64	13.30	12.89	13.05
12			13.27	13.50	13.29	13.47

Lucerne rotation only	K_2O: cwt per acre*		
	0.9	1.8	Mean
P_2O_5: cwt per acre*	(3) and (4)		
0.9	12.38	12.18	12.28
1.8	13.47	13.08	13.28
Mean	12.93	12.63	12.78

	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	(±0.438)		(1) and (2)		(1) and (2)	
0.5	11.64	14.12	12.60	13.16	13.02	12.74
1.0	14.62	16.09	15.04	15.68	15.21	15.50
Dung: tons per acre			(1) and (2)		(1) and (2)	
None			12.83	13.43	13.02	13.24
12			14.81	15.41	15.21	15.00

Lucerne rotation only	K_2O: cwt per acre*		
	0.9	1.8	Mean
P_2O_5: cwt per acre*	(3) and (4)		
0.9	13.90	14.01	13.95
1.8	14.35	14.28	14.31
Mean	14.12	14.15	14.13

*Including basal dressing

Highfield	Fosters	
(1) ±0.240	(1) ±0.165	for use in horizontal and interaction comparisons.
(2) ±0.377	(2) ±0.331	for use in all others.
(3) ±0.952	(3) ±0.876	for use only in testing the PK interaction.
(4) ±0.754	(4) ±0.662	for use in all other comparisons.

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

	Treatment crops 1954-1956				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	89.5	89.4	89.8	87.7	89.1
N: cwt per acre					
0.5	88.1	88.8	88.8	86.1	87.9
1.0	90.8	90.0	90.7	89.3	90.2
Difference	+2.7	+1.2	+1.9	+3.2	+2.3
Dung: tons per acre					
None	90.5	90.0	89.7	86.9	89.3
12	88.5	88.7	89.9	88.4	88.9
Difference	-2.0	-1.3	+0.2	+1.5	-0.4
P_2O_5: cwt per acre*					
0.9	89.3	88.7	89.2	88.0	88.8
1.8	89.6	90.0	90.3	87.3	89.3
Difference	+0.3	+1.3	+1.1	-0.7	+0.5
K_2O: cwt per acre*					
0.9	89.7	88.6	89.2	87.0	88.6
1.8	89.2	90.1	90.4	88.4	89.5
Difference	-0.5	+1.5	+1.2	+1.4	+0.9
Fosters					
Mean	91.0	90.7	92.0	89.5	90.8
N: cwt per acre					
0.5	89.6	89.7	90.9	88.2	89.6
1.0	92.4	91.6	93.2	90.9	92.0
Difference	+2.8	+1.9	+2.3	+2.7	+2.4
Dung: tons per acre					
None	90.6	89.7	91.6	88.8	90.2
12	91.4	91.6	92.5	90.3	91.4
Difference	+0.8	+1.9	+0.9	+1.5	+1.2
P_2O_5: cwt per acre*					
0.9	91.5	90.9	92.1	89.8	91.1
1.8	90.5	90.4	92.0	89.3	90.5
Difference	-1.0	-0.5	-0.1	-0.5	-0.6
K_2O: cwt per acre*					
0.9	91.0	90.4	92.4	89.1	90.7
1.8	91.0	90.9	91.6	90.0	90.9
Difference	0.0	+0.5	-0.8	+0.9	+0.2

*Including basal dressing

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

	Dung: tons per acre		P_2O_5: cwt per acre*		K_2O: cwt per acre*	
	None	12	0.9	1.8	0.9	1.8
Highfield						
N: cwt per acre						
0.5	88.3	87.6	88.0	87.9	87.7	88.1
1.0	90.3	90.1	89.6	90.8	89.5	90.9
Dung: tons per acre						
None			89.3	89.2	88.8	89.7
12			88.3	89.5	88.4	89.3

Lucerne rotation only	K_2O: cwt per acre*		
	0.9	1.8	Mean
P_2O_5: cwt per acre*			
0.9	90.1	88.5	89.3
1.8	89.4	89.9	89.6
Mean	89.7	89.2	89.5

	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	88.9	90.3	89.8	89.4	89.7	89.4
1.0	91.5	92.5	92.3	91.7	91.7	92.3
Dung: tons per acre						
None			90.7	89.6	90.0	90.3
12			91.4	91.4	91.4	91.4

Lucerne rotation only	K_2O: cwt per acre*		
	0.9	1.8	Mean
P_2O_5: cwt per acre*			
0.9	90.8	92.2	91.5
1.8	91.2	89.7	90.5
Mean	91.0	91.0	91.0

*Including basal dressing

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

	Treatment crops 1953-1955				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	34.0	37.1	37.2	39.2	36.9
N: cwt per acre					
None	39.0	39.7	39.4	41.0	39.7
0.2	29.1	34.5	35.1	37.4	34.0
Difference (±1.61)	-9.9	-5.2	-4.3	-3.6	-5.7 (±0.80)
Dung to potatoes 1957: tons per acre					
None	34.2	38.1	37.2	39.3	37.2
12	33.9	36.1	37.3	39.1	36.6
Difference (±1.61)	-0.3	-2.0	+0.1	-0.2	-0.6 (±0.80)
Fosters					
Mean	41.5	40.2	39.8	38.9	40.1
N: cwt per acre					
None	41.9	42.1	40.8	36.2	40.3
0.2	41.1	38.2	38.8	41.5	39.9
Difference (±1.11)	-0.8	-3.9	-2.0	+5.3	-0.4 (±0.55)
Dung to potatoes 1957: tons per acre					
None	41.4	40.2	39.4	38.3	39.8
12	41.6	40.1	40.3	39.4	40.3
Difference (±1.11)	+0.2	-0.1	+0.9	+1.1	+0.5 (±0.55)

	Highfield N: cwt per acre		Fosters N: cwt per acre	
	None	0.2	0.2	0.4
Dung to potatoes 1957: tons per acre	(±0.80)		(±0.55)	
None	40.4	33.9	40.0	39.6
12	39.1	34.1	40.5	40.2

Mean dry matter % as harvested:
Highfield: 83.6
Fosters: 73.7

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

	Treatment crops 1953-1955				
	Lucerne	Ley	Cut Grass	Arable with hay	Mean
Highfield					
Mean	37.6	39.8	35.2	39.5	38.0
N: cwt per acre					
None	33.1	38.0	33.5	37.9	35.6
0.2	42.1	41.6	36.9	41.1	40.4
Difference	+9.0	+3.6	+3.4	+3.2	+4.8
Dung to potatoes 1957: tons per acre					
None	36.4	38.6	35.2	38.9	37.3
12	38.8	40.9	35.2	40.1	38.7
Difference	+2.4	+2.3	0.0	+1.2	+1.4
Fosters					
Mean	35.6	39.6	38.0	34.0	36.8
N: cwt per acre					
None	33.1	36.0	33.2	32.3	33.6
0.2	38.1	43.2	42.8	35.8	40.0
Difference	+5.0	+7.2	+9.6	+3.5	+6.4
Dung to potatoes 1957: tons per acre					
None	34.2	39.1	38.3	32.8	36.1
12	36.9	40.0	37.8	35.3	37.5
Difference	+2.7	+0.9	-0.5	+2.5	+1.4

	Highfield		Fosters	
	N: cwt per acre		N: cwt per acre	
	None	0.2	0.2	0.4
Dung to potatoes 1957: tons per acre				
None	34.3	40.2	32.3	39.9
12	36.9	40.6	35.0	40.0

Mean dry matter % as harvested:
Highfield: 79.3
Fosters: 86.9

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58/Bb/1.18

Treatment crops Arable and Hay rotation

(values based on mean of 2 sub plots only)

	Highfield N: cwt per acre applied in 1958			Fosters N: cwt per acre applied in 1958		
	Single rate	Double rate	Mean	Single rate	Double rate	Mean
Hay (dry matter): cwt per acre						
No dung	73.4	72.1	72.8	61.5	63.3	62.4
Dung in 1956	70.6	79.1	74.9	70.1	73.8	72.0
Mean	72.0	75.6	73.8	65.8	68.5	67.2
Potatoes, total tubers: tons per acre						
No dung	13.55	12.59	13.07	10.12	12.78	11.45
Dung in 1958	13.11	14.26	13.69	12.66	14.47	13.56
Mean	13.33	13.43	13.38	11.39	13.62	12.51
Potatoes, percentage ware ($1\frac{1}{2}$" riddle)						
No dung	89.9	91.4	90.7	87.0	92.4	89.7
Dung in 1958	88.6	86.4	87.5	93.1	92.2	92.6
Mean	89.2	88.9	89.1	90.0	92.3	91.2
	Oats					
	None	0.2		0.2	0.4	
Grain (at 85% dry matter): cwt per acre						
No dung	23.5	19.7	21.6	35.2	35.9	35.5
Dung in 1957	26.3	17.1	21.7	32.9	34.9	33.9
Mean	24.9	18.4	21.6	34.0	35.4	34.7
Straw (at 85% dry matter): cwt per acre						
No dung	32.2	35.1	33.6	34.3	40.5	37.4
Dung in 1957	36.3	38.1	37.2	39.7	46.3	43.0
Mean	34.3	36.6	35.4	37.0	43.4	40.2

Highfield, Oats, Mean dry matter % as harvested Grain: 83.5 Straw: 67.8
Fosters, Oats, Mean dry matter % as harvested Grain: 83.4 Straw: 82.9

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Cut grass. Dry matter: cwt per acre

1st year	Corrective dressing of K_2O: cwt per acre 3.0	Highfield N: to previous 3 test crops Single rate	Highfield N: to previous 3 test crops Double rate	Highfield Dung to potatoes 1956: tons per acre None	Highfield Dung to potatoes 1956: 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 1956: tons per acre None	Fosters Dung to potatoes 1956: tons per acre 12	Fosters Mean
N (1) to cut grass (5 cuts)											
Single rate		56.4	64.5	60.3	60.6	60.4	51.6	49.8	46.3	55.1	50.7
Double rate		74.0	70.3	71.7	72.6	72.1	65.0	64.4	63.7	65.6	64.7
N: to test crops											
Single rate				65.2	65.2	65.2			54.8	61.7	58.3
Double rate				66.8	67.9	67.4			55.2	58.9	57.1
Mean				66.0	66.6	66.3			55.0	60.3	57.7

		Highfield N to cut grass (1) Single rate	Highfield N to cut grass (1) Double rate	Highfield Mean	Fosters N to cut grass (1) Single rate	Fosters N to cut grass (1) Double rate	Fosters Mean
2nd year (6 cuts)	2.4	75.1	96.7	85.9	81.4	90.1	85.8
3rd year (5 cuts)	*	73.1	92.3	82.7	73.9	87.2	80.6

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

*Highfield: 3.6
Fosters: 3.0

58/Bb/1.19

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Lucerne. Dry matter: cwt per acre

1st year (2 cuts)	Corrective dressing of K_2O: cwt per acre	Highfield N to 3 previous test crops Single rate	Highfield N to 3 previous test crops Double rate	Highfield Mean	Fosters N to 3 previous test crops Single rate	Fosters N to 3 previous test crops Double rate	Fosters Mean
Dung to potatoes 1956							
None		36.5	42.2	39.4	41.2	40.5	40.9
12 tons		39.5	38.2	38.8	46.9	46.4	46.6
Mean		38.0	40.2	39.1	44.0	43.5	43.8
2nd year (3 cuts)	1.2			81.7			70.5
3rd year (3 cuts)	1.2			52.5			81.5

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	31.2	33.9	32.5	19.8	21.6	20.7
2nd year	34.2	40.3	37.2	31.0	31.5	31.3
3rd year	31.4	36.2	33.8	31.3	35.6	33.5

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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						
8th exptl.year						
Blocks 10 and 12				32.7*	41.8*	37.2*
Blocks 9 and 11	17.2	20.4	18.8	23.2*	30.3*	26.7*
9th exptl.year						
Blocks 7 and 8				28.1*	36.8*	32.5*
Blocks 5 and 6	23.7	26.8	25.2	19.7*	18.0*	18.9*
10th exptl.year						
Blocks 1 and 3				31.6*	35.0*	33.3*
Blocks 2 and 4	23.2	28.3	25.7	27.1*	25.9*	26.5*
Fosters						
8th exptl.year						
Blocks 6 and 10				50.6*	41.5*	46.0*
Blocks 11 and 12	14.8	14.2	14.5	38.3*	34.5*	36.4*
9th exptl.year						
Blocks 5 and 9				42.6*	35.3*	39.0*
Blocks 7 and 8	27.2	25.9	26.5	23.9*	23.5*	23.7*
10th exptl.year						
Blocks 1 and 2				34.2*	32.5*	33.4*
Blocks 3 and 4	27.4	27.2	27.3	29.0*	25.4*	27.2*

Permanent Grass. Dry matter: cwt per acre

Highfield						
8th exptl.year						
Blocks 10 and 12				42.1*	41.7*	41.9*
Blocks 9 and 11	25.2	26.1	25.6	29.3*	30.9*	30.1*
9th exptl.year						
Blocks 7 and 8				27.6*	40.3*	34.0*
Blocks 5 and 6	16.9	23.0	20.0	22.7*	25.5*	24.1*
10th exptl.year						
Blocks 1 and 3				34.5*	42.7*	38.6*
Blocks 2 and 4	20.9	21.3	21.1	23.0*	23.6*	23.3*

*Aftermath grazing.

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58/Bc/1.1

REFERENCE PLOTS

The effects of N P K and Dung on a sequence of five arable crops - Great Field IV 1956-1958.

The site selected for the experiment was ploughed out of old grassland in March 1956 and was shown by soil analysis to be low in available P and K. All crops in 1956 were spring sown. Similar effects are also illustrated on the original grass sward, which is cut for hay.

Design: Rotation:- Winter wheat; kale; barley; clover; potatoes.
6 rows (1 for each crop) of a 12 × 12 Latin Square.

Area of each plot: 0.0013 acres.

Treatments. All combinations of:-
Nitrogen: N_1 and no nitrogen.
Phosphate: P and no phosphate.
Potash: K and no potash
and the following additional treatments
N_2PK; dung; dung + N_1PK; dung + N_2PK.

Rates and forms of manuring.
All N as 'Nitro-Chalk': Potatoes and wheat, 0.6 or 1.2; barley, 0.45 or 0.90; kale, 1.0 or 2.0; clover, 0.15 or 0.30; grass, 1.0 or 2.0 cwt N per acre.
All P as granular superphosphate: 0.5 cwt P_2O_5 per acre.
All K as sulphate of potash: 1.0 cwt K_2O per acre.
Dung: 15 tons per acre to all crops in 1956 and 1957; omitted on clover in 1958.

Cultivations, etc.:
1956.
Spring wheat. Dung N P and K applied, drilled: Apr 7, 1956. Harvested: Sept 7. Variety: Koga II.
Kale. Dung N P and K applied, sown: Apr 10, 1956. Harvested: Nov 15. Variety: Thousand Head.
Barley. Dung N P and K applied, drilled: Apr 7, 1956. Harvested: Aug 28. Variety: Proctor.
Clover. Dung N P and K applied, sown: Apr 10, 1956. Cut twice: Aug 14 and Oct 25. Variety: Giant Hybrid.
Potatoes. Dung N P and K applied, planted: Apr 10, 1956. Harvested: Sept 3. Variety: King Edward.

Note: The whole area received hydrated lime at 32 cwt per acre on Apr 7, 1956.

1957
Winter wheat. Dung applied, hand dug: Sept 3, 1956. PK applied, drilled: Sept 18. First N dressing applied: Mar 4, 1957. Second N dressing applied: Mar 27. Harvested: Aug 7. Variety: Cappelle.

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Kale. Dung applied and hand dug: Nov 26, 1956. N P and K applied, sown: Mar 13, 1957. Harvested: Nov 26. Variety: Thousand Head.
Barley. Dung applied and hand dug: Nov 27, 1956. Drilled, N P and K applied: Mar 4, 1957. Harvested: July 24. Variety: Proctor.
Clover. Undersown in barley: Apr 7, 1956. Dung applied: Nov 26. P and K applied: Feb 15, 1957. N applied: Mar 11. Cut twice: June 18 and Aug 13. Variety: Giant Hybrid.
Potatoes. Dung applied and hand dug: Nov 27, 1956. N P and K applied: Mar 13, 1957. Planted: Mar 14. Harvested: Sept 4. Variety: King Edward.
Permanent grass. Dung P and K applied: Feb 15, 1957. First N dressing applied: Mar 11. Second N dressing applied: May 29. Cut twice: May 29 and Sept 18.

1958

Winter wheat. Dung applied and hand dug: Sept 5, 1957. PK applied, drilled: Sept 23. First N dressing applied: Apr 30, 1958. Harvested: Aug 6. Variety: Capelle.
Kale. Dung applied and hand dug: Jan 17, 1958. N P and K applied, sown: Apr 9. Harvested: Oct 30. Variety: Thousand Head.
Barley. Dung applied and hand dug: Feb 3, 1958. N P and K applied, drilled: Mar 25. Harvested: Aug 16. Variety: Proctor.
Clover. Undersown in barley: Mar 4, 1957. N P and K applied: Feb 17, 1958. Cut twice: June 26 and Aug 29. Variety: Giant Hybrid.
Potatoes. Dung applied and hand dug: Jan 17, 1958. N P and K applied, planted: Apr 8. Harvested: Sept 12. Variety: King Edward.
Permanent grass. Dung applied: Feb 4, 1958. First N dressing applied, P K applied: Feb 17. Second N dressing applied: June 4. Cut twice: June 4 and Sept 16.

Summary of Results

1956

Treatment	cwt per acre Wheat Grain (at 85% D.M.)	Wheat Straw (at 85% D.M.)	Barley Grain (at 85% D.M.)	Barley Straw (at 85% D.M.)	Clover 1st cut (dry matter)	Clover 2nd cut (dry matter)	Clover Total (dry matter)	tons per acre Potatoes Total tubers	Kale Total weight
None	9.8	14.0	13.5	13.5	13.9	10.0	23.9	2.64	11.28
N_1	13.3	18.1	26.1	25.5	17.7	10.5	28.2	2.54	16.76
P	11.3	16.6	15.5	13.4	17.0	9.7	26.7	3.90	15.80
N_1P	10.7	17.8	16.0	15.6	17.7	11.3	29.0	2.52	13.98
K	19.9	23.2	16.2	15.2	22.2	15.2	37.4	6.85	11.90
N_1K	22.1	26.7	15.9	16.4	25.3	16.6	41.9	8.47	16.76
PK	20.9	26.5	20.7	19.2	27.8	18.4	46.2	7.08	13.11
N_1PK	26.4	35.2	22.9	21.8	29.6	18.9	48.5	7.94	21.53
N_2PK	24.1	33.8	26.4	30.4	30.3	17.8	48.1	7.68	23.00
D	34.9	47.5	39.9	34.8	38.6	21.9	60.5	9.50	17.97
N_1PKD	30.6	54.1	36.5	45.4	34.7	24.6	59.3	13.44	24.57
N_2PKD	34.2	45.6	35.9	38.1	35.6	22.8	58.4	13.77	27.34
Mean D.M.%	67.8	65.5	71.7	57.7	18.4	15.0	16.7		

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1957

cwt per acre

Treatment	Wheat Grain (at 85% D.M.)	Wheat Straw (at 85% D.M.)	Barley Grain (at 85% D.M.)	Barley Straw (at 85% D.M.)	Clover 1st cut (dry matter)	Clover 2nd cut (dry matter)	Clover Total (dry matter)
None	27.8	50.2	24.1	18.0	31.8	32.8	64.6
N_1	32.5	41.1	28.1	21.1	39.4	31.0	70.4
P	33.8	53.5	29.2	22.6	31.9	24.5	56.4
N_1P	20.5	38.7	22.4	22.4	32.5	23.5	56.0
K	37.6	75.2	28.0	23.1	46.3	37.5	83.8
N_1K	40.9	78.6	30.4	24.4	39.9	33.3	73.2
PK	36.7	76.2	30.7	24.1	50.0	37.3	87.3
N_1PK	42.4	81.9	39.4	37.5	45.1	33.5	78.6
N_2PK	40.1	76.1	44.1	41.1	47.0	36.4	83.4
D	42.4	86.2	42.9	38.5	37.2	33.5	70.7
N_1PKD	39.4	80.0	45.9	42.0	41.0	37.9	78.9
N_2PKD	43.1	76.8	47.8	47.9	39.6	33.2	72.8

Treatment	tons per acre Potatoes Total tubers	tons per acre Kale Total weight	cwt per acre Grass 1st cut (dry matter)	cwt per acre Grass 2nd cut (dry matter)	cwt per acre Grass Total (dry matter)
None	1.42	13.88	28.0	23.4	51.4
N_1	2.49	14.36	30.1	26.3	56.4
P	1.47	13.30	18.5	22.2	40.7
N_1P	1.92	20.62	36.9	29.0	65.9
K	4.46	8.32	31.9	22.8	54.7
N_1K	6.42	12.36	49.4	31.2	80.6
PK	8.88	12.96	37.4	22.8	60.2
N_1PK	8.10	21.76	46.1	29.3	75.4
N_2PK	8.86	22.62	50.0	37.5	87.5
D	12.76	16.88	34.4	26.1	60.5
N_1PKD	16.26	20.80	44.7	33.2	77.9
N_2PKD	17.95	28.36	55.4	39.3	94.7

Mean dry matter % as harvested.

Wheat Grain, 85.0
Straw, 72.8

Barley Grain, 71.4
Straw, 54.6

Clover 1st cut, 28.0
2nd cut, 21.4
Total, 24.7

Grass 1st cut, 28.4
2nd cut, 31.0
Total, 29.7

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1958

Treatment	Wheat cwt per acre Grain (at 85% D.M.)	Wheat cwt per acre Straw (at 85% D.M.)	Barley cwt per acre Grain (at 85% D.M.)	Barley cwt per acre Straw (at 85% D.M.)	Clover cwt per acre (dry matter) 1st cut	Clover 2nd cut	Clover Total
None	45.3	59.4	24.5	23.6	24.8	10.7	35.5
N_1	43.1	56.6	19.8	36.5	31.1	9.5	40.6
P	44.7	67.2	26.1	33.6	33.0	14.9	47.9
N_1P	30.8	62.4	24.6	40.4	33.2	12.0	45.2
K	50.9	68.0	24.4	54.2	51.9	38.3	90.2
N_1K	56.0	73.5	32.2	40.4	46.3	32.6	78.9
PK	48.8	79.4	31.6	45.9	54.9	35.9	90.8
N_1PK	51.1	78.6	43.2	41.9	58.6	32.2	90.8
N_2PK	46.9	80.5	47.1	36.2	57.8	30.5	88.3
D	52.2	84.8	37.5	59.2	53.6	31.3	84.9
N_1PKD	46.4	97.9	40.9	33.1	54.4	41.4	95.8
N_2PKD	45.5	80.2	23.6	66.4	63.6	34.0	97.6

Treatment	Potatoes tons per acre Total tubers	Kale tons per acre Total weight	Grass cwt per acre (dry matter) 1st cut	Grass 2nd cut	Grass Total
None	4.72	12.59	21.3	37.4	58.7
N_1	8.00	16.93	27.2	34.7	61.9
P	4.37	16.93	17.5	36.6	54.1
N_1P	5.26	22.33	31.9	38.6	70.5
K	8.72	14.06	22.0	32.6	54.6
N_1K	8.77	21.36	44.1	45.3	89.4
PK	12.63	12.32	27.9	40.3	68.2
N_1PK	11.52	23.00	40.0	36.0	76.0
N_2PK	14.06	30.90	50.0	43.7	93.7
D	13.00	18.49	35.5	39.9	75.4
N_1PKD	16.95	32.73	39.7	53.3	93.0
N_2PKD	18.56	40.28	53.3	57.2	110.5

Mean dry matter % as harvested.

Wheat Grain, 62.4
Straw, 39.7

Barley Grain, 80.8
Straw, 54.1

Clover 1st cut, 21.0
2nd cut, 16.1
Total, 18.6

Grass 1st cut, 24.0
2nd cut, 22.4
Total, 23.2

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GREEN MANURING EXPERIMENT

Woburn Stackyard - 1958, the 5th year of the revised scheme.

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

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

Cultivations, etc.:

Green manures after barley 1957 (for early potatoes 1958): Trefoil at 30 lb per acre, ryegrass at 40 lb per acre, undersown: May 11, 1957. Varieties: Trefoil-English; Ryegrass-Western Wolths.

Early potatoes: Straw applied: Sept 23, 1957. "Fallow" plots ploughed: Oct 1, 1957. All plots ploughed: Feb 21, 1958. Basal fertilizer applied: Apr 14. 'Nitro-Chalk' applied, potatoes mechanically planted: Apr 15. Earthed up: June 18. Sprayed with copper fungicide at 5 lb in 80 gallons per acre: July 14. Lifted: July 29. Variety: Ulster Chieftain.

Green manures after early potatoes 1957 (for barley 1958): Trefoil at 30 lb per acre, ryegrass at 40 lb per acre, sown: July 16, 1957. Varieties: Trefoil-English; Ryegrass-Western Wolths.

Barley: "Fallow" plots and "early" green manure plots ploughed: Oct 12, 1957, Feb 20, 1958. "Late" green manure plots ploughed: Feb 20. Ground chalk applied at 23 cwt per acre: Mar 5. 'Nitro-Chalk' applied, seed drilled at 2½ bushels per acre: Mar 20. Trefoil and ryegrass undersown: Apr 29. Harvested: Aug 20. Variety: Herta.

Standard errors per plot:

Potatoes. Total tubers: 1.200 tons per acre or 12.1% (18 d.f.)
Barley. Grain: 1.97 cwt per acre or 7.9% (20 d.f.)

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

	Green manure	Ploughed in	Dry matter	Nitrogen
For early potatoes	Trefoil		14.2	0.418
	Ryegrass		16.5	0.240
For barley	Trefoil	Early	32.8	1.170
	Ryegrass	Early	37.3	0.619
	Trefoil	Late	10.8	0.331
	Ryegrass	Late	23.1	0.417

Errata to the "Results of the Field Experiments" 1955, 1956 and 1957.
Pages 55/Bd/1.3 & 1.4; 56/Bd/1.4 & 1.5; 57/Bd/1.3 & 1.4.

Rearrange the headings of the main barley table in the order shown in 1958: the order of the means should not be altered.

The means of Trefoil and Ryegrass in the bottom left table should be altered accordingly., e.g. 55/Bd/1.3 the table should read:

25.6 37.6 (not 40.3) 36.9 (not 34.1) 34.9

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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	(±0.424)		(±0.424)		(±0.424)		(±0.300)
None	9.70	9.73	9.64	9.80	9.12	10.32	9.72
	(±0.600)		(±0.600)		(±0.600)		(±0.424)
Trefoil	11.14	10.36	10.20	11.30	9.71	11.79	10.75
Ryegrass	9.56	10.68	9.65	10.58	9.30	10.93	10.12
Straw: tons per acre			(±0.424)		(±0.424)		(±0.300)
None			9.77	10.29	9.12	10.93	10.03
1½			9.80	10.45	9.50	10.74	10.12
N: cwt per acre (including basal)							
0.6					8.92	10.64	9.78
1.2					9.71	11.03	10.37
Mean (±0.300)					9.31	10.84	10.08
Plots fallow under old scheme							
Straw: tons per acre			(±0.848)		(±0.848)		(±0.600)
None			8.44	10.17	8.58	10.04	9.31
1½			8.52	10.74	8.40	10.86	9.63
N: cwt per acre (including basal)							
0.6					7.12	9.84	8.48
1.2					9.85	11.06	10.45
Mean (±0.600)					8.49	10.45	9.47

	Undersown green manures for potatoes				
Old scheme	None Fallow	None	Trefoil	Ryegrass	Mean
		Excluding fallow			
	9.47 (±0.424)	9.72 (±0.300)	10.75	10.12 (±0.424)	9.95

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Barley, grain per acre

	Green manures: In barley for potatoes		Green manures: After potatoes for barley		N: cwt per acre (including basal)		Dung to cabbages 1953: tons per acre		
	None	Undersown	Trefoil	Ryegrass	0.23	0.46	None	10	Mean
Excluding plots fallow under old scheme									
Green manures ploughed in	(±0.70)		(±0.70)		(±0.70)		(±0.70)		(±0.49)
Early	22.2	23.4	23.6	22.0	20.8	24.7	21.9	23.7	22.8
Late	30.6	31.2	30.7	31.2	30.0	31.8	31.2	30.7	30.9
Green manures in barley for potatoes									
None			26.6	26.2	24.6	28.2	26.6	26.2	26.4
Undersown			27.7	26.9	26.3	28.3	26.4	28.2	27.3
Green manures after potatoes for barley									
Trefoil					26.0	28.3	27.2	27.1	27.1
Ryegrass					24.9	28.2	25.8	27.3	26.6
N: cwt per acre (including basal)									
0.23							25.2	25.6	25.4
0.46							27.8	28.7	28.3
Mean (±0.49)							26.5	27.2	26.9

Old scheme	Green manures after potatoes for barley: None	Trefoil	Ryegrass	Mean
	Fallow	Excluding fallow		
	17.6 (±0.70)	27.1	26.6 (±0.49)	25.0

Plots fallow under old scheme

N: cwt per acre (including basal)			
	(±1.40)		(±0.99)
0.23	16.2	14.8	15.5
0.46	20.1	19.4	19.7
Mean (±0.99)	18.2	17.0	17.6

58/Ba/1.3

Barley, straw: cwt per acre

	Green manures: In barley for potatoes		Green manures: After potatoes for barley		N: cwt per acre (including basal)		Dung to cabbages 1953: tons per acre		
	None	Under-sown	Trefoil	Rye-grass	0.23	0.46	None	10	Mean
Excluding plots fallow under old scheme									
Green manures ploughed in									
Early	19.3	23.9	24.1	19.1	19.6	23.6	19.8	23.4	21.6
Late	28.1	30.0	29.6	28.5	27.4	30.7	29.4	28.8	29.1
Green manures in barley for potatoes									
None			24.5	22.9	21.0	26.4	23.6	23.8	23.7
Undersown			29.2	24.7	26.0	27.9	25.5	28.4	27.0
Green manures after potatoes for barley									
Trefoil					25.4	28.4	26.5	27.3	26.9
Ryegrass					21.6	25.9	22.7	24.9	23.8
N: cwt per acre (including basal)									
0.23							23.2	23.8	23.5
0.46							25.9	28.4	27.2
Mean							24.6	26.1	25.3

Old scheme	Green manures after potatoes for barley: None Fallow	Trefoil (Excluding fallow)	Ryegrass (Excluding fallow)	Mean
	15.1	26.9	23.8	23.3

Plots fallow under old scheme

N: cwt per acre (including basal)			
0.23	12.0	13.5	12.7
0.46	16.3	18.7	17.5
Mean	14.1	16.1	15.1

58/Bd/1.4

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LEY AND ARABLE ROTATIONS

Woburn Stackyard 1958 - the 21st year.

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

In 1958, owing to the use of a new compound fertilizer (16% N, 16% K) the following alterations were made in fertilizer treatments:-

	Old treatment		New treatment	
	N	K	N	K
Carrots	0.48	0.6 in seedbed	0.6	0.6 in seedbed
1 year hay	0.48	0.6 in spring	0.6	0.6 in spring
	0.22	- for aftermath	0.22	- for aftermath
2nd & 3rd year	0.2	0.55 in spring	0.18	0.18 in spring
of grazed ley	0.2	- in early summer	0.18	0.18 in early summer
	0.2	- in late summer	0.18	0.18 in late summer

Under the revised scheme the total P & K balance for all four rotations as before, and at the same level.

Owing to acidity the following extra dressings of ground chalk were applied during the year 1957/8:-

To Block 2 (plots 17-32): 12 cwt per acre.
To Block 3 (plots 33-47): 19 cwt per acre.

The chalk was applied in winter 1957/8 except to potatoes, where it was applied shortly after lifting in 1958.

Cultivations, etc.,

Treatment crops

Ley rotations

Ley 1st year. Ploughed twice: Aug 30, 1957 and Nov 30. Ground chalk applied at 19 cwt per acre: Mar 5, 1958. Basal fertilizers and 'Nitro-Chalk' applied: Apr 18. Seed sown at 40 lb per acre: Apr 19. 'Nitro-Chalk' applied: 2nd dressing - June 30; 3rd dressing - Aug 13. Grazed 7 circuits: June 23 - Nov 3. Seeds mixture: 20 lb S24 Perennial Ryegrass, 11 lb S143 Cocksfoot, 6 lb Late Flowering Red Clover, 3 lb S100 White Clover.

Ley 2nd year. Potash and nitrogen fertilizer applied: Mar 24, May 29, Aug 8. Grazed 9 circuits: Apr 28 - Oct 24.

Ley 3rd year. Ground chalk applied at 12 cwt per acre: Mar 5. Potash and nitrogen fertilizer applied: Mar 24, May 30, Aug 8. Grazed 8 circuits: May 6 - Nov 5.

Lucerne 1st year. Ploughed twice: Aug 30, 1957 and Nov 30. Ground chalk applied at 19 cwt per acre: Mar 5, 1958. Basal fertilizers applied: Apr 18. Seed sown at 25 lb per acre: Apr 19. Sprayed with dieldrin at 2 pints in 40 gallons per acre: June 14. Cut twice: Aug 8, Oct 14. Variety: Du Puits.

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Lucerne 2nd year. Basal potash applied: Mar 14. Cut 3 times: June 16, Aug 8, Oct 14.

*Lucerne 3rd year. Basal potash applied: Mar 14. Cut 3 times: June 16, Aug 8, Oct 14.

Arable rotations

Potatoes 1st course. Ploughed twice: Aug 30, 1957 and Nov 30. Basal fertilizers applied: Apr 16, 1958. Potatoes machine planted: Apr 17. Earthed up: June 19. Sprayed 3 times with copper fungicide: 5 lb in 80 gallons per acre, July 14; 5 lb in 40 gallons per acre, July 29 and Aug 16. Sprayed with arsenious compound, 1 gallon in 40 gallons per acre: Sept 12. Lifted: Oct 7. Variety: Majestic.

Rye 2nd course. Ploughed: Oct 5, 1957. Seed drilled at 2½ bushels per acre: Oct 26. 'Nitro-Chalk' applied: Apr 22,1958. Seeds hay mixture undersown on 4 plots: Apr 19. Harvested: Aug 31. Variety: King II.

Seeds hay 3rd course. Seeds undersown at 30 lb per acre in rye: May 11, 1957. Ploughed: Aug 26. Resown: Aug 28. Ground chalk applied at 12 cwt per acre: Mar 5, 1958. Potash and nitrogen fertilizer applied: Mar 24. 1st cut: June 16. 'Nitro-Chalk' applied: June 17. 2nd cut: Oct 14. Seeds mixture: 19 lb S24 Perennial Ryegrass, 9 lb Late Flowering Red Clover, 2 lb Alsike American.

Carrots 3rd course. Ploughed twice: Aug 26, 1957 and Nov 29. Ground chalk at 12 cwt per acre applied: Mar 5, 1958. Potash and nitrogen fertilizer applied: Apr 18. Carrots sown: Apr 19. Sprayed with dieldrin at 2 pints in 40 gallons per acre: June 14, and at 4 pints in 40 gallons per acre: Aug 11. Singled: June 9-18. Lifted: Oct 27. Variety: Scarlet Intermediate.

Test crops

Sugar beet 1st test crop. Dung applied, ploughed: Nov 29,1957. Basal and treatment fertilizers applied: Apr 17, 1958. Seed drilled at 12 lb per acre: Apr 18. Sprayed with miscible DDT at 3 pints in 40 gallons per acre: May 3. Singled: June 5. Sprayed with demeton methyl at 11 oz in 32 gallons per acre: June 26. Lifted: Oct 27. Variety: Klein E.

Barley 2nd test crop. Ploughed: Dec 6, 1957. Potash applied to equalize treatment dressings to 1957 sugar beet test crop: Feb 3, 1958. Ground chalk applied at 21 cwt per acre: Mar 5. 'Nitro-Chalk' applied: Mar 20. Seed drilled at 2½ bushels per acre: Mar 20. Harvested: Aug 27. Variety: Herta.

*Note: Plots 27 and 28 were fallowed and received no potash.

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Standard errors per plot. Test crops.

Sugar beet. Total sugar.		Whole plot:	1.35 cwt per acre or 2.4% (4 d.f.)
		½ plot:	2.32 cwt per acre or 4.1% (4 d.f.)
		⅛ plot:	4.91 cwt per acre or 8.6% (24 d.f.)
	Tops	Whole plot:	1.57 tons per acre or 7.6% (4 d.f.)
		½ plot:	1.23 tons per acre or 6.0% (4 d.f.)
		⅛ plot:	1.90 tons per acre or 9.2% (24 d.f.)
Barley.	Grain(at 85% Dry Matter)	Whole plot:	1.44 cwt per acre or 5.1% (4 d.f.)
		½ plot:	1.09 cwt per acre or 3.9% (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
1662	2361	2349

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

	1st cut	2nd cut	3rd cut	Total
1st year				
Dung in 1956: tons per acre				
None	17.2	12.9		30.1
15	23.6	16.0		39.6
Difference	6.4	3.1		9.5
Previous rotation				
Lucerne	13.5	13.5		27.0
Arable with hay	27.2	15.4		42.6
Mean	20.4	14.4		34.8
2nd year				
Dung in 1955: tons per acre				
None	5.2	10.4	6.8	22.4
15	14.1	18.4	11.1	43.6
Difference	8.9	8.0	4.3	21.2
Previous rotation				
Lucerne	9.6	14.6	9.3	33.5
Arable with sugar beet	9.7	14.2	8.6	32.5
Mean	9.6	14.4	8.9	32.9
3rd year				
Dung in 1954: tons per acre				
None	17.5	23.2	8.4	49.1
15	24.2	27.8	9.1	61.1
Difference	6.7	4.6	0.7	12.0

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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	12.97	90.5	28.9	42.4
15*	15.00	91.0	28.8	42.8
Difference	+2.03	+0.5	-0.1	+0.4
Previous rotation				
Ley	16.04	94.2	29.8	45.0
Lucerne	14.95	89.8	29.8	45.6
Arable with hay	11.58	87.6	28.6	41.8
Arable with sugar beet	13.37	91.5	27.2	38.0
Mean	13.99	90.8	28.8	42.6

Hay

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

	1st cut	2nd cut	Total
Dung in 1954: tons per acre			
None	58.6	15.6	74.2
15	66.8	24.6	91.4
Difference	8.2	9.0	17.2
Previous rotation			
Lucerne	67.1	27.0	94.1
Arable with hay	58.2	13.3	71.5
Mean	62.7	20.1	82.8

Carrots

	Roots Washed: tons per acre	Tops: tons per acre
Dung in 1954: tons per acre		
None	6.22	0.88
15	8.32	1.10
Difference	2.10	0.22
Previous rotation		
Ley	7.56	1.00
Arable with sugar beet	6.98	0.98
Mean	7.27	0.99

* Dung applied: Potatoes - for test crop sugar beet in 1956.
Rye - for test crop potatoes in 1955.

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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	17.90	17.17	15.46	16.47	16.75
Dung: tons per acre					
None	16.92	15.76	13.60	14.14	15.10
15	18.87	18.58	17.32	18.80	18.39
Difference	1.95	2.82	3.72	4.66	3.29
Response to additional 0.72 cwt N per acre					
No dung	-0.44	-0.49	-0.54	+0.90	-0.14
Dung 15 tons per acre	+1.96	-0.99	-0.63	-0.08	+0.06
Response to additional 0.9 cwt K_2O per acre					
No dung	+2.97	+0.35	+1.39	+0.24	+1.24
Dung 15 tons per acre	+0.44	-0.44	+0.52	-1.32	-0.20
Sugar Percentage					
Mean	16.5	16.8	17.5	17.5	17.1
Dung: tons per acre					
None	16.5	17.0	17.7	17.5	17.2
15	16.5	16.5	17.2	17.5	16.9
Difference	0.0	-0.5	-0.5	0.0	-0.3
Response to additional 0.72 cwt N per acre					
No dung	-1.4	-0.7	-0.9	-0.5	-0.9
Dung 15 tons per acre	-0.3	-0.3	-0.1	-0.5	-0.3
Response to additional 0.9 cwt K_2O per acre					
No dung	+0.4	-0.3	+0.3	+0.2	+0.1
Dung 15 tons per acre	-0.1	+0.5	0.0	+0.1	+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 (±0.96)	59.1	57.6	54.0	57.7	57.1
Dung: tons per acre					
None (±1.50)*	56.0	53.8	48.3	49.6	51.9
15	62.2	61.4	59.6	65.7	62.2
Difference (±2.32)	6.2	7.6	11.3	16.1	10.3 (±1.16)
Response to additional 0.72 cwt N per acre		(±3.47)			(±1.74)
No dung	-6.1	-3.7	-4.3	+1.7	-3.1
Dung 15 tons per acre	+5.2	-4.2	-2.3	-2.2	-0.9
Response to additional 0.9 cwt K_2O per acre		(±3.47)			(±1.74)
No dung	+11.1	+0.4	+5.4	+1.4	+4.6
Dung 15 tons per acre	+0.9	+0.3	+1.9	-4.2	-0.3
Tops: tons per acre					
Mean (±1.113)	23.74	22.27	18.30	18.31	20.66
Dung: tons per acre					
None (±1.273)*	22.72	21.13	16.58	17.15	19.39
15	24.77	23.41	20.03	19.48	21.92
Difference (±1.235)	2.05	2.28	3.45	2.33	2.53 (±0.617)
Response to additional 0.72 cwt N per acre		(±1.346)			(±0.673)
No dung	+3.70	+2.90	+2.76	+4.73	+3.52
Dung 15 tons per acre	+3.86	+1.90	+2.83	+4.72	+3.32
Response to additional 0.9 cwt K_2O per acre		(±1.346)			(±0.673)
No dung	+2.94	+2.05	-0.79	-2.46	+0.44
Dung 15 tons per acre	+1.95	+0.22	-1.74	+0.50	+0.23

* 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	16.76	17.30	15.83	16.19	16.52
None	15.78	15.36	14.26	13.16	14.64
15	17.75	19.24	17.39	19.22	18.40
Difference	+1.97	+3.88	+3.13	+6.06	+3.76
Sugar percentage					
Mean	16.8	17.0	17.8	17.6	17.3
None	16.9	17.6	18.1	17.6	17.5
15	16.6	16.6	17.4	17.6	17.0
Difference	-0.3	-1.0	-0.7	0.0	-0.5
Total sugar: cwt per acre					
Mean (±2.38)	56.1	58.8	56.1	57.0	57.0
None (±3.36)*	53.4	54.0	51.6	46.4	51.3
15	58.8	63.6	60.5	67.7	62.7
Difference (±4.85)	+5.4	+9.6	+8.9	+21.3	+11.4
Tops: tons per acre					
Mean (±1.221)	20.46	21.09	17.67	17.49	19.18
None (±1.726)*	19.38	19.43	16.07	17.32	18.05
15	21.55	22.75	19.27	17.66	20.31
Difference (±2.060)	+2.17	+3.32	+3.20	+0.34	+2.26

*For use in horizontal and diagonal comparisons only.

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2nd Test crop
Barley

Previous rotation

Dung in 1957: tons per acre		Ley	Lucerne	Arable with hay	Arable with roots	Mean
Grain (at 85% Dry Matter): cwt per acre						
None	(±1.15)*	28.1	30.2	27.0	28.6	28.5
15		25.8	28.8	27.4	29.7	27.9
Mean	(±1.02)	26.9	29.5	27.2	29.1	28.1
Difference	(±1.09)	-2.3	-1.4	+0.4	+1.1	-0.6 (±0.54)
Straw (at 85% Dry Matter): cwt per acre						
None		30.4	28.1	25.9	25.9	27.5
15		30.6	31.6	31.4	32.3	31.4
Mean		30.5	29.8	28.6	29.1	29.4
Difference		+0.2	+3.5	+5.5	+6.4	+3.9

*For use in horizontal and diagonal comparisons only.

Note: There was early lodging on the plots receiving dung in 1957.

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58/Bf/1.1

WOBURN MARKET GARDEN EXPERIMENT

Organic manures and nitrogen - Lansome Field 1958, the 17th year.

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

Note: The results for the 1958-59 leeks will be included in the 1959 report.

Area of each plot (acres): 0.0125. Area harvested: Leeks - 0.0104; globe beet - 0.0106; early potatoes - 0.0085.

Cultivations, etc.:

Leeks 1957-58. Organic manures applied: July 19, 1957. Ploughed: July 22. 'Nitro-Chalk' and basal fertilizers applied: July 23. Planted: July 24. Second dressing of 'Nitro-Chalk' applied: Sept 9. Harvested: Mar 3 - Apr 10, 1958. Variety: Musselburgh.

Early potatoes. Organic manures applied: Dec 16, 1957. All plots ploughed: Dec 19. Fertilizers applied on the flat: Apr 14, 1958. Machine planted: Apr 14. Earthed up: June 18. Sprayed with copper fungicide at 5 lb in 80 gallons per acre: July 14. Lifted: July 22. Variety: Arran Pilot.

Globe beet. Ploughed, organic manures applied: Apr 25, 1958. Ground chalk at 23 cwt per acre applied: Apr 30. 'Nitro-Chalk' and basal fertilizers applied: May 8. Seed drilled at 14 lb per acre: May 9. Sprayed with miscible DDT at 3 pints in 40 gallons per acre: May 28. Singled: June 25 - July 9. Second dressing of 'Nitro-Chalk' applied: July 16. Harvested: Aug 11 - Sept 18. Variety: Detroit.

Standard errors per plot:

Leeks 1957-58.	Saleable produce:	0.423 tons per acre or 7.6%	(17 d.f.)
Early potatoes.	Total tubers:	0.892 tons per acre or 12.3%	(17 d.f.)
Globe beet.	Saleable bulbs:	1.45 tons per acre or 18.4%	(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 1957-58. Saleable produce: tons per acre						
			(±0.299)			(±0.211)
None		2.14	3.46	4.93	4.93	2.80*
Dung	10	3.58	4.98			4.28
	20	6.18	6.59			6.38
Sludge compost	10	5.37	6.02			5.70
	20	6.22	7.02			6.62
Sludge	10	6.52	5.90			6.21
	20	6.34	6.89			6.61
Vegetable compost	10	4.48	5.93			5.20
	20	6.06	7.24			6.65
Mean (±0.106)		5.59+	6.32+			5.54**
Leeks 1957-58. Percentage saleable (by number)						
None		78.2	92.5	98.5	99.5	85.4*
Dung	10	96.2	99.0			97.6
	20	98.1	98.8			98.4
Sludge compost	10	97.3	100.0			98.6
	20	100.0	97.7			98.9
Sludge	10	100.0	97.7			98.8
	20	97.8	100.0			98.9
Vegetable compost	10	98.3	99.4			98.8
	20	99.8	99.1			99.4
Mean		98.4+	99.0+			97.4**
Early potatoes. Total tubers: tons per acre						
			(±0.630)			(±0.446)
None		3.62	6.13	6.71	6.97	4.87*
Dung	10	6.68	6.91			6.80
	20	7.49	8.57			8.03
Sludge compost	10	6.85	7.56			7.20
	20	8.03	9.02			8.52
Sludge	10	6.91	7.84			7.37
	20	8.86	8.24			8.55
Vegetable compost	10	6.12	7.72			6.92
	20	7.33	7.29			7.31
Mean (±0.223)		7.28+	7.89+			7.24**

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

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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						
			(±1.024)			(±0.724)
None		1.12	2.28	4.41	4.20	1.70*
Dung	10	3.79	7.14			5.46
	20	11.66	11.88			11.77
Sludge compost	10	7.61	8.51			8.06
	20	10.62	12.72			11.67
Sludge	10	9.70	7.71			8.71
	20	9.06	11.58			10.32
Vegetable compost	10	5.86	6.60			6.23
	20	8.33	12.28			10.31
Mean (±0.362)		8.33+	9.80+			7.85**
Total produce (whole plants): tons per acre						
None		3.31	4.66	8.01	7.85	3.99*
Dung	10	7.06	11.83			9.44
	20	18.52	19.82			19.17
Sludge compost	10	12.70	13.83			13.27
	20	17.10	21.40			19.25
Sludge	10	15.99	13.28			14.64
	20	15.35	19.62			17.48
Vegetable compost	10	9.65	11.04			10.34
	20	13.73	19.48			16.60
Mean		13.76+	16.29+			13.21**
Plant number: thousands per acre						
None		101.2	88.8	99.3	98.6	95.0*
Dung	10	98.6	103.9			101.3
	20	102.2	99.6			100.9
Sludge compost	10	101.0	94.4			97.7
	20	95.6	101.2			98.4
Sludge	10	100.3	99.8			100.0
	20	97.3	91.2			94.2
Vegetable compost	10	101.4	92.6			97.0
	20	99.9	98.5			99.2
Mean		99.5+	97.6+			98.3**

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

+Excluding 'no organics'.

**General mean.

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58/Bg/1.1

IRRIGATION EXPERIMENT

Second year of revised scheme (the 8th year)

The effects of irrigation and nitrogen - Woburn Butt Close 1958.

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

Muriate of potash was applied to certain grass plots at 0.6 cwt K_2O per acre after the second cut and each subsequent cut except the last. This made possible a test of (0 v Irrigation) (0 v K) on the main grass plots.

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

Rainfall and Irrigation: inches

Week ending	Rain-fall	Cut grass B and C	Sugar beet A	Sugar beet B	Sugar beet C	Wheat A and C	Beans C
May 5	.18	.75					
12	.14						
19	.81	.75					
26	.30		-	.50	.50	.50	.50
June 2	.77	.50				.50	.50
9	1.11						
16	1.05	.50					
23	.83						
30	1.97						
July 7	.84						
14	.11						
21	.01	.78	.75	-	.75	.50	
28	1.24	.50	.50	-	.50		
Aug 4	.23						
11	.32						
18	.83	.50					
25	.76						
Sept 1	.43						
8	.51						
15	.40						
22	.59						
29	.76						
Total	14.19	4.28	1.25	.50	1.75	1.50	1.00

Note: (1) On grass 0 = A, B = C; on wheat 0 = B, A = C.
(2) Owing to weather conditions the experimental insecticide spray treatment of beans was omitted.

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Cultivations, etc.:

Sugar beet. Ploughed: Sept 2, Oct 9, 1957 and Mar 18, 1958. Ground chalk applied: Mar 6. Salt applied: Mar 17. 'Nitro-Chalk' applied: Apr 15. Seed drilled at 10 lb per acre: Apr 17. Basal fertilizer applied: Apr 18. Singled: May 27-28. Sprayed with miscible DDT at 3 pints in 40 gallons per acre: May 3. Sprayed with demeton methyl at 12 oz in 40 gallons per acre: June 26. Lifted: Oct 20-21. Variety: Klein E.

Spring wheat. Ploughed: Dec 10-19, 1957. Fertilizers applied, seed drilled at 3 bushels per acre: Mar 25, 1958. Combine harvested: Sept 1. Variety: Peko.

Spring beans. Ploughed: Sep 30, 1957 and Jan 14, 1958. Dung applied: Jan 14. Seed combine drilled at 200 lb per acre: Mar 25. Combine harvested: Oct 15. Variety: Garton's Spring Tick.

Grass. Basal fertilizers applied: Dec 2, 1957. 'Nitro-Chalk' applied: Apr 14, 1958. Cut 8 times (all plots): May 14, June 3, June 24, July 15, Aug 6, Sept 5, Oct 8, Nov 14; 'Nitro-Chalk' applied after each cut, except the last. Muriate of potash applied after second and subsequent cuts except the last. Variety: Cocksfoot S37.

Standard errors per plot.

Sugar beet.	Total sugar,	whole plot:	4.78 cwt per acre or 10.5% (6 d.f.)
		sub plot:	5.05 cwt per acre or 11.1% (8 d.f.)
	Tops,	whole plot:	2.41 tons per acre or 21.4% (6 d.f.)
		sub plot:	1.46 tons per acre or 12.9% (8 d.f.)
Spring wheat.	Grain (at 85% D.M.),	Whole plot:	2.46 cwt per acre or 9.8% (8 d.f.)
		Sub plot:	1.81 cwt per acre or 7.2% (10 d.f.)
Spring beans.	Grain (at 85% D.M.),	Whole plot:	2.51 cwt per acre or 14.1% (8 d.f.)
		Sub plot:	1.54 cwt per acre or 8.6% (10 d.f.)
Cut grass.	Dry matter, Totals of Cuts 1 & 2.	Whole plot:	1.40 cwt per acre or 7.3% (8 d.f.)
		Sub plot:	1.02 cwt per acre or 5.3% (10 d.f.)
	Totals of Cuts 3-8.	Whole plot:	3.87 cwt per acre or 6.2% (6 d.f.)
		Sub plot:	4.24 cwt per acre or 6.8% (8 d.f.)

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Summary of Results

Sugar beet

N: cwt per acre	Irrigation 0	A	B	C	Mean
Roots (washed): tons per acre					
0.6	12.70	11.64	11.63	11.76	11.93
1.2	15.54	15.28	15.96	16.40	15.79
Mean	14.12	13.46	13.79	14.08	13.86
Difference	2.84	3.64	4.33	4.64	3.86
Sugar Percentage					
0.6	16.6	16.5	16.8	16.3	16.5
1.2	16.1	16.5	16.2	16.5	16.3
Mean	16.4	16.5	16.5	16.4	16.4
Difference	-0.5	0.0	-0.6	+0.2	-0.2
Total sugar: cwt per acre		(±3.44)*			
0.6	42.1	38.1	39.0	38.3	39.4
1.2	50.4	50.3	51.5	54.2	51.6
Mean (±2.75)	46.2	44.2	45.2	46.2	45.4
Diff.(±4.12)	8.3	12.2	12.5	15.9	12.2 (±2.06)
Tops: tons per acre		(±1.513)*			
0.6	9.58	9.19	8.32	7.94	8.76
1.2	14.82	13.57	13.53	13.14	13.77
Mean (±1.391)	12.20	11.38	10.92	10.54	11.26
Diff.(±1.189)	5.24	4.38	5.21	5.20	5.01 (±0.594)

* For use in horizontal and diagonal comparisons only.

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Spring Wheat

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

N: cwt per acre	Irrigation 0 & B	A & C	Mean
	(±1.13)*		
0.4	24.3	23.0	23.6
0.8	27.6	25.4	26.5
Mean (±1.00)	25.9	24.2	25.1
Diff.(±1.42)	3.3	2.4	2.9 (±0.74)

* For use in horizontal and diagonal comparisons only.

Mean dry matter % as harvested: 79.8

Spring Beans

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

Dung: tons per acre	Irrigation 0	C	Mean
	(±1.12)*		
None	18.0	18.9	18.5
12	16.9	17.4	17.2
Mean (±1.02)	17.5	18.2	17.8
Diff.(±0.89)	-1.1	-1.5	-1.3 (±0.63)

* For use in horizontal and diagonal comparisons only.

Mean dry matter % as harvested: 74.3

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Cut Grass

Total of Cuts 1 & 2. Dry matter: cwt per acre

N: cwt per acre+	Irrigation O & A	Irrigation B & C	Mean
	(±0.64)		
0.3	16.6	18.8	17.7
0.6	19.3	22.4	20.9
Mean (±0.57)	17.9	20.6	19.3
Diff. (±0.59)	2.7	3.6	3.2 (±0.42)

Mean dry matter % as cut:21.3

Total of Cuts 3-8. Dry matter: cwt per acre

N: cwt per acre+	Irrigation O & A	Irrigation B & C	K_2O: cwt per acre including basal 1.2	K_2O: cwt per acre including basal 4.8++	Mean
	(±2.00)*		(±2.00)*		
0.3	56.9	57.6	55.9	58.7	57.3
0.6	68.3	65.8	62.7	71.4	67.1
Mean	62.6	61.7	59.3	65.1	62.2
	(±1.58)		(±1.58)		
Difference	11.4	8.2	6.8	12.7	9.8 (±1.73)
	(±2.45)		(±2.45)		

K_2O: cwt per acre ++ including basal	Irrigation O & A	Irrigation B & C	Mean
	(±2.23)		
1.2	60.5	58.0	59.3
4.8	64.7	65.5	65.1
Diff. (±3.16)	4.2	7.5	5.8

* For use in horizontal and diagonal comparisons only.

+ For each cut

++ Total for 6 cuts

Mean dry matter % as cut: 17.7

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WINTER WHEAT

Seed rates, sowing dates and levels of nitrogen - Great Field I 1958.

Design: 3 randomized blocks of 9 plots, each plot 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:-
Seed rates: 2; 3; 4 bushels per acre.
Sowing dates: Sept 17; Oct 7; Nov 8, 1957.
Nitrogen: 0.6; 1.2 cwt N per acre applied as 'Nitro-Chalk' in two equal parts in early February and late April.

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: Aug 21, 1957. Compound fertilizer applied by hand: First sowing - Sept 17; second sowing - Oct 7; third sowing - Nov 8. First dressing of N applied: Feb 15, 1958. Sprayed with CMPP at 6 pints in 40 gallons per acre: Apr 17. Second dressing of N applied: Apr 24. Combine harvested: Sept 10. Variety: Cappelle. Previous crop: Potatoes.

Standard errors per plot. Grain (at 85% dry matter):
Whole plot: 2.36 cwt per acre or 7.7% (16 d.f.)
Sub plot: 2.25 cwt per acre or 7.3% (18 d.f.)

Note. Estimates of % area lodged and counts of plant shoot and ear number were made. All plots were completely lodged at harvest.

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Summary of Results

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

Seed rate: bushels per acre	Date of sowing: Sept 17th	Oct 7th	Nov 8th	N: cwt per acre: 0.4	0.8	Diff.	Mean
	(±0.96)			(±0.95)*		(±1.06)	(±0.56)
2	33.2	31.1	34.3	35.0	30.7	-4.3	32.8
3	29.3	27.2	33.7	30.8	29.3	-1.5	30.1
4	31.2	29.2	26.9	29.8	28.4	-1.4	29.1

Date of sowing	(±0.95)*		(±1.06)	(±0.56)
Sept 17th	31.3	31.1	-0.2	31.2
Oct 7th	30.1	28.1	-2.0	29.1
Nov 8th	34.1	29.2	-4.9	31.6
Mean	31.8	29.5	-2.3 (±0.61)	30.7

*For use in vertical and diagonal comparisons.

Mean dry matter % as harvested: 74.1

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58/Ca/2.1

WINTER WHEAT

Uptake of nitrogen - Great Harpenden II 1958.

Design: 3 randomized blocks of 8 plots each.

Area of each plot: 0.0289 acres. Area harvested: 0.0129 acres.

Treatments: None (two plots per block) and all combinations of:-
Forms of nitrogen: Calcium nitrate; sulphate of ammonia, each at 100 lb N per acre.
Times of application of N: In autumn; in spring; half in autumn and half in spring.

Basal dressing: 5 cwt compound fertilizer (10% P_2O_5, 20% K_2O) per acre applied by hand.

Cultivations, etc.: Ploughed: Sept 16, 1957. Compound fertilizer applied, seed drilled at $2\frac{1}{2}$ bushels per acre, autumn nitrogen applied: Oct 5. Spring nitrogen applied: Mar 20, 1958. Sprayed with CMPP at 6 pints in 40 gallons per acre: Apr 30. Combine harvested: Sept 3. Variety: Cappelle. Previous crop: Fallow.

Standard error per plot.
Grain (at 85% dry matter): 2.33 cwt per acre or 5.3% (15 d.f.)

Note. The mineral nitrogen content of the soil and the total nitrogen content of the plants were determined at various stages of growth.

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Summary of Results

Form of N	Time of application: Autumn	Spring	Autumn & Spring	Mean
Grain (at 85% dry matter): cwt per acre				
		(±1.35)		(±0.78)
None				43.9(1)
Calcium nitrate	44.8	42.7	42.4	43.3
Sulphate of ammonia	44.3	46.2	42.3	44.3
Mean (±0.95)	44.5	44.4	42.3	43.8
Difference (±1.90)	-0.5	+3.5	-0.1	+1.0 (±1.10)
Straw (at 85% dry matter): cwt per acre				
None				40.9
Calcium nitrate	44.0	38.4	43.2	41.9
Sulphate of ammonia	43.7	41.2	45.6	43.5
Mean	43.8	39.8	44.4	42.2
Difference	-0.3	+2.8	+2.4	+1.6

(1) ±0.95

Mean dry matter % as harvested: Grain: 79.4
Straw: 76.1

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58/Ca/3

WINTER WHEAT

Varieties and levels of nitrogen - Long Hoos V 1958.

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

Area of each sub plot: 0.0116 acres. Area harvested: 0.0077 acres.

Treatments: All combinations of:-
Whole plots. Varieties: Banco (1); Cappelle (2); Heine 7 (3); Hybrid 46 (4); Leda (5); Marne (6); Minister (7); Pia (8).
Sub plots. Nitrogen: 0.5; 1.0 cwt N per acre applied as 'Nitro-Chalk'.

Basal dressing: 4 cwt compound fertilizer (5% N, 12½% P_2O_5, 12½% K_2O) per acre combine drilled with the seed.

Cultivations, etc.: Ploughed: Oct 15, 1957. Seed combine drilled at 2¾ bushels per acre: Oct 23. 'Nitro-Chalk' applied: Apr 16, 1958. Sprayed with CMPP at 6 pints in 40 gallons per acre: Apr 30. Combine harvested: Sept 5. Previous crop: Spring beans.

Standard errors per plot, Grain (at 85% dry matter):
Whole plot: 1.38 cwt per acre or 3.3% (14 d.f.)
Sub plot: 1.98 cwt per acre or 4.7% (16 d.f.)

Summary of Results

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

N: cwt per acre (including basal)	Variety 1	2	3	4	5	6	7	8	Mean
				(±1.13)*					
0.7	38.8	47.3	44.2	47.0	43.1	40.0	46.0	40.6	43.4
1.2	33.3	48.2	41.7	43.5	34.6	43.0	43.3	36.4	40.5
Mean (±0.79)	36.0	47.8	42.9	45.3	38.8	41.5	44.6	38.5	41.9
Difference (±1.62)	-5.5	+0.9	-2.5	-3.5	-8.5	+3.0	-2.7	-4.2	-2.9 (±0.57)

*for use in comparisons other than vertical.

Mean dry matter % as harvested: 75.4

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58/Ca/4

WINTER WHEAT

Levels and times of application of N - Great Knott I.

Design: 2 randomized blocks of 16 plots each.

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

Treatments: None (2 plots per block), and all combinations of:-
Nitrogen: 0.6; 1.2 cwt N per acre as sulphate of ammonia.
Times of application: All in seedbed (A); all as early top dressing (E); all as late top dressing (L); $\frac{1}{2}$A and $\frac{1}{2}$E; $\frac{1}{2}$A and $\frac{1}{2}$L; $\frac{1}{2}$E and $\frac{1}{2}$L; $\frac{1}{3}$A, $\frac{1}{3}$E and $\frac{1}{3}$L.

Basal dressing: 4 cwt per acre compound fertilizer (10% P_2O_5, 20% K_2O) combine drilled with seed.

Cultivations, etc.: Ploughed: Sept 13, 1957. Seedbed sulphate of ammonia applied: Oct 9. Seed combine drilled at $2\frac{1}{2}$ bushels per acre: Oct 11. Early top dressing of sulphate of ammonia applied: Mar 14, 1958. Sprayed with CMPP at 6 pints in 40 gallons per acre: Apr 30. Late top dressing of sulphate of ammonia applied: May 17. Combine harvested: Sept 2.
Variety: Cappelle. Previous crop: Winter wheat.

Standard error per plot.
Grain (at 85% dry matter): 2.33 cwt per acre or 5.6% (16 d.f.)

Summary of Results

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

N: cwt per acre	Time of application A	E	L	$\frac{1}{2}$A$\frac{1}{2}$E	$\frac{1}{2}$A$\frac{1}{2}$L	$\frac{1}{2}$E$\frac{1}{2}$L	$\frac{1}{3}$A$\frac{1}{3}$E$\frac{1}{3}$L	Mean
			(±1.65)					(±0.62)
None								33.8(1)
0.6	40.6	43.7	39.4	42.5	39.1	39.8	40.0	40.7
1.2	46.0	46.7	41.6	44.4	44.4	47.2	45.6	45.1
Mean (±1.16)	43.3	45.2	40.5	43.4	41.8	43.5	42.8	41.8
Diff. (±2.33)	5.4	3.0	2.2	1.9	5.3	7.4	5.6	4.4 (±0.88)

(1) ±1.16

A applied in seedbed
E applied in March
L applied in May.

Mean dry matter % as harvested: 80.0

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SPRING WHEAT

Combine drilling of nitrogen - Rothamsted (R) Great Knott III and Woburn (W) Lansome Field 1958.

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

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

Treatments: None and all combinations of:-
Nitrogen: 0.22*(N_1); 0.54 (N_2); 0.72*(N_3) cwt N per acre.
Method of application: Broadcast as sulphate of ammonia; combine drilled as compound fertilizer:

N_1: 5% N, 12½% P_2O_5, 12½% K_2O.
N_2: 8% N, 8% P_2O_5, 8% K_2O.
N_3: 12% N, 9% P_2O_5, 9% K_2O.

*Note. For N_1 and N_3 on Great Knott III (R) the compound fertilizer was actually applied at the rates of 0.19 and 0.59 cwt N per acre respectively. The broadcast dressings were corrected to these amounts.

Basal dressing per acre (each field): 0.54 cwt P_2O_5 and 0.54 cwt K_2O combine drilled
(a) as compound 16% P_2O_5, 16% K_2O on the no nitrogen and broadcast nitrogen plots;
(b) as compounds N_1, N_2, N_3 on the plots receiving drilled nitrogen.

Cultivations, etc.:
Great Knott III (R): Ploughed: Oct 28, 1957. Seed combine drilled at 3 bushels per acre: Apr 3, 1958. Sulphate of ammonia broadcast: Apr 4. Sprayed with MCPA at 4 pints in 40 gallons per acre: May 20. Combine harvested: Sept 12. Variety: Koga II. Previous crop: Spring wheat.
Lansome Field (W): Ploughed: Nov 27, 1957. Seed combine drilled at 3 bushels per acre: Apr 11, 1958. Sprayed with MCPA at 5 pints in 40 gallons per acre: May 22. Combine harvested: Oct 9. Variety: Peko. Previous crop: Fallow.

Standard errors per plot, Grain (at 85% dry matter):
Great Knott III (R): 0.94 cwt per acre or 5.1% (18 d.f.)
Lansome Field (W): 1.44 cwt per acre or 7.9% (18 d.f.)

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Summary of Results

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

N: cwt per acre							
	Broadcast			Combine drilled			
None	0.22+	0.54	0.72*	0.22+	0.54	0.72*	Mean
Great Knott III, Rothamsted							
9.9	13.1	20.1	20.2 (±0.46)	18.4	24.9	23.3	18.5

Mean dry matter % as harvested: 78.6

Lansome Field, Woburn							
12.6	17.7	21.7	22.0 (±0.71)	17.4	16.7	19.1	18.2

Mean dry matter % as harvested: 74.2

+0.19 on Great Knott III, Rothamsted.
*0.59 " " " " "

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SPRING WHEAT

Levels and times of application of nitrogen - Rothamsted (R) Great Knott III and Woburn (W) Stackyard, Series C 1958.

Design (each field): 22 treatments arranged in 4 blocks of 13 plots each, the control and 3 of the treatments occurring in every block, the other 18 treatments occurring in 2 blocks. The total amounts of N applied per block were equal.

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

Treatments: None, and all combinations of:-
Nitrogen: 0.3; 0.6; 0.9 cwt N per acre as 'Nitro-Chalk'.
Times of application: All in seedbed (S); all as early top dressing (E); all as late top dressing (L); $\frac{1}{2}$S & $\frac{1}{2}$E; $\frac{1}{2}$S & $\frac{1}{2}$L; $\frac{1}{2}$E & $\frac{1}{2}$L; $\frac{1}{3}$S, $\frac{1}{3}$E, $\frac{1}{3}$L.

Basal dressing:
Great Knott III (R): 2 cwt compound fertilizer (16% P_2O_5, 16% K_2O) per acre combine drilled with seed.
Stackyard (W): 1 cwt compound fertilizer (16% P_2O_5, 16% K_2O) per acre combine drilled with seed.

Cultivations, etc.:
Great Knott III (R). Ploughed: Oct 28, 1957. Seedbed 'Nitro-Chalk' applied, seed combine drilled at 3 bushels per acre: Apr 2, 1958. Early 'Nitro-Chalk' top dressing applied: Apr 25. Late 'Nitro-Chalk' top dressing applied: May 16. Sprayed with MCPA at 4 pints in 40 gallons per acre: May 20. Combine harvested: Sept 12. Variety: Koga II. Previous crop: Spring wheat.
Stackyard (W). Ploughed: Feb 13, 1957 to Mar 5, 1958. Seedbed 'Nitro-Chalk' applied: Mar 21. Seed combine drilled at 3 bushels per acre: Mar 22. Early 'Nitro-Chalk' top dressing applied: Apr 23. Late 'Nitro-Chalk' top dressing applied: May 16. Sprayed with MCPA at 4 pints in 40 gallons per acre: May 27. Combine harvested: Oct 9. Variety: Peko. Previous crop: Potatoes.

Standard errors per plot, Grain (at 85% dry matter).
Great Knott III (R): 2.58 cwt per acre or 14.0% (27 d.f.)
Stackyard (W): 1.97 cwt per acre or 7.4% (27 d.f.)

Note. Estimates of incidence of Eyespot (*Cercosporella herpotrichoides*) and Take-all (*Ophiobolus graminis*), and counts of plant number were made.

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Summary of Results

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

N: cwt per acre	Time of application							
	S	E	L	½S½E	½S½L	½E½L	⅓S⅓E⅓L	Mean
Great Knott III, Rothamsted								
			(±1.94)				(±1.29)	(±0.64)
None								8.5(1)
0.3	19.4	16.1	16.4	14.5	13.8	21.4	13.9	16.2
0.6	24.6	21.9	13.4	16.4	24.1	17.6	21.6	20.2
0.9	20.3	22.2	18.5	22.2	23.8	14.7	24.5	21.4
Mean (±1.08)	21.4	20.1	16.1	17.7	20.6	17.9	20.0(2)	18.4

(1) ±1.29 (2) ±0.74

Mean dry matter % as harvested: 80.0

Stackyard Field, Woburn

			(±1.48)				(±0.99)	(±0.49)
None								16.0(1)
0.3	27.4	24.1	21.7	24.9	23.7	22.9	25.7	24.5
0.6	31.1	26.9	26.2	31.4	25.7	25.2	29.3	28.1
0.9	31.4	29.4	26.3	32.4	29.9	31.1	31.1	30.3
Mean (±0.83)	30.0	26.8	24.7	29.6	26.4	26.4	28.7(2)	26.8

(1) ±0.99 (2) ±0.57

Mean dry matter % as harvested: 72.5

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58/Ca/7.1

SPRING WHEAT

Varieties and levels of nitrogen - Rothamsted (R) Great Knott III and Woburn (W) Stackyard 1958.

Design (each field): 3 randomized blocks of 7 plots each, plots being split into 2 for the application of nitrogen.

Area of each sub plot (acres):		Area harvested (acres):
Great Knott III (R):	0.0154	0.0103
Stackyard (W):	0.0193	0.0129

Treatments: All combinations of:-

Whole plots. Varieties: Atle (1); Atson (2); Koga II (3); Miana (4); Peko (5); Progress (6); Svenno (7).

Sub plots: Nitrogen, applied as sulphate of ammonia.

Great Knott III (R): None; 0.4 cwt N per acre

Stackyard (W): 0.4; 0.8 cwt N per acre.

Basal dressing:

Great Knott III (R): 3.3 cwt compound fertilizer (12% N, 9% P_2O_5, 9% K_2O) per acre combine drilled with seed.

Stackyard (W): 1 cwt compound fertilizer (16% P_2O_5, 16% K_2O) per acre combine drilled with seed.

Cultivations, etc.:

Great Knott III (R). Ploughed: Oct 28,1957. Seed combine drilled at 3¼ bushels per acre: Apr 4, 1958. Nitrogen applied: Apr 8. Sprayed with MCPA at 4 pints in 40 gallons per acre: Apr 20. Combine harvested: Sept 12. Previous crop: Spring wheat.

Stackyard (W). Ploughed: Feb 13, 1958. Nitrogen applied: Mar 24. Seed combine drilled at 3¼ bushels per acre: Apr 2. Sprayed with MCPA at 4 pints in 40 gallons per acre: May 27. Combine harvested: Oct 9. Previous crop: Potatoes.

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

Great Knott III (R):

Whole plot: 1.53 cwt per acre or 6.2% (12 d.f.)

Sub plot: 1.98 cwt per acre or 8.0% (14 d.f.)

Stackyard (W):

Whole plot: 1.61 cwt per acre or 6.2% (12 d.f.)

Sub plot: 1.85 cwt per acre or 7.1% (14 d.f.)

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Summary of Results

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

N: cwt per acre (including basal)	Variety 1	2	3	4	5	6	7	Mean
Great Knott III (R)								
				(±1.20)*				
0.4	24.6	24.1	23.4	15.4	23.2	23.6	23.3	22.5
0.8	24.6	26.0	26.8	25.1	26.8	25.9	31.0	26.6
Mean (±0.88)	24.6	25.0	25.1	20.2	25.0	24.8	27.1	24.5
Difference (±1.62)	0.0	1.9	3.4	9.7	3.6	2.3	7.7	4.1 (±0.61)

Mean dry matter % as harvested: 80.6

N: cwt per acre	Stackyard (W)							
				(±1.20)*				
0.4	23.4	22.9	26.2	21.3	26.2	25.1	23.7	24.1
0.8	28.1	26.3	28.9	24.9	29.3	30.5	25.9	27.7
Mean (±0.93)	25.8	24.6	27.5	23.1	27.7	27.8	24.8	25.8
Difference (±1.51)	4.7	3.4	2.7	3.6	3.1	5.4	2.2	3.6 (±0.57)

Mean dry matter % as harvested: 73.6

*for use in comparisons other than vertical.

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58/Cb/1.1

BARLEY

Residual effects of dung, N, P and K applied to potatoes 1957 and direct effects of N and P - West Barnfield II 1958.

Design: Half replicate of 4×2^5 arranged in 4 blocks of 16 plots each, the identity being d(20 - 10 + 5 - 0)npkNP = 1, with certain high order interactions confounded with block differences.

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

Treatments. All combinations of:-

Applied to potatoes 1957.

Dung: None; 5; 10; 20 tons per acre ploughed in.
N: None; 0.9 cwt N per acre as sulphate of ammonia.
P: None; 0.75 cwt P_2O_5 per acre as superphosphate.
K: None; 1.5 cwt K_2O per acre as muriate of potash.

Applied to barley 1958.

N: None; 0.4 cwt N per acre as 'Nitro-Chalk'.
P: None; 0.4 cwt P_2O_5 as superphosphate.

Basal dressing: 0.8 cwt K_2O per acre as muriate of potash.

Cultivations, etc.: Ploughed: Nov 7, 1957. 'Nitro-Chalk' and basal fertilizers applied, seed drilled at 2 bushels per acre: Mar 25, 1958. Sprayed with MCPB at 5 pints in 40 gallons per acre: May 28. Combine harvested: Sept 2. Variety: Proctor. Previous crop: Potatoes.

Standard error per plot.
Grain (at 85% dry matter): 1.51 cwt per acre or 4.4% (27 d.f.)

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Summary of Results

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

	Dung to potatoes 1957: tons per acre				
	None	5	10	20	Mean
Mean (±0.38)	33.6	33.9	34.1	35.0	34.2
Applied to potatoes 1957					
N: cwt per acre					
None (±0.53)	34.1	34.3	34.1	34.8	34.3
0.9	33.2	33.6	34.1	35.2	34.0
Difference (±0.76)	-0.9	-0.7	0.0	+0.4	-0.3 (±0.38)
P_2O_5: cwt per acre					
None (±0.53)	32.1	32.7	33.7	34.1	33.1
0.75	35.2	35.2	34.5	35.9	35.2
Difference (±0.76)	+3.1	+2.5	+0.8	+1.8	+2.1 (±0.38)
K_2O: cwt per acre					
None (±0.53)	33.6	34.3	33.4	35.7	34.2
1.5	33.7	33.6	34.8	34.3	34.1
Difference (±0.76)	+0.1	-0.7	+1.4	-1.4	-0.1 (±0.38)
Applied to barley 1958					
N: cwt per acre					
None (±0.53)	33.2	32.9	33.6	34.6	33.6
0.4	34.1	35.0	34.6	35.4	34.8
Difference (±0.76)	+0.9	+2.1	+1.0	+0.8	+1.2 (±0.38)
P_2O_5: cwt per acre					
None (±0.53)	31.0	32.7	33.1	34.0	32.7
0.4	36.2	35.2	35.0	35.9	35.6
Difference (±0.76)	+5.2	+2.5	+1.9	+1.9	+2.9 (±0.38)

Responses to treatments cwt per acre

	Applied to potatoes 1957						Applied to barley 1958			
	N		P_2O_5		K_2O		N		P_2O_5	
Response to	None	0.9	None	0.75	None	1.5	None	0.4	None	0.4
Applied to potatoes 1957					(±0.53)					
N	-	-	+0.3	-0.9	-1.0	+0.4	+0.8	-1.4	-0.6	0.0
P_2O_5	+2.6	+1.4	-	-	+1.5	+2.5	+2.4	+1.6	+2.9	+1.1
K_2O	-0.9	+0.5	-0.7	+0.3	-	-	-0.2	-0.2	0.0	-0.4
Applied to barley 1958										
N	+2.3	+0.1	+1.6	+0.8	+1.2	+1.2	-	-	+1.0	+1.4
P_2O_5	+2.6	+3.2	+3.8	+2.0	+3.1	+2.7	+2.7	+3.1	-	-

Mean dry matter % as harvested: 80.9

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BARLEY

Residual effects of dung, N, P, K and salt to sugar beet 1957 and direct effect of N - Rothamsted (R) West Barnfield II and Woburn (W) Great Hill 1958.

Design: Half replicate of 4×2^5 arranged in 4 blocks of 16 plots each, the identity being d(20 - 10 - 5 + 0)npksN = 1, with certain high order interactions confounded with block differences.

Area of each plot (each field): 0.0167 acres. Area harvested: 0.0141 acres.

Treatments: All combinations of:-

Applied to sugar beet 1957

Dung: None; 5; 10; 20 tons per acre ploughed in.
N: None; 0.9 cwt N per acre as sulphate of ammonia.
P: None; 0.75 cwt P_2O_5 per acre as superphosphate.
K: None; 1.5 cwt K_2O per acre as muriate of potash.
Salt: None; 5 cwt agricultural salt per acre.

Applied to barley 1958

N: None; 0.4 cwt N per acre as 'Nitro-Chalk'.

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

Cultivations, etc.:

West Barnfield II (R). Ploughed: Jan 1. Seed combine drilled with basal fertilizers at 2 bushels per acre, nitrogen fertilizer applied: Mar 25. Sprayed with MCPB at 5 pints in 40 gallons per acre: May 28. Combine harvested: Aug 27. Variety: Proctor. Previous crop: Sugar beet.

Great Hill (W). Ploughed: Jan 27. Nitrogen fertilizer applied, seed combine drilled at 3 bushels per acre with basal fertilizer: Apr 9. Sprayed with MCPA at 5 pints in 40 gallons per acre: May 20. Combine harvested: Aug 26. Variety: Herta. Previous crop: Sugar beet.

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

West Barnfield II (R): 1.48 cwt per acre or 3.9% (27 d.f.)
Great Hill (W): 1.48 cwt per acre or 5.8% (27 d.f.)

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Summary of Results

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

	Dung to sugar beet 1957: tons per acre				
	None	5	10	20	Mean
	West Barnfield II (R)				
Mean (±0.37)	36.4	37.6	37.8	38.8	37.7
Applied to sugar beet 1957					
N: cwt per acre					
None (±0.52)	35.4	37.5	37.9	38.5	37.3
0.9	37.4	37.8	37.7	39.1	38.0
Difference (±0.74)	+2.0	+0.3	-0.2	+0.6	+0.7 (±0.37)
P_2O_5: cwt per acre					
None (±0.52)	36.0	37.4	37.1	38.1	37.1
0.75	36.8	37.9	38.5	39.5	38.2
Difference (±0.74)	+0.8	+0.5	+1.4	+1.4	+1.1 (±0.37)
K_2O: cwt per acre					
None (±0.52)	37.2	37.6	37.9	38.7	37.9
1.5	35.7	37.6	37.7	38.9	37.5
Difference (±0.74)	-1.5	0.0	-0.2	+0.2	-0.4 (±0.37)
Salt: cwt per acre					
None (±0.52)	36.6	37.7	38.1	38.8	37.8
5.0	36.3	37.5	37.5	38.9	37.5
Difference (±0.74)	-0.3	-0.2	-0.6	+0.1	-0.3 (±0.37)
Applied to barley 1958					
N: cwt per acre					
None (±0.52)	33.7	35.7	36.3	37.3	35.7
0.4	39.1	39.5	39.4	40.4	39.6
Difference (±0.74)	+5.4	+3.8	+3.1	+3.1	+3.9 (±0.37)

Responses to treatments cwt per acre

Response to	Applied to sugar beet 1957								Applied to barley 1958	
	N		P_2O_5		K_2O		Salt		N	
	None	0.9	None	0.75	None	1.5	None	5.0	None	0.4
Applied to sugar beet 1957					(±0.52)					
N	-	-	+1.3	+0.1	+1.1	+0.3	+1.1	+0.3	+2.1	-0.7
P_2O_5	+1.7	+0.5	-	-	+1.4	+0.8	+0.6	+1.6	+1.3	+0.9
K_2O	0.0	-0.8	-0.1	-0.7	-	-	-0.2	-0.6	-0.3	-0.5
Salt	+0.1	-0.7	-0.8	+0.2	-0.1	-0.5	-	-	-0.5	-0.1
Applied to barley 1958										
N	+5.2	+2.4	+4.0	+3.6	+3.9	+3.7	+3.6	+4.0	-	-

Mean dry matter % as harvested: 80.7

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

	Dung to sugar beet 1957: tons per acre None	5	10	20	Mean
	Great Hill (W)				
Mean (±0.37)	25.0	25.6	26.0	25.5	25.5
Applied to sugar beet 1957					
N: cwt per acre					
None (±0.52)	24.4	25.2	25.9	25.5	25.3
0.9	25.6	25.9	26.2	25.5	25.8
Difference (±0.74)	+1.2	+0.7	+0.3	0.0	+0.5 (±0.37)
P_2O_5: cwt per acre					
None (±0.52)	25.2	25.1	26.1	25.2	25.4
0.75	24.8	26.1	26.0	25.8	25.7
Difference (±0.74)	-0.4	+1.0	-0.1	+0.6	+0.3 (±0.37)
K_2O: cwt per acre					
None (±0.52)	24.7	25.9	26.1	25.8	25.6
1.5	25.2	25.2	26.0	25.3	25.4
Difference (±0.74)	+0.5	-0.7	-0.1	-0.5	-0.2 (±0.37)
Salt: cwt per acre					
None (±0.52)	24.6	26.0	25.7	25.3	25.4
5.0	25.4	25.1	26.4	25.7	25.6
Difference (±0.74)	+0.8	-0.9	+0.7	+0.4	+0.2 (±0.37)
Applied to barley 1958					
N: cwt per acre					
None (±0.52)	19.4	19.8	20.4	19.8	19.8
0.4	30.5	31.4	31.7	31.2	31.2
Difference (±0.74)	+11.1	+11.6	+11.3	+11.4	+11.4 (±0.37)

Responses to treatments cwt per acre

Response to	Applied to sugar beet 1957 N None	N 0.9	P_2O_5 None	P_2O_5 0.75	K_2O None	K_2O 1.5	Salt None	Salt 5.0	Applied to barley 1958 N None	N 0.4
Applied to sugar beet 1957					(±0.52)					
N	-	-	+0.1	+0.9	-0.3	+1.3	+0.6	+0.4	+0.9	+0.1
P_2O_5	-0.1	+0.7	-	-	+0.6	0.0	+0.9	-0.3	+0.2	+0.4
K_2O	-1.0	+0.6	+0.1	-0.5	-	-	-0.2	-0.2	+0.4	-0.8
Salt	+0.3	+0.1	+0.8	-0.4	+0.2	+0.2	-	-	-0.2	+0.6
Applied to barley 1958										
N	+11.8	+11.0	+11.3	+11.5	+12.0	+10.8	+11.0	+11.8	-	-

Mean dry matter % as harvested: 80.0

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58/Cb/3.1

BARLEY

Combine drilling of nitrogen - Rothamsted (R) Great Knott III and Woburn (W) Lansome Field 1958.

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

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

Treatments: None and all combinations of:-
Nitrogen: 0.22* (N_1); 0.54 (N_2); 0.72* (N_3) cwt N per acre.
Method of application: Broadcast as sulphate of ammonia; combine drilled as compound fertilizer:

*N_1: 5% N, 12% P_2O_5, 12½% K_2O
N_2: 8% N, 8% P_2O_5, 8% K_2O
*N_3: 12% N, 9% P_2O_5, 9% K_2O

*Note: For N_1 and N_3 on Great Knott III (R), the compound fertilizer was actually applied at the rates of 0.19 and 0.57 cwt N per acre. The broadcast dressings were corrected to these amounts.

Basal dressing per acre (each field): 0.54 cwt P_2O_5 and 0.54 cwt K_2O combine drilled
(a) as compound (16% P_2O_5, 16% K_2O) on the no nitrogen and broadcast nitrogen plots.
(b) as compounds N_1, N_2, N_3 on the plots receiving drilled nitrogen.

Cultivations, etc.:
Great Knott III (R). Ploughed: Oct 28, 1957. Seed combine drilled at 2¾ bushels per acre: Apr 3, 1958. Sulphate of ammonia broadcast: Apr 4. Sprayed with MCPA at 4 pints in 40 gallons per acre: May 20. Combine harvested: Aug 25. Variety: Herta. Previous crop: Spring wheat.
Lansome Field (W). Ploughed: Nov 27, 1957. Seed combine drilled at 2¾ bushels per acre: Apr 3, 1958. Sulphate of ammonia broadcast: Apr 8. Sprayed with MCPA at 5 pints in 40 gallons per acre: May 22. Combine harvested: Aug 27. Variety: Herta. Previous crop: Fallow.

Standard errors per plot, Grain (at 85% dry matter):
Great Knott III (R): 2.25 cwt per acre or 7.3% (18 d.f.)
Lansome Field (W): 1.79 cwt per acre or 5.8% (18 d.f.)

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Summary of Results

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

N: cwt per acre							
	Broadcast			Combine drilled			
None	0.22+	0.54	0.72*	0.22+	0.54	0.72*	Mean
Great Knott III, Rothamsted							
19.0	25.0	36.1	36.4 (±1.13)	25.8	37.3	37.2	31.0
Mean dry matter % as harvested: 74.2							
Lansome Field, Woburn							
20.0	27.7	33.9	33.4 (±0.89)	28.0	36.5	35.0	30.6
Mean dry matter % as harvested: 84.3							

+0.19 on Great Knott III, Rothamsted.

*0.57 " " " " " "

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BARLEY

Levels and times of application of nitrogen - Rothamsted (R) Great Knott III and Woburn (W) Stackyard, Series C 1958.

Design, (each field): 22 treatments arranged in 4 blocks of 13 plots each, the control and 3 of the treatments occurring in every block, the other 18 treatments occurring in 2 blocks. The total amounts of N applied per block were equal.

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

Treatments: None, and all combinations of:-
Nitrogen: N_1; N_2; N_3 applied as 'Nitro-Chalk'.
Times of application: All in seedbed (S); all as early top dressing (E); all as late top dressing (L); $\frac{1}{2}$S & $\frac{1}{2}$E; $\frac{1}{2}$S & $\frac{1}{2}$L; $\frac{1}{2}$E & $\frac{1}{2}$L; $\frac{1}{3}$S, $\frac{1}{3}$E, $\frac{1}{3}$L.
Where N_1; N_2; N_3 =
Great Knott III (R): 0.23; 0.46; 0.69 cwt N per acre.
Stackyard (W): 0.3; 0.6; 0.9 cwt N per acre.

Basal dressing:
Great Knott III (R): 2 cwt compound fertilizer (16% P_2O_5, 16% K_2O) per acre combine drilled with seed.
Stackyard (W): 1 cwt compound fertilizer (16% P_2O_5, 16% K_2O) per acre combine drilled with seed.

Cultivations, etc.:
Great Knott III (R): Ploughed: Oct 28, 1957. Seedbed 'Nitro-Chalk' applied: Apr 2, 1958. Seed combine drilled at $2\frac{3}{4}$ bushels per acre: Apr 3. Early 'Nitro-Chalk' top dressing applied: Apr 25. Late 'Nitro-Chalk' top dressing applied: May 16. Sprayed with MCPA, 4 pints in 40 gallons per acre: May 20. Combine harvested: Aug 26. Variety: Herta. Previous crop: Spring wheat.
Stackyard (W). Ploughed: Feb 13 to Mar 5, 1958. Seedbed 'Nitro-Chalk' applied, seed combine drilled at $2\frac{1}{2}$ bushels per acre: Mar 22. Early 'Nitro-Chalk' top dressing applied: Apr 23. Late 'Nitro-Chalk' top dressing applied: May 16. Sprayed with MCPA, 4 pints in 40 gallons per acre: May 27. Combine harvested: Sept 1. Variety: Herta. Previous crop: Potatoes.

Standard errors per plot, Grain (at 85% dry matter).
Great Knott III (R): 1.85 cwt per acre or 5.4% (27 d.f.)
Stackyard (W): 1.49 cwt per acre or 4.4% (27 d.f.)

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Summary of Results

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

N: cwt per acre	Time of application							Mean
	S	E	L	½S ½E	½S ½L	½E ½L	⅓S ⅓E ⅓L	
Great Knott III, Rothamsted								
			(±1.39)				(±0.92)	(±0.46)
None								22.7 (1)
0.23	30.2	32.0	30.1	31.7	31.9	30.2	30.5	30.9
0.46	35.8	36.0	35.7	35.7	36.0	39.5	37.7	36.7
0.69	36.6	37.8	37.8	37.2	38.4	38.9	39.3	38.1
Mean (±0.77)	34.2	35.3	34.5	34.8	35.4	36.2	35.8 (2)	34.3

(1) ±0.92 (2) ±0.53

Mean dry matter % as harvested: 75.5

N: cwt per acre	Time of application							Mean
	S	E	L	½S ½E	½S ½L	½E ½L	⅓S ⅓E ⅓L	
Stackyard, Woburn								
			(±1.12)				(±0.75)	(±0.37)
None								21.6 (1)
0.3	32.1	32.3	32.4	31.6	33.6	33.4	32.5	32.5
0.6	34.6	38.2	35.2	35.4	37.5	38.5	38.5	37.0
0.9	34.0	36.1	36.1	35.9	37.4	34.8	38.3	36.4
Mean (±0.62)	33.6	35.5	34.6	34.3	36.2	35.6	36.4 (2)	34.3

(1) ±0.75 (2) ±0.43

Mean dry matter % as harvested: 83.4

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BARLEY

Varieties and levels of nitrogen - Rothamsted (R) Great Knott III and Woburn (W) Lansome Field.

Design: 3 randomized blocks of 6 plots each, plots being split into 2 for the application of nitrogen.

Area of each sub plot (acres):	Area harvested (acres):
Great Knott III (R): 0.0103.	0.0069
Lansome Field (W): 0.0167.	0.0111.

Treatments: All combinations of:-
Whole plots. Varieties: Domen (1); Herta (2); Ingrid (3); Plumage Archer (4); Proctor (5); Rika (6).
Sub plots. Nitrogen, applied as sulphate of ammonia.
Great Knott III (R): None; 0.3 cwt N per acre
Lansome Field (W): 0.4; 0.8 cwt N per acre.

Basal dressing:
Great Knott III (R): $2\frac{1}{2}$ cwt compound fertilizer (12% N, 9% P_2O_5, 9% K_2O) per acre combine drilled with seed.
Lansome Field (W): $2\frac{1}{2}$ cwt compound fertilizer (16% P_2O_5, 16% K_2O) per acre combine drilled with seed.

Cultivations, etc.:
Great Knott III (R): Ploughed: Oct 28 - Nov 6, 1957. Seed combine drilled at $2\frac{1}{2}$ bushels (Proctor - 2 bushels) per acre: Apr 3 - 4, 1958. Sulphate of ammonia applied: Apr 8. Sprayed with MCPA at 4 pints in 40 gallons per acre: Apr 22. Combine harvested: Aug 26. Previous crop: Spring wheat.

Lansome Field (W): Ploughed: Nov 27 - 29, 1957. Sulphate of ammonia applied: Apr 3, 1958. Seed combine drilled at $2\frac{3}{4}$ bushels per acre: Apr 11. Sprayed with MCPA at 5 pints in 40 gallons per acre: May 22. Combine harvested: Aug 27. Previous crop: Fallow.

Standard errors per plot, Grain (at 85% dry matter):
Great Knott III (R):
Whole plot: 1.14 cwt per acre or 3.7% (10 d.f.)
Sub plot: 0.81 cwt per acre or 2.6% (12 d.f.)
Lansome Field (W):
Whole plot: 1.38 cwt per acre or 4.2% (10 d.f.)
Sub plot: 1.88 cwt per acre or 5.8% (12 d.f.)

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Summary of Results

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

N: cwt per acre (including basal)	Variety 1	2	3	4	5	6	Mean
	Great Knott III (R) (±0.73)*						
0.3	26.5	30.5	26.8	24.9	30.6	29.7	28.1
0.6	30.0	36.4	33.2	30.6	36.7	34.2	33.5
Mean (±0.65)	28.2	33.5	30.0	27.8	33.6	31.9	30.8
Difference (±0.66)	3.5	5.9	6.4	5.7	6.1	4.5	5.4 (±0.27)

Mean dry matter % as harvested: 74.4

N: cwt per acre	Lansome Field (W) (±1.10)*						
0.4	32.1	33.0	33.4	29.9	34.1	35.0	32.9
0.8	31.3	30.9	33.5	26.3	37.1	32.8	32.0
Mean (±0.79)	31.7	31.9	33.4	28.1	35.6	33.9	32.4
Difference (±1.54)	-0.8	-2.1	+0.1	-3.6	+3.0	-2.2	-0.9 (±0.63)

Mean dry matter % as harvested: 83.1

*for use in comparisons other than vertical.

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BARLEY

Residual effects of nitrogenous fertilizers and direct effect of potash - Long Hoos I, II and III 1958.

Design: 4 randomized blocks of 16 plots each, plots being split into 2 for the application of potash.

Area of each sub plot: 0.0038 acres. Area harvested: 0.0032 acres.

Treatments: All combinations of:-

Applied to ryegrass. (whole plots):
None (2 plots per block) together with all combinations of:-

Materials and methods of application

Applied in 1 single dressing:

Formalized casein,	12.2% N in 1956
" "	12.2% N in 1957
Casein,	12.6% N in 1956 and 1957

Applied in 4 dressings of one quarter the single rate:

Ammonium sulphate,	21.0% N in 1957
" "	21.0% N in 1956 and 1957
Urea,	43.5% N in 1956 and 1957
Calcium nitrate,	15.5% N in 1956 and 1957

Rates of application

0.75; 1.5 cwt N per acre

Applied to barley (1958) (sub plots):
K: None; 1.0 cwt K_2O per acre as muriate of potash.

Basal dressing: 3 cwt compound fertilizer (9% N, 18% P_2O_5) per acre combine drilled with seed.

Cultivations, etc.: Ploughed: Nov 28, 1957. Seed combine drilled at $2\frac{1}{2}$ bushels per acre, muriate of potash applied: Mar 22, 1958. Sprayed with MCPA at 5 pints in 40 gallons per acre: May 27. Harvested: Aug 11. Variety: Proctor. Previous crop: Ryegrass.

Standard errors per plot. Grain (at 85% dry matter):
Whole plot: 2.10 cwt per acre or 7.8% (46 d.f.)
Sub plot: 1.76 cwt per acre or 6.6% (49 d.f.)

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Summary of Results

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

Level of N in fertilizer: cwt per acre	Fertilizer: None	Single dressing 1956 F	Single dressing 1957 F	Single dressing 1956 & 1957 C	Divided dressing 1957 A	Divided dressing 1956 A	Divided dressing and U	Divided dressing 1957 N	Mean
Mean (±0.74)	25.5	25.4	31.9	26.2	25.7	24.7	27.9	26.9	26.8
				(±1.05)					
0.75	-	24.2	30.9	26.3	25.1	23.8	27.0	23.5	25.8
1.50	-	26.7	33.0	26.2	26.4	25.6	28.9	30.3	28.2
Diff. (±1.48)		+2.5	+2.1	-0.1	+1.3	+1.8	+1.9	+6.8	+2.4 (±0.56)
K_2O: cwt per acre				(±0.86)*					
None	25.9	25.0	31.5	25.3	25.6	23.7	28.0	26.0	26.4
1.0	25.1	25.8	32.4	27.1	25.9	25.7	27.9	27.8	27.2
Diff. (±0.88)	-0.8	+0.8	+0.9	+1.8	+0.3	+2.0	-0.1	+1.8	+0.8 (±0.31)

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

Level of N in fertilizer: cwt per acre	None	1956 F	1957 F	1957 C	1957 A	1956 A	and U	1957 N	Mean
Mean	21.6	23.4	29.7	23.5	22.8	22.4	25.4	24.0	24.1
0.75	-	22.2	27.0	25.1	23.2	21.6	23.6	20.8	23.4
1.50	-	24.5	32.4	22.0	22.5	23.3	27.2	27.1	25.6
Diff.		+2.3	+5.4	-3.1	-0.7	+1.7	+3.6	+6.3	+2.2
K_2O: cwt per acre									
None	22.2	22.9	29.2	22.0	21.8	21.8	25.3	22.8	23.5
1.0	21.0	23.8	30.2	25.0	23.9	23.1	25.5	25.2	24.7
Diff.	-1.2	+0.9	+1.0	+3.0	+2.1	+1.3	+0.2	+2.4	+1.2

Treatments

F = Formalized casein 12.2% N
C = Casein 12.6% N
A = Ammonium sulphate 21.0% N
U = Urea 43.5% N
N = Calcium nitrate 15.5% N

Mean dry matter % as harvested:
Grain, 77.3
Straw, 67.0

*For use in horizontal and diagonal comparisons only.

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BARLEY

Residual effects of dung, N, P and K applied to potatoes 1957 and direct effect of N - Great Hill Woburn 1958.

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

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

Treatments. All combinations of:-

To potatoes 1957.

Dung:	None;	5; 10; 20 tons per acre ploughed in.
N:	None;	0.9 cwt N per acre as sulphate of ammonia.
P:	None;	0.75 cwt P_2O_5 per acre as superphosphate.
K:	None;	1.5 cwt K_2O per acre as muriate of potash.

To barley 1958.

N:	None;	0.4 cwt N per acre as 'Nitro-Chalk'.

Basal dressing: $2\frac{1}{2}$ cwt compound fertilizer (16% P_2O_5, 16% K_2O) per acre.

Cultivations, etc.: Ploughed: Dec 10, 1957. 'Nitro-Chalk' and basal fertilizer applied, seed drilled at 3 bushels per acre: Apr 9, 1958. Sprayed with MCPA at 5 pints in 40 gallons per acre: May 20. Combine harvested: Aug 27. Variety: Herta. Previous crop: Potatoes.

Standard error per plot.
Grain (at 85% dry matter): 3.25 cwt per acre or 14.7% (34 d.f.)*

*1 missing value.

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Summary of Results

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

	Dung to potatoes 1957: tons per acre None	5	10	20	Mean
Mean (±0.81)	22.0	21.1	22.7	22.8	22.1
Applied to potatoes 1957					
N: cwt per acre					
None (±1.15)	21.1	20.1	21.8	20.7	20.9
0.9 (±1.15)	22.9	22.1	23.6	25.0	23.4
Difference (±1.62)	+1.8	+2.0	+1.8	+4.3	+2.5 (±0.81)
P_2O_5: cwt per acre					
None (±1.15)	22.9	20.3	21.3	22.9	21.9
0.75 (±1.15)	21.0	21.9	24.0	22.7	22.4
Difference (±1.62)	-1.9	+1.6	+2.7	-0.2	+0.5 (±0.81)
K_2O: cwt per acre					
None (±1.15)	22.9	21.2	23.3	23.6	22.7
1.5 (±1.15)	21.1	21.0	22.1	22.1	21.5
Difference (±1.62)	-1.8	-0.2	-1.2	-1.5	-1.2 (±0.81)
Applied to barley 1958					
N: cwt per acre					
None (±1.15)	16.5	15.1	18.3	16.6	16.6
0.4 (±1.15)	27.5	27.1	27.0	29.0	27.7
Difference (±1.62)	+11.0	+12.0	+8.7	+12.4	+11.1 (±0.81)

Responses to treatments cwt per acre

Response to	Applied to potatoes 1957: N None	N 0.9	P_2O_5 None	P_2O_5 0.75	K_2O None	K_2O 1.5	Applied to barley 1958: N None	N 0.4
Applied to potatoes 1957 (±1.15)								
N	-	-	+2.2	+2.8	+2.3	+2.7	+3.3	+1.7
P_2O_5	+0.2	+0.8	-	-	+0.4	+0.6	+1.2	-0.2
K_2O	-1.4	-1.0	-1.3	-1.1	-	-	-1.5	-0.9
Applied to barley 1958								
N	+11.8	+10.2	+11.7	+10.3	+10.7	+11.3	-	-

Mean dry matter % as harvested: 80.7

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58/Cc/1

SPRING OATS

Varieties and levels of nitrogen - Long Hoos VII 1958.

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

Area of each sub plot: 0.0154 acres. Area harvested: 0.0103 acres.

Treatments: All combinations of:-
Whole plots. Varieties: Blenda (1); Deva (2); Eagle (3); Flamande (4); Palu (5); Pendek (6); Sun II (7); de Wattines (8).
Sub plots. Nitrogen: None; 0.36 cwt N per acre applied as sulphate of ammonia.

Basal dressing: 3 cwt compound fertilizer (12% N, 9% P_2O_5, 9% K_2O) per acre combine drilled with seed.

Cultivations, etc.: Ploughed: Dec 30 - 31, 1957. Seed combine drilled at 3½ bushels per acre, sulphate of ammonia applied: Mar 27, 1958. Sprayed with MCPA, 5 pints in 40 gallons per acre: May 27. Combine harvested: Aug 31. Previous crop: Potatoes.

Standard errors per plot, Grain (at 85% dry matter):
Whole plot: 1.68 cwt per acre or 5.4% (14 d.f.)
Sub plot: 3.54 cwt per acre or 11.4% (16 d.f.)

Summary of Results

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

N: cwt per acre (including basal)	Variety 1	2	3	4	5	6	7	8	Mean
				(±1.74)*					
0.36	35.5	28.5	30.0	32.2	36.1	30.8	32.3	33.8	32.4
0.72	30.4	26.5	26.4	29.6	34.6	25.1	30.4	32.3	29.4
Mean (±0.96)	32.9	27.5	28.2	30.9	35.3	27.9	31.3	33.1	30.8
Difference (±2.89)	-5.1	-2.0	-3.6	-2.6	-1.5	-5.7	-1.9	-1.5	-3.0 (±1.02)

*for use in comparisons other than vertical.

Mean dry matter % as harvested: 84.8

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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 1958 - the 2nd year.

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

Area of each plot: 0.0305 acres. Area harvested: 0.0200 acres.

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 will be split for N, and all cropped with winter wheat.

Basal dressing: All blocks received 23 cwt per acre ground chalk in Nov 1956; 2 cwt compound fertilizer (16% P_2O_5, 16% K_2O) per acre combine drilled with seed.

Nitrogen for cereals: 3 cwt 'Nitro-Chalk' per acre to spring wheat and 2 cwt 'Nitro-Chalk' per acre to oats and barley, all in seedbed. 6 cwt 'Nitro-Chalk' per acre to winter wheat as spring top dressing, half applied in March and half in May.

Cultivations, etc.: Ploughed: Sept 13, 1957. Winter wheat combine drilled at $2\frac{1}{2}$ bushels per acre: Oct 10. 1st application of 'Nitro-Chalk' to winter wheat: Mar 10, 1958. 'Nitro-Chalk' applied for barley, oats and spring wheat and seed combine drilled at 2, 4 and 3 bushels per acre respectively: Mar 20. 2nd application of 'Nitro-Chalk' to winter wheat: May 12. Sprayed with CMPP at 6 pints in 40 gallons per acre: May 15. Combine harvested: Oats and barley: Sept 1; winter and spring wheat: Sept 3. Varieties: Winter wheat - Heine 7; spring wheat - Koga II; oats - Sun II; barley - Proctor. Previous crop: Series starting in 1958: spring wheat.

Note. Estimates of % area lodged, weed infestation and 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 year's results etc. see 'Results of the Field Experiments ' 57/Cd/1.

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Summary of Results

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

Series starting in 1957

Crop in 1957 1958	WW WW	SW WW	B WW	O WW	WW O
Mean dry matter % as harvested	18.7	19.5 78.5	20.2	19.8*	25.1 85.0

Series starting in 1958

Crop in 1958	WW	SW	B	O
Mean dry matter % as harvested	12.3 75.2	13.3 70.2	29.4 81.5	26.7 85.1

*All three plots were badly damaged by birds.

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SPRING BEANS

Effect of seed rates and spraying on aphids (Aphis fabae)- Great Knott III 1958.

Design: 4 randomized blocks of 6 plots each, plots being split into 2 for the application of spray.

Area of each sub plot: 0.0354 acres. Area harvested: 0.0126 acres.

Treatments. All combinations of:-
Seed rate, lb per acre: 50; 100; 200; 300; 400; 800.
Spray: None; demeton-methyl (new formulation) at 6 fluid oz of 50% active ingredient in 60 gallons per acre.

Basal dressing: 400 lb compound fertilizer (10% P_2O_5, 20% K_2O) per acre placement drilled with seed.

Cultivations, etc.: Ploughed: Oct 28, 1957. Seed placement drilled with basal fertilizer: Mar 18, 1958. Appropriate plots sprayed with demeton-methyl: June 18. Combine harvested: Oct 7. Variety: Spring Tick. Previous crop: Spring wheat.

Standard errors per plot, Grain (at 85% dry matter):
Whole plot: 2.75 cwt per acre or 10.8% (15 d.f.)
Sub plot: 1.69 cwt per acre or 6.6% (18 d.f.)

Note. Counts of aphids at intervals after spraying, plant numbers, and assessments of early incidence of virus diseases were made.

Summary of Results

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

Spray	Seed rate: lb per acre 50	100	200	300	400	800	Mean
			(±1.50)*				
None	16.6	24.2	27.9	27.9	26.2	20.5	23.9
Demeton-methyl	24.1	31.2	32.3	29.8	25.1	21.3	27.3
Mean (±1.38)	20.3	27.7	30.1	28.9	25.6	20.9	25.5
Diff.(±1.20)	+7.5	+7.0	+4.4	+1.9	-1.1	+0.8	+3.4 (±0.49)

*for use in horizontal and diagonal comparisons.

Mean dry matter % as harvested: 70.8

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BEANS

Time of sowing, spraying, P and K - Little Knott I 1958.

Design: 3 blocks of 4 whole plots each, plots being split into 3 for P and K with spraying on pairs of whole plots, time of sowing on whole plots, and PK partially confounded.

Area of each sub plot: 0.0337 acres. Area harvested: 0.0105 acres.

Treatments. All combinations of:-
Time of sowing: Autumn; spring.
Spray: None; demeton-methyl (new formulation) at 6 fluid oz of 50% active ingredient in 60 gallons per acre.
Phosphate: None; 0.5; 1.0 cwt P_2O_5 per acre as superphosphate.
Potash: None; 1.0; 2.0 cwt K_2O per acre as muriate of potash.

Basal dressing: None.

Cultivations, etc.: Ploughed: Sept 12, 1957. Fertilizers applied for autumn beans, seed drilled at 275 lb per acre: Oct 8. Fertilizers applied for spring beans: Feb 22, 1958. Seed drilled at 200 lb per acre: Mar 7. Appropriate plots sprayed with demeton-methyl: June 18. Combine harvested: Sept 25. Variety: Winter beans - S.Q.Giant, spring beans - Albyn Tick. Previous crop: Spring wheat.

Note. A similar experiment at Woburn was abandoned due to bird damage.

Standard errors per plot, Grain (at 85% dry matter):
Whole plot: 1.24 cwt per acre or 9.5% (4 d.f.)
Sub plot: 1.51 cwt per acre or 11.5% (12 d.f.)

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Summary of Results

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

	Sown			P_2O_5: cwt per acre			K_2O: cwt per acre			
	Autumn	Spring	Diff.	None	0.5	1.0	None	1.0	2.0	Mean
					(±0.62)*			(±0.62)*		
Spray										
None	12.8	14.4	+1.6	14.8	14.1	11.9	14.3	14.0	12.6	13.6
Demeton-methyl	10.6	14.5	+3.9	13.6	11.6	12.5	13.5	12.8	11.3	12.6
Diff.	-2.2	+0.1	+2.3 (±1.43)	-1.2	-2.5 (±0.87)**	+0.6	-0.8	-1.2 (±0.87)**	-1.3	-1.0
					(1) & (2)			(1) & (2)		
Sown										
Autumn				12.9	11.0	11.2	12.3	11.5	11.3	11.7
Spring				15.4	14.7	13.2	15.5	15.3	12.6	14.5
Mean (±0.44)				14.2	12.8	12.2	13.9	13.4	12.0	13.1
Diff. (±1.01)				+2.5	+3.7	+2.0	+3.2	+3.8	+1.3	+2.8 (±0.72)

Mean dry matter % as harvested: Autumn sown, 70.7; spring sown, 72.6.

(1) ±0.71 for use in diagonal comparison only.
(2) ±0.62 for use in horizontal and interaction comparisons only.

*For use in horizontal comparisons only.

**For use only in testing the difference of two differences.

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POTATOES

Control of skin spot (Oospora pustulans) by seed tuber treatment - Geescroft 1958.

Design: 6 randomized blocks of 6 plots each.

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

Treatments applied to seed tubers:

Wedderspoon seed untreated	(1)
Wedderspoon seed washed 5 days after lifting	(2)
Wedderspoon seed washed as above and dipped in organo-mercury fungicide 5 days after lifting	(3)
Wedderspoon seed washed and dipped as above and inoculated at planting	(4)
Irish seed untreated	(5)
Irish seed inoculated at planting	(6)

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

Cultivations, etc.: Ploughed: Sept 23 - Oct 21, 1957. Dung applied at 12½ tons per acre: Dec 2 - 10. Second ploughing: Dec 3 and Feb 6, 1958. Basal dressing applied: Apr 12. Potatoes hand planted: Apr 21. Earthed up: July 8. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 10. Sprayed with copper fungicide, 3 lb and 1 pint spreader in 40 gallons per acre: Aug 6 and again Aug 16. Sprayed with sulphuric acid at 20% BOV in 100 gallons per acre: Sept 10. Lifted: Oct 22. Variety: Majestic. Previous crop: Barley.

Standard error per plot.
Total tubers: 0.951 tons per acre or 7.3% (25 d.f.)

Summary of Results

Treatments 1	2	3	4	5	6	Mean
Total tubers: tons per acre (±0.388)						
13.66	12.81	11.92	12.33	14.00	13.43	13.03
Percentage ware (1½" riddle)						
90.0	89.0	84.6	88.5	88.2	89.4	88.3

Note. Records of incidence of skin spot (Oospora pustulans) were made.

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POTATOES

The control of blight (Phytophthora infestans) by copper fungicide spray - Great Knott II 1958.

Design: 8 randomized blocks of 2 plots each.

Area of each plot: 0.1273 acres. Area harvested: Whole plots - 0.0141 acres; sub plots - 0.0071 acres.

Treatments.
Whole plots: No spray; copper fungicide sprayed twice.
Sub plots: On sprayed plots only, 2 rows damaged by 2 passages of the tractor during copper spray operations were compared with 2 undamaged rows.

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

Cultivations, etc.: Ploughed: Oct 2 - 19, 1957. Sprayed with TCA at 20 lb in 80 gallons per acre: Jan 14, 1958. Basal fertilizer applied: Apr 21. Potatoes machine planted: Apr 23. Earthed up: July 4. Fungicide treatment, 5 lb in 40 gallons per acre, applied twice: July 16 and Aug 11. Sprayed with sulphuric acid, 20% BOV, 100 gallons per acre: Sept 17. Lifted: Oct 24. Variety: Majestic. Previous crop: Spring wheat.

Standard errors per plot. Total tubers:
Whole plots: 0.693 tons per acre or 6.0% (7 d.f.)
Sub plots (sprayed plots only): 0.611 tons per acre or 5.1% (7 d.f.)

Note. Estimates were made of the rate of bulking, destruction of foliage by blight and amount of blight on the tubers. 2 rows of King Edward were planted on each plot for an assessment of blight infected tubers.

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Summary of Results

Spray: None	Spray: Copper fungicide	Mean	Difference
Total tubers: tons per acre			
11.04	12.08	11.56	+1.04 (±0.347)
Percentage ware ($1\frac{1}{2}$" riddle)			
91.2	91.8	91.5	+0.6

Sprayed plots only

Undamaged	Damaged	Difference
Total tubers: tons per acre		
12.23	11.93	-0.30 (±0.305)
Percentage ware ($1\frac{1}{2}$" riddle)		
92.2	91.5	-0.7

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POTATOES

Control of virus spread by application of insecticides to the soil at planting - Highfield Drive 1958.

Design: 4 × 4 Latin square.

Area of each plot: 0.0089 acres. Area harvested: 0.0081 acres.

Treatments (applied by hand in the ridges before planting):
Fertilizer alone, 10 cwt compound per acre (10% N, 10% P_2O_5, 18% K_2O). (C)
Fertilizer and 'Thimet' applied together. (F)
Fertilizer and 'Thimet' applied separately. (T)
Fertilizer and 'Rogor' applied separately. (R)

Infector plants: One leaf roll and one virus Y King Edward infector planted in each plot.

Percentages and rate of application of % active ingredient of insecticide: 'Thimet' (Carbon powder) 44%, 'Rogor' (Charcoal powder) 50%, each at 10.8 lb per acre.

Cultivations, etc.: Dung applied at 10 tons per acre: Nov 26, 1957. Ploughed: Nov 28. Compound fertilizer applied: Apr 16, 1958. Potatoes hand planted: Apr 21. Earthed up: June 19. Sprayed with copper fungicide at 5 lb in 40 gallons per acre: July 12. Twice sprayed with copper fungicide at 3 lb and 1 pint of spreader to 40 gallons per acre: Aug 6 and 16. Sprayed with sulphuric acid, 20% BOV, 100 gallons per acre: Sept 18. Lifted: Sept 26. Variety: Majestic. Previous crop: Winter wheat.

Standard error per plot.
Total tubers: 0.845 tons per acre or 5.6% (6 d.f.)

Note: Aphid counts were made and tuber samples taken to assess virus spread.

Summary of Results

	Treatment C	F	T	R	Mean
	Total tubers: tons per acre				
Mean (±0.423)	15.07	14.95	15.48	14.43	14.98
Increase (±0.598)		-0.12	+0.41	-0.64	
	Percentage ware ($1\frac{1}{2}$" riddle)				
Mean	92.0	93.6	94.6	92.5	93.2
Increase		+1.6	+2.6	+0.5	

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GRASS

Slow acting nitrogenous fertilizers - Harwoods Piece 1958.

Design: 4 randomized blocks of 16 plots each.

Area of each plot: 0.0087 acres. Area harvested: 0.0050 acres.

Treatments: None (6 plots per block) together with all combinations of:-

Materials and methods of application

'Nitro-Chalk' (15.5% N): all in seed bed.
Ureaformaldehyde (37.2% N): all in seed bed (2 plots per block).
'Nitro-Chalk' (15.5% N): $\frac{1}{3}$ in seed bed; $\frac{1}{3}$ after 1st and 2nd cuts (2 plots per block).

Rates of application

1.0; 2.0 cwt N per acre.

Basal dressing: 5 cwt compound fertilizer (10% P_2O_5, 10% K_2O) per acre applied in seed bed.

Cultivations, etc.: Ploughed: Oct 28 - Nov 22, 1957. Basal fertilizer and seed bed nitrogen applied: Apr 23, 1958. Seeds sown: Apr 24. Sprayed with MCPA at 4 pints in 40 gallons per acre: May 27. 2nd and 3rd dressings of 'Nitro-Chalk' applied: July 15 and Aug 14. Cut three times: July 8, Aug 13, Oct 23. Variety: S22 Italian Ryegrass. Previous crop: Spring wheat.

Standard errors per plot. Dry matter:

1st cut:	1.69 cwt per acre	or 7.9%	(54 d.f.)
2nd cut:	1.26 cwt per acre	or 10.4%	(54 d.f.)
3rd cut:	1.28 cwt per acre	or 10.1%	(54 d.f.)
Total of 3 cuts:	2.96 cwt per acre	or 6.4%	(54 d.f.)

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58/Cg/1.2

Summary of Results

Dry matter: cwt per acre

	Fertilizer							
		Single dressing				Divided dressing		
	None	N1	N2	U1	U2	N1	N2	Mean
1st cut								
	(±0.35)	(±0.85)			(±0.60)			
Mean	13.2	29.9	32.1	22.4	27.6	22.1	27.4	21.3
Increase		16.7	18.9	9.2	14.4	8.9	14.2	
		(±0.91)			(±0.69)			
2nd cut								
	(±0.26)	(±0.63)			(±0.44)			
Mean	7.7	12.4	15.7	9.0	12.2	17.2	21.4	12.1
Increase		4.7	8.0	1.3	4.5	9.5	13.7	
		(±0.68)			(±0.51)			
3rd cut								
	(±0.26)	(±0.64)			(±0.45)			
Mean	7.9	11.4	16.4	10.7	12.9	18.7	21.1	12.6
Increase		3.5	8.5	2.8	5.0	10.8	13.2	
		(±0.69)			(±0.52)			
Total of 3 cuts								
	(±0.60)	(±1.48)			(±1.05)			
Mean	28.9	53.8	64.2	42.1	52.7	58.1	69.9	46.0
Increase		24.9	35.3	13.2	23.8	29.2	41.0	
		(±1.60)			(±1.21)			

Fertilizers:

N 'Nitro-Chalk' 15.5% N

U Ureaformaldehyde 37.2% N

Levels of N in fertilizer: cwt per acre

1 1.0

2 2.0

Mean dry matter % as cut:

1st cut: 15.9

2nd cut: 15.9

3rd cut: 16.6

Total of 3 cuts: 16.1

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GRASS

Levels of N and K - Harwoods Piece 1958.

Design: 4 randomized blocks of 12 plots each.

Area of each plot: 0.0087 acres. Area harvested: 1st cut - 0.0050 acres, 2nd and 3rd cuts - 0.0035 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 N and 0.6 K also received phosphate at either None or 1.2 cwt P_2O_5 per acre as superphosphate.

Basal dressing: None.

Cultivations, etc.: Ploughed: Oct 28 - Nov 22, 1957. Fertilizers applied in seedbed: Apr 23, 1958. Seeds sown: Apr 24. Sprayed with MCPA at 4 pints in 40 gallons per acre: May 27. 2nd and 3rd dressings of N and K applied: July 16 and Sept 9. Cut 3 times: July 9, Sept 9 and Oct 27. Variety: S22 Italian Ryegrass. Previous crop: Spring wheat.

Standard error per plot. Dry matter:
1st cut: 2.03 cwt per acre or 7.7% (33 d.f.)
2nd cut: 1.91 cwt per acre or 6.7% (33 d.f.)
3rd cut: 0.83 cwt per acre or 5.9% (33 d.f.)
Total of 3 cuts: 3.06 cwt per acre or 4.5% (33 d.f.)

Summary of Results

Dry matter: cwt per acre

cwt per acre												
N	0.0	0.3	0.3	0.3	0.6	0.6	0.6	0.9	0.9	0.9	0.9	0.9	
P_2O_5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.0	1.2	
K_2O	0.0	0.0	0.3	0.6	0.0	0.3	0.6	0.0	0.3	0.6	0.6	0.6	Mean
1st cut (±1.01)	15.2	21.6	22.3	19.8	27.3	27.6	27.5	31.6	30.3	30.4	30.5	31.0	26.3
2nd cut (±0.95)	15.6	25.1	25.2	26.2	29.8	30.2	30.1	32.0	33.8	32.1	30.8	32.1	28.6
3rd cut (±0.41)	4.0	12.3	12.7	11.9	14.6	15.5	15.0	17.1	15.5	16.0	15.6	17.4	13.9
Total of 3 cuts (±1.53)	34.8	59.0	60.2	57.9	71.6	73.3	72.6	80.6	79.5	78.4	76.8	80.5	68.8

Mean dry matter % as cut:
1st cut: 15.1 3rd cut: 12.6
2nd cut: 12.4 Total of 3 cuts: 13.4

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GRASS

Species and levels of nitrogen - Harwood's Piece 1958.

Design: 4 randomized blocks of 12 plots each.

Area of each plot: 0.0087 acres. Area harvested: 0.0035 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 fertilizer (10% P_2O_5, 20% K_2O) per acre applied in seedbed.

Cultivations, etc.: Ploughed: Oct 28 - Nov 22, 1957. Basal fertilizer and seedbed nitrogen applied: Apr 23, 1958. Seed sown: Apr 24. Sprayed with MCPA at 4 pints in 40 gallons per acre: May 27. Topped: July 9. Cut twice: Aug 25, Oct 24. 2nd and 3rd dressings of 'Nitro-Chalk' applied: July 16 and Aug 25. Previous crop: Spring wheat.

Standard errors per plot. Dry matter:

1st cut:	2.08 cwt per acre	or 11.5% (33 d.f.)
2nd cut:	1.81 cwt per acre	or 12.3% (33 d.f.)
Total of 2 cuts:	3.14 cwt per acre	or 9.6% (33 d.f.)

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Summary of Results

Dry matter: cwt per acre

N: cwt per acre *	Species C	M	R	T	Mean
1st cut					
		(±1.04)			(±0.51)
None	9.1	7.8	10.0	8.0	8.7
0.3	22.2	19.5	21.2	18.2	20.3
0.6	30.0	21.6	27.6	21.3	25.1
Mean (±0.60)	20.4	16.3	19.6	15.8	18.0
2nd cut					
		(±0.90)			(±0.45)
None	6.0	6.2	8.0	4.1	6.1
0.3	20.1	18.1	18.7	10.9	17.0
0.6	26.0	21.5	22.8	14.0	21.0
Mean (±0.53)	17.4	15.2	16.5	9.7	14.6
Total of 2 cuts					
		(±1.56)			(±0.78)
None	15.1	14.0	18.0	12.0	14.8
0.3	42.4	37.6	39.9	29.2	37.2
0.6	56.0	43.0	50.3	35.3	46.2
Mean (±0.90)	37.8	31.5	36.1	25.5	32.7

Mean dry matter % as cut:

1st cut:	15.5
2nd cut:	16.7
Total of 2 cuts:	16.1

Species

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

*Applied for each cut.

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METEOROLOGICAL RECORDS ROTHAMSTED 1958

(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 frosts[2]	Total rainfall: in. 1/1000 acre gauge	Rain days[3]	Drainage through 20 in. soil: in.	Wind[4] m.p.h.
Jan.	56 (+4)	37.9 (+0.6)	34.5	38.4	43.3	17	2.84 (+0.33)	16	2.29	5.4
Feb.	50 (-20)	40.2 (+2.0)	36.7	40.2	42.4	11	3.45 (+1.52)	19	2.35	6.2
Mar.	122 (+4)	38.1 (-3.3)	33.3	39.4	42.0	18	1.85 (-0.04)	12	0.76	5.2
Apr.	151 (-6)	44.8 (-1.0)	37.1	44.3	42.8	9	1.26 (-0.66)	9	0.35	5.6
May	193 (-3)	52.4 (+0.5)	45.3	52.9	47.6	2	2.04 (-0.11)	17	0.27	4.7
June	143 (-60)	56.7 (-0.6)	51.1	58.1	51.8	0	4.67 (+2.48)	17	2.49	3.3
July	182 (-12)	60.3 (-0.4)	54.2	61.9	55.9	0	2.03 (-0.51)	18	0.31	3.4
Aug.	123 (-60)	60.2 (0.0)	56.3	61.1	57.5	0	3.55 (+0.95)	20	1.20	2.9
Sept.	135 (-10)	58.9 (+2.9)	55.3	60.2	58.2	0	3.61 (+1.23)	18	1.66	3.6
Oct.	87 (-17)	50.7 (+1.8)	48.1	52.8	55.3	0	2.62 (-0.35)	19	1.71	3.3
Nov.	43 (-19)	42.6 (+0.2)	41.2	46.2	51.4	10	2.46 (-0.34)	17	1.84	2.8
Dec.	38 (-6)	40.0 (+1.3)	38.4	41.6	46.8	11	3.50 (+0.93)	22	3.08	3.4
Year*	1323 (-205)	48.6 (+0.4)	44.3	49.7	49.6	78	33.88 (+5.43)	204	18.31	4.1

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

*Mean or total.

58/E/1.1

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METEOROLOGICAL RECORDS WOBURN 1958

Month	Total sunshine: hours	Mean temperature: °F Air (1)	In ground 1 ft.	Grass minimum: °F	Total rainfall: in. 8" gauge	Rain days (2)
January	53	38.1	37.7	29.5	2.71	17
February	54	40.8	40.1	31.6	2.71	17
March	107	38.3	39.1	29.1	2.01	13
April	133	44.9	45.0	33.4	1.06	10
May	185	52.7	54.3	44.5	2.00	18
June	138	57.3	59.6	47.5	5.32	18
July	180	60.5	63.6	50.9	2.09	14
August	136	60.4	61.9	49.8	2.25	18
September	129	58.9	60.0	48.4	2.73	15
October	92	50.9	51.9	44.0	2.07	16
November	44	47.8	45.1	35.1	1.74	13
December	28	39.9	40.5	31.8	2.55	17
Year*	1279	49.2	49.9	39.6	29.24	186

(1) Mean of maximum and minimum.

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

*Mean or total.

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CONVERSION FACTORS

Factors for the Conversion of Imperial to Metric Units

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

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

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

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

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

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

Temperatures

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

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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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