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Yields of the Field Experiments 1963

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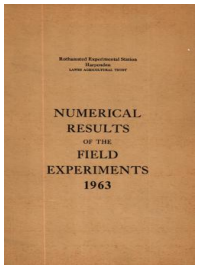

Rotation Experiments

Rothamsted Research

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63/B/1.1

LEY AND ARABLE ROTATIONS

(HIA and FIA)

Highfield and Fosters Field 1963, the 15th year.

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

Oats: The variety has now been changed from Sun II to Condor.

Permanent (Reseeded) grass: During the 3 years commencing in Autumn 1962 the plots in blocks coming into wheat are to be ploughed up. Subsequent cropping and treatments are the same as follow the 3 year crops. The plots not mentioned above are split lengthwise for the 'all-grass' and 'clover-grass' treatments already applied to the Permanent (Old) grass.

Note: The 2nd year all grass-ley on Highfield failed during the winter and was resown in spring 1963.

Cultivations, etc.:

HIGHFIELD

1st-year Treatment Crops

All-grass ley. Ploughed twice: Sept 7 and Dec 3, 1962. Basal PK compound applied: Apr 22, 1963. 'Nitro-Chalk' applied, seeds sown at 30 lb per acre: Apr 25. Cut 4 times: July 8, Aug 8, Sept 12, Oct 28. NK compound applied after first 3 cuts.

Clover-grass ley. Ploughed twice: Sept 7 and Dec 3, 1962. Basal PK compound applied: Apr 22, 1963. Seed sown at 33 lb per acre: Apr 25. Cut 4 times: July 8, Aug 8, Sept 20, Oct 28. Muriate of potash applied after first 3 cuts.

Lucerne. Ploughed twice: Sept 7 and Dec 3, 1962. Basal PK compound applied: Apr 22, 1963. Seed drilled at 20 lb per acre: Apr 26. Cut twice: July 25 and Sept 27.

Hay. Seeds undersown in barley: Apr 25, 1962. Basal NPK compound applied: Mar 6, 1963. Cut twice: June 17 and Aug 8. NK compound applied after first cut.

2nd-year Treatment Crops

All-grass ley. Basal PK compound applied: Nov 26, 1962. 'Nitro-Chalk' applied: Mar 15, 1963. Sprayed with paraquat at 2 lb in 40 gallons per acre: May 17 and June 5. Rotary cultivated, seed sown at 30 lb per acre: June 19. Sprayed with mecoprop/2,4-D at 6 pints in 40 gallons per acre: July 30. Cut twice: Sept 12 and Oct 28. NK compound applied after first cut.

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Clover-grass ley. Basal PK compound applied: Nov 26, 1962. Cut 5 times: May 29, June 24, July 24, Sept 20, Oct 28. Muriate of potash applied after first 4 cuts.

Lucerne. Basal PK compound applied: Nov 23, 1962. Cut 3 times: June 12, July 25, Sept 27, 1963.

Sugar beet. Ploughed twice: Aug 24 and Dec 3, 1962. Muriate of potash applied: Feb 14, 1963. Basal NPK compound (10% N, 10% P_2O_5, 10% K_2O) applied: Apr 16. Seed drilled at 5.25 lb per acre: Apr 19. Singled: May 30. Sprayed with DDT emulsion at 0.5 pints DDT in 16 gallons per acre: June 6. Sprayed with menazon at 0.53 pints in 16 gallons per acre: July 31. Lifted: Oct 24. Variety: Klein E.

3rd-year Treatment Crops

Cut grass. Basal PK compound applied: Nov 23, 1962. NK compound applied: Mar 15, 1963 and after every cut except the last. Cut 4 times: May 29, June 24, July 24, Sept 12.

Grazed ley. Basal PK compound applied: Nov 23, 1962. 'Nitro-Chalk' applied: May 18, 1963 and Aug 2, 1963. Grazed: 9 circuits, May 7 - Sept 4.

Lucerne. Basal PK compound applied: Nov 23, 1962. Cut 3 times: June 12, July 25, Sept 9.

Oats. Ploughed: Dec 3, 1962. Seed combine drilled at 4 bushels per acre: Apr 9, 1963. 'Nitro-Chalk' applied: Apr 11. Sprayed with methoxychlorobenzoic acid/MCPA (MBA/MCPA) at 4 pints in 40 gallons per acre: June 5. Combine harvested: Sept 7.

1st Test Crop, Wheat

Ploughed: Sept 26, 1962. Seed combine drilled at 2.75 bushels per acre: Oct 18. Plots following permanent (reseeded) grass sprayed with aldrin at 2.4 pints in 80 gallons per acre: Apr 9, 1963. 'Nitro-Chalk' applied: Apr 26. Sprayed with mecoprop/2,4-D at 7 pints in 40 gallons per acre: May 16. Combine harvested: Sept 9. Variety: Cappelle.

2nd Test Crop, Potatoes

Dung applied: Sept 13, 1962. Ploughed twice: Sept 14 and Dec 18. Fertilisers applied: May 9, 1963. Potatoes machine planted: May 10. Earthed up: June 22. Sprayed with maneb at 1.2 lb in 20 gallons per acre: July 19. Sprayed with copper oxychloride fungicide at 2.3 lb Cu plus 0.35 pints menazon in 20 gallons per acre: Aug 14. Sprayed with undiluted BOV at 16 gallons per acre: Sept 12. Lifted: Oct 10. Variety: Majestic (chitted seed).

3rd Test Crop, Barley

Ground chalk applied: Nov 15, 1962. Additional P and K applied: Nov 16. Ploughed: Nov 20. Seed combine drilled at 2 bushels per acre: Apr 8, 1963. 'Nitro-Chalk' applied: Apr 11. Sprayed with MCPB/MCPA at 5 pints in 40 gallons per acre: June 5. Combine harvested: Sept 7. Variety: Proctor.

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Permanent grasses. 13th, 14th and 15th experimental years permanent (old) grass, all blocks, 13th, 14th and 15th years reseeded grass, blocks 1, 4, 6, 7, 9 and 12. Ground chalk applied to blocks 1 and 4: Nov 15, 1962. Basal PK compound applied: Nov 26. 'Nitro-Chalk' applied to 'all-grass' half plots: Mar 15, 1963. Cut 5 times: May 29, June 26, July 24, Sept 13, Oct 28. Muriate of potash and NK compound applied to appropriate half plots after first 4 cuts.

14th year Reseeded grass, Blocks 5 and 8.

Block 5. Basal PK compound applied: Nov 20, 1962. 'Nitro-Chalk' applied: May 18 and Aug 2, 1963. Grazed: 12 circuits, May 7 - Oct 12.

Block 8. Basal PK compound applied : Nov 23, 1962. 'Nitro-Chalk' applied: Mar 15, 1963. Cut for silage: May 29. 2nd dressing of 'Nitro-Chalk' applied: May 31. Grazed: 8 circuits, June 18 - Oct 11.

15th year Reseeded grass, Blocks 2 and 3.

Block 2. Basal PK compound applied: Nov 20, 1962. 'Nitro-Chalk' applied: May 18 and Aug 2, 1963. Grazed: 10 circuits, May 7 - Sept 12.

Block 3. Basal PK compound applied: Nov 23, 1962. 'Nitro-Chalk' applied: Mar 15, 1963. Cut for silage: May 29. 2nd dressing of 'Nitro-Chalk' applied: May 31. Grazed: 6 circuits, June 18 - Sept 12.

FOSTERS

1st-year Treatment Crops

All-grass ley. Ploughed twice: Sept 7 and Dec 18, 1962. Basal PK compound applied: Apr 22, 1963. 'Nitro-Chalk' applied: Apr 24. Seed sown at 30 lb per acre: Apr 25. Cut 4 times: July 8, Aug 8, Sept 12, Oct 28. NK compound applied after first 3 cuts.

Clover-grass ley. Ploughed twice: Sept 7 and Dec 18, 1962. Basal PK compound applied: Apr 22, 1963. Seed sown at 33 lb per acre: Apr 25. Cut 4 times: July 8, Aug 8, Sept 20, Oct 28. Muriate of potash applied after first 3 cuts.

Lucerne. Ploughed twice: Sept 7 and Dec 18, 1962. Basal PK compound applied: Apr 22, 1963. Seed drilled at 20 lb per acre: Apr 26. Cut twice: July 26 and Sept 27. Variety: Du Puits.

Hay. Seeds undersown in barley: Apr 25, 1962. Basal NPK compound applied: Mar 6, 1963. Cut twice: June 14 and Aug 8. NK compound applied after first cut.

2nd-year Treatment Crops

All-grass ley. Basal PK compound applied: Nov 26, 1962. 'Nitro-Chalk' applied: Mar 16, 1963. Cut 5 times: May 29, June 24, July 24, Sept 12, Oct 28. NK compound applied after first 4 cuts.

Clover-grass ley. Basal PK compound applied: Nov 26, 1962. Cut 5 times: May 29, June 24, July 24, Sept 20, Oct 28, 1963. Muriate of potash applied after first 4 cuts.

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Lucerne. Basal PK compound applied: Nov 20, 1962. Cut 3 times: June 12, July 26, Sept 27, 1963.

Sugar Beet. Ploughed twice: Aug 24 and Dec 18, 1962. Muriate of potash applied: Feb 14, 1963. Basal NPK (10% N, 10% P_2O_5, 10% K_2O) applied: Apr 16. Seed drilled at 5.25 lb per acre: Apr 19. Singled: May 29. Sprayed with DDT emulsion at 0.5 pints DDT in 16 gallons per acre: June 6. Sprayed with menazon at 0.53 pints in 16 gallons per acre: July 31. Lifted: Oct 24. Variety: Klein E.

3rd-year Treatment Crops

Cut grass. Basal PK compound applied: Nov 20, 1962. NK compound applied: Mar 16, 1963 and after every cut except the last. Cut 4 times: May 29, June 24, July 24, Sept 12.

Grazed ley. Basal PK compound applied: Nov 20, 1962. 'Nitro-Chalk' applied: May 18 and Aug 2, 1963. Grazed: 9 circuits, May 7 - Sept 4.

Lucerne. Basal PK compound applied: Nov 20, 1962. Cut 3 times: June 12, July 26, Sept 9, 1963.

Oats. Ploughed: Dec 3, 1962. Seed combine drilled at 4 bushels per acre, 'Nitro-Chalk' applied: Apr 8, 1963. Sprayed with methoxychlorobenzoic acid/MCPA (MBA/MCPA) at 4 pints in 40 gallons per acre: June 5. Combine harvested: Sept 7. Variety: Condor.

1st Test Crop, Wheat

Ploughed: Sept 20, 1962. Seed combine drilled at 2.75 bushels per acre: Oct 18. Plots following permanent (reseeded) grass sprayed with aldrin at 2.4 pints in 80 gallons per acre: Apr 19, 1963. 'Nitro-Chalk' applied: Apr 26. Sprayed with mecoprop/2,4-D at 7 pints in 40 gallons per acre: May 16. Combine harvested: Sept 9. Variety: Cappelle.

2nd Test Crop, Potatoes

Dung applied, plots ploughed: Sept 13, 1962. Ploughed second time: Dec 18. Fertilisers applied, potatoes machine planted: May 9, 1963. Replanted potatoes which were uncovered through grubbing: June 17. Earthed up: June 22. Sprayed with maneb at 1.2 lb in 20 gallons per acre: July 19. Sprayed with copper oxychloride fungicide at 2.3 lb Cu plus 0.35 pints menazon in 20 gallons per acre: Aug 16. Sprayed with undiluted BOV at 16 gallons per acre: Sept 12. Lifted: Oct 9. Variety: Majestic (chitted seed).

3rd Test Crop, Barley

Additional P and K applied: Nov 16, 1962. Ploughed: Nov 19. Seed combine drilled at 2 bushels per acre: Apr 8, 1963. 'Nitro-Chalk' applied: Apr 9. Sprayed with MCPB/MCPA at 5 pints in 40 gallons per acre: June 5. Combine harvested: Sept 6. Variety: Proctor.

Permanent grasses

13th, 14th and 15th years reseeded grass, Blocks 1, 3, 6, 8, 9 and 11. Basal PK compound applied: Nov 26, 1962. 'Nitro-Chalk' applied to 'all-grass' half plots: Mar 16, 1963. Cut 5 times: May 29, June 27,

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July 24, Sept 13, Oct 28. Muriate of potash and NK compound applied to appropriate half plots after first 4 cuts.

14th year reseeded grass, Blocks 5 and 7. Basal PK compound applied: Nov 20, 1962.
Block 5. 'Nitro-Chalk' applied: Mar 16, 1963. Cut for silage: May 29. 2nd dressing of 'Nitro-Chalk' applied: May 31. Grazed: 8 circuits, June 18 - Oct 12.
Block 7. 'Nitro-Chalk' applied: May 18 and Aug 2, 1963. Grazed: 12 circuits, May 7 - Oct 12.

15th year reseeded grass, Blocks 2 and 4. Basal PK compound applied: Nov 20, 1962.
Block 2. 'Nitro-Chalk' applied: Mar 16, 1963. Cut for silage: May 29. 2nd dressing of 'Nitro-Chalk' applied: May 31. Grazed: 6 circuits, June 18 - Sept 14.
Block 4. 'Nitro-Chalk' applied: May 18 and Aug 2, 1963. Grazed: 10 circuits, May 7 - Sept 12.

Standard errors per sub plot. Test crops.

Wheat, grain (at 85% dry matter)	Highfield:	2.62 cwt per acre or 6.3% (55 d.f.)
	Fosters:	3.52 cwt per acre or 7.8% (55 d.f.)
Barley, grain (at 85% dry matter)	Highfield:	4.49 cwt per acre or 11.4% (23 d.f.)
	Fosters:	2.67 cwt per acre or 6.5% (23 d.f.)

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Summary of Results

Wheat 1st test crop

N: cwt per acre	Treatment crops 1960 - 1962					Mean
	Lucerne	Ley	Cut grass	Arable with hay	Reseeded grass	
Grain (at 85% dry matter): cwt per acre						
Highfield						
			(±1.31)*			(±0.59)
To test crop						
None	44.3	40.1	33.7	23.1	40.8	36.4
0.3	48.4	43.4	40.9	35.1	44.7	42.5
0.6	44.6	44.1	43.8	39.6	47.9	44.0
0.9	44.0	44.7	43.5	45.3	45.5	44.6
Mean	45.3	43.1	40.5	35.8	44.7	41.9
Fosters						
			(±1.76)*			(±0.79)
To test crop						
None	44.3	35.0	39.4	27.8	36.4	36.6
0.4	53.1	44.4	43.4	41.3	43.8	45.2
0.8	54.6	47.9	44.5	46.7	47.2	48.2
1.2	53.5	48.2	45.8	49.9	47.8	49.0
Mean	51.4	43.9	43.3	41.4	43.8	44.8

*For use only in vertical and interaction comparisons

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Wheat 1st test crop

N: cwt per acre	Treatment crops 1960 - 1962					Mean
	Lucerne	Ley	Cut grass	Arable with hay	Reseeded grass	
Straw (at 85% dry matter): cwt per acre						
Highfield						
To test crop						
None	37.2	30.3	22.7	19.7	31.1	28.2
0.3	43.3	33.9	30.1	27.5	39.8	34.9
0.6	40.9	33.9	34.9	36.4	41.5	37.5
0.9	42.4	35.7	35.1	38.0	38.6	38.0
Mean	41.0	33.5	30.7	30.4	37.7	34.7
Fosters						
To test crop						
None	31.0	26.8	23.3	18.5	30.0	25.9
0.4	40.3	36.6	32.5	30.3	38.7	35.7
0.8	39.7	39.0	36.0	38.8	45.1	39.7
1.2	39.7	41.6	39.5	39.1	38.1	39.6
Mean	37.7	36.0	32.8	31.7	38.0	35.2

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

	Treatment crops 1959 - 1961				
	Lucerne	Ley	Cut grass	Arable with hay	Mean
	Highfield				
Mean	14.64	13.89	13.73	14.74	14.25
N: cwt per acre to wheat 1962					
None	15.03	14.13	13.91	14.60	14.42
0.3	14.81	13.80	14.14	14.35	14.28
0.6	14.60	13.81	13.64	14.92	14.24
0.9	14.14	13.80	13.25	15.08	14.07
N: cwt per acre 1963*					
0.75	14.54	14.02	13.79	14.73	14.27
1.25	14.75	13.75	13.68	14.74	14.23
Difference	+0.21	-0.27	-0.11	+0.01	-0.04
PK	13.77	13.81	14.11	14.23	13.98
Dung	15.52	13.96	13.36	15.24	14.52
Difference	+1.75	+0.15	-0.75	+1.01	+0.54
P_2O_5: cwt per acre					
0.9	14.81	13.74	13.73	14.29	14.14
1.8	14.48	14.03	13.74	15.19	14.36
Difference	-0.33	+0.29	+0.01	+0.90	+0.22
K_2O: cwt per acre					
0.9	14.83	13.70	13.81	14.80	14.29
1.8	14.46	14.07	13.66	14.67	14.21
Difference	-0.37	+0.37	-0.15	-0.13	-0.08

*Including basal dressing

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

	N: cwt per acre to wheat 1962			
	None	0.3	0.6	0.9
	Highfield			
N: cwt per acre 1963*				
0.75	14.55	14.19	14.38	13.97
1.25	14.29	14.36	14.10	14.17
Difference	-0.26	+0.17	-0.28	+0.20
PK	14.39	13.62	14.26	13.64
Dung	14.45	14.93	14.22	14.50
Difference	+0.06	+1.31	-0.04	+0.86
P_2O_5: cwt per acre				
0.9	14.34	14.02	14.26	13.94
1.8	14.50	14.53	14.22	14.20
Difference	+0.16	+0.51	-0.04	+0.26
K_2O: cwt per acre				
0.9	14.54	14.24	14.28	14.10
1.8	14.30	14.31	14.21	14.03
Difference	-0.24	+0.07	-0.07	-0.07

	PK	Dung	P_2O_5: cwt per acre 0.9	P_2O_5: cwt per acre 1.8	K_2O: cwt per acre 0.9	K_2O: cwt per acre 1.8
N: cwt per acre 1963*						
0.75	13.95	14.59	14.12	14.41	14.31	14.23
1.25	14.01	14.45	14.16	14.31	14.26	14.20
PK			13.87	14.08	13.95	14.00
Dung			14.41	14.64	14.62	14.42
P_2O_5: cwt per acre						
0.9					14.13	14.14
1.8					14.44	14.28

*Including basal dressing

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

	Treatment crops 1959 - 1961				
	Lucerne	Ley	Cut grass	Arable with hay	Mean
		Fosters			
Mean	14.76	13.89	13.61	14.90	14.29
N: cwt per acre to wheat 1962					
None	14.30	14.86	13.67	15.16	14.50
0.4	14.73	13.88	13.41	14.39	14.10
0.8	15.23	13.52	13.59	15.28	14.41
1.2	14.79	13.30	13.78	14.78	14.16
N: cwt per acre 1963*					
0.75	14.66	13.78	13.49	14.46	14.10
1.25	14.86	14.00	13.74	15.34	14.48
Difference	+0.20	+0.22	+0.25	+0.88	+0.38
PK	14.53	14.53	13.42	14.56	14.26
Dung	14.99	13.25	13.81	15.25	14.32
Difference	+0.46	-1.28	+0.39	+0.69	+0.06
P_2O_5: cwt per acre					
0.9	14.66	13.88	13.86	14.77	14.29
1.8	14.86	13.90	13.37	15.03	14.29
Difference	+0.20	+0.02	-0.49	+0.26	0.00
K_2O: cwt per acre					
0.9	14.66	13.98	13.58	15.18	14.35
1.8	14.86	13.80	13.64	14.62	14.23
Difference	+0.20	-0.18	+0.06	-0.56	-0.12

*Including basal dressing

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63/B/1.11

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

	N: cwt per acre to wheat 1962			
	None	0.4	0.8	1.2
	Fosters			
N: cwt per acre 1963*				
0.75	14.27	14.02	14.19	13.92
1.25	14.73	14.18	14.63	14.40
Difference	+0.46	+0.16	+0.44	+0.48
PK	14.46	14.11	14.46	14.02
Dung	14.53	14.10	14.36	14.30
Difference	+0.07	-0.01	-0.10	+0.28
P_2O_5: cwt per acre				
0.9	14.93	14.03	13.98	14.23
1.8	14.06	14.18	14.83	14.09
Difference	-0.87	+0.15	+0.85	-0.14
K_2O: cwt per acre				
0.9	14.38	14.13	14.61	14.28
1.8	14.61	14.07	14.20	14.04
Difference	+0.23	-0.06	-0.41	-0.24

	PK	Dung	P_2O_5: cwt per acre 0.9	P_2O_5: cwt per acre 1.8	K_2O: cwt per acre 0.9	K_2O: cwt per acre 1.8
N: cwt per acre 1963*						
0.75	13.97	14.23	14.06	14.14	14.18	14.02
1.25	14.55	14.41	14.53	14.44	14.52	14.45
PK			14.22	14.31	14.37	14.15
Dung			14.37	14.27	14.34	14.31
P_2O_5: cwt per acre						
0.9					14.30	14.28
1.8					14.40	14.18

*Including basal dressing

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63/B/1.12

Potatoes 2nd test crop. Percentage ware (1.5 inch riddle)

	Treatment crops 1959 - 1961				
	Lucerne	Ley	Cut grass	Arable with hay	Mean
	Highfield				
Mean	91.6	92.6	91.8	91.2	91.8
N: cwt per acre to wheat 1962					
None	91.6	92.0	91.4	91.4	91.6
0.3	92.3	92.3	92.4	90.4	91.8
0.6	91.4	93.2	92.1	91.6	92.1
0.9	91.2	92.9	91.3	91.5	91.7
N: cwt per acre 1963*					
0.75	91.9	92.6	92.0	91.4	92.0
1.25	91.4	92.6	91.6	91.0	91.6
Difference	-0.5	0.0	-0.4	-0.4	-0.4
PK	91.5	92.3	92.4	91.1	91.8
Dung	91.8	92.9	91.3	91.4	91.8
Difference	+0.3	+0.6	-1.1	+0.3	0.0
P_2O_5: cwt per acre					
0.9	91.9	92.7	91.8	91.7	92.0
1.8	91.4	92.5	91.9	90.8	91.6
Difference	-0.5	-0.2	+0.1	-0.9	-0.4
K_2O: cwt per acre					
0.9	91.7	92.6	91.6	91.3	91.8
1.8	91.6	92.6	92.0	91.2	91.8
Difference	-0.1	0.0	+0.4	-0.1	0.0

*Including basal dressing

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63/B/1.13

Potatoes 2nd test crop. Percentage ware (1.5 inch riddle)

	N: cwt per acre to wheat 1962			
	None	0.3	0.6	0.9
	Highfield			
N: cwt per acre 1963*				
0.75	92.0	92.0	92.2	91.7
1.25	91.2	91.7	92.0	91.7
Difference	-0.8	-0.3	-0.2	0.0
PK	91.8	91.2	92.4	91.9
Dung	91.4	92.6	91.8	91.6
Difference	-0.4	+1.4	-0.6	-0.3
P_2O_5: cwt per acre				
0.9	91.9	92.2	92.1	91.8
1.8	91.3	91.5	92.1	91.6
Difference	-0.6	-0.7	0.0	-0.2
K_2O: cwt per acre				
0.9	91.9	91.9	91.8	91.6
1.8	91.4	91.8	92.4	91.8
Difference	-0.5	-0.1	+0.6	+0.2

	PK	Dung	P_2O_5: cwt per acre 0.9	P_2O_5: cwt per acre 1.8	K_2O: cwt per acre 0.9	K_2O: cwt per acre 1.8
N: cwt per acre 1963*						
0.75	91.9	92.1	92.4	91.6	92.0	92.0
1.25	91.7	91.6	91.6	91.7	91.6	91.7
PK			92.0	91.7	91.9	91.7
Dung			92.1	91.6	91.7	92.0
P_2O_5: cwt per acre						
0.9					91.9	92.1
1.8					91.7	91.6

*Including basal dressing

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63/B/1.14

Potatoes 2nd test crop. Percentage ware (1.5 inch riddle)

	Treatment crops 1959 - 1961				
	Lucerne	Ley	Cut grass	Arable with hay	Mean
		Fosters			
Mean	93.4	92.8	92.8	93.1	93.0
N: cwt per acre to wheat 1962					
None	93.5	93.1	92.4	93.2	93.0
0.4	93.3	92.5	93.0	93.4	93.0
0.8	92.8	92.9	93.3	92.5	92.9
1.2	93.9	92.6	92.7	93.4	93.2
N: cwt per acre 1963*					
0.75	93.4	92.8	93.0	93.0	93.0
1.25	93.4	92.8	92.7	93.2	93.0
Difference	0.0	0.0	-0.3	+0.2	0.0
PK	93.0	93.5	93.5	93.4	93.4
Dung	93.7	92.1	92.2	92.8	92.7
Difference	+0.7	-1.4	-1.3	-0.6	-0.7
P_2O_5: cwt per acre					
0.9	93.2	92.7	93.3	93.2	93.1
1.8	93.6	92.9	92.4	93.0	93.0
Difference	+0.4	+0.2	-0.9	-0.2	-0.1
K_2O: cwt per acre					
0.9	93.6	93.0	92.7	92.9	93.1
1.8	93.1	92.6	93.0	93.3	93.0
Difference	-0.5	-0.4	+0.3	+0.4	-0.1

*Including basal dressing

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63/B/1.15

Potatoes 2nd test crop. Percentage ware (1.5 inch riddle)

	N: cwt per acre to wheat 1962			
	None	0.4	0.8	1.2
	Fosters			
N: cwt per acre 1963*				
0.75	93.0	93.1	93.0	93.1
1.25	93.1	92.9	92.7	93.2
Difference	+0.1	-0.2	-0.3	+0.1
PK	93.3	93.3	93.1	93.7
Dung	92.9	92.8	92.6	92.6
Difference	-0.4	-0.5	-0.5	-1.1
P_2O_5: cwt per acre				
0.9	93.0	93.2	93.0	93.2
1.8	93.1	92.9	92.8	93.1
Difference	+0.1	-0.3	-0.2	-0.1
K_2O: cwt per acre				
0.9	92.9	93.1	92.8	93.4
1.8	93.2	92.9	92.9	92.9
Difference	+0.3	-0.2	+0.1	-0.5

			P_2O_5: cwt per acre		K_2O: cwt per acre	
	PK	Dung	0.9	1.8	0.9	1.8
N: cwt per acre 1963*						
0.75	93.4	92.7	93.0	93.1	93.1	93.0
1.25	93.2	92.8	93.2	92.9	93.0	93.0
PK			93.5	93.2	93.4	93.3
Dung			92.7	92.8	92.8	92.7
P_2O_5: cwt per acre						
0.9					93.1	93.0
1.8					93.0	92.9

*Including basal dressing

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63/B/1.16

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

	Treatment crops 1958 - 1960				
	Lucerne	Ley	Cut grass	Arable with hay	Mean
		Highfield			
Mean	40.1	38.8	40.6	38.6	39.5
N: cwt per acre		(±2.24)*			(±1.12)
None	41.2	40.9	39.6	33.9	38.9
0.1	39.6	40.8	41.5	39.3	40.3
0.2	41.3	37.4	38.5	40.4	39.4
0.3	38.6	36.1	43.0	40.8	39.6
Dung to potatoes 1962: tons per acre					
None	38.9	36.6	40.6	37.1	38.3
12	41.4	40.9	40.6	40.0	40.8
Difference (±2.24)	+2.5	+4.3	0.0	+2.9	+2.5 (±1.12)

Dung to potatoes 1962: tons per acre	N: cwt per acre None	0.1	0.2	0.3
		(±1.59)		
None	36.4	39.5	38.5	38.8
12	41.3	41.0	40.2	40.5
Difference (±2.24)	+4.9	+1.5	+1.7	+1.7

*For use in vertical and interaction comparisons

Mean dry matter % as harvested: 68.1

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

	Treatment crops 1958 - 1960				
	Lucerne	Ley	Cut grass	Arable with hay	Mean
		Fosters			
Mean	41.9	40.7	41.1	41.5	41.3
N: cwt per acre		(±1.34)*			(±0.67)
None	40.3	39.0	38.3	39.4	39.2
0.2	43.6	42.5	42.5	-	-
0.4	41.2	41.4	43.5	43.5	42.1
0.6	42.4	40.0	39.9	42.2	41.1
0.8	-	-	-	40.9	-
Dung to potatoes 1962: tons per acre					
None	41.8	40.1	40.3	40.4	40.6
12	41.9	41.3	41.8	42.6	41.9
Difference (±1.34)	+0.1	+1.2	+1.5	+2.2	+1.3 (±0.67)

Dung to potatoes 1962: tons per acre	Excluding arable with hay N: cwt per acre None	0.2	0.4	0.6	Mean
		(±1.09)			
None	38.2	40.9	42.1	41.8	40.7
12	40.3	44.9	42.0	39.7	41.7
Mean (±0.77)	39.2	42.9	42.0	40.8	41.2
Difference (±1.54)	+2.1	+4.0	-0.1	-2.1	+1.0 (±0.77)

*For use in vertical and interaction comparisons

Mean dry matter % as harvested: 69.8

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63/B/1.18

Treatment crops Arable and Hay rotation

	Hay (dry matter): cwt per acre				
	N to barley 1962				
	0	1	2	3	Mean
	Highfield				
No dung	81.7	82.8	79.4	81.4	81.3
Dung in 1961	78.2	91.0	82.0	86.9	84.5
Mean	79.9	86.9	80.6	84.2	82.9
	Fosters				
No dung	81.6	84.0	78.8	74.6	79.8
Dung in 1961	81.4	75.8	84.0	75.8	79.3
Mean	81.5	79.9	81.4	75.2	79.5

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63/B/1.19

Treatment crops Arable and Hay rotation

Highfield Mean	Fosters Mean
Sugar beet	
Roots washed: tons per acre	
16.66	14.49
Sugar percentage	
17.1	18.5
Total sugar: cwt per acre	
57.2	53.6
Tops: tons per acre	
17.38	12.70
Plant no: thousands per acre	
29.2	30.3
Oats	
Grain (at 85% dry matter): cwt per acre	
39.4	42.4

Oats, grain, mean dry matter % as harvested, Highfield: 76.5
Fosters: 76.6

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63/B/1.20

Cut grass. Dry matter: cwt per acre

	Highfield Mean	Fosters Mean
3rd year (4 cuts)	62.8	63.6

Lucerne. Dry matter: cwt per acre

	Highfield			Fosters		
	Dung to potatoes 1961: tons per acre			Dung to potatoes 1961: tons per acre		
	None	12	Mean	None	12	Mean
1st year (2 cuts)	44.5	49.7	47.1	44.0	46.4	45.2
2nd year (3 cuts)			61.3			76.8
3rd year (3 cuts)			39.0			46.3

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Grazed ley. Dry matter: cwt per acre

	Highfield Mean	Fosters Mean
3rd year	35.4	31.0

All-grass ley. Dry matter: cwt per acre

	Highfield Dung to potatoes 1961: tons per acre None	12	Mean	Fosters Dung to potatoes 1961: tons per acre None	12	Mean
1st year (4 cuts)	63.8	63.3	63.6	61.5	65.8	63.7
2nd year (Highfield 2 cuts) (Fosters 5 cuts)			23.2			83.9

Clover-grass ley. Dry matter: cwt per acre

	Highfield Dung to potatoes 1961: None	12	Mean	Fosters Dung to potatoes 1961: None	12	Mean
1st year (4 cuts)	41.7	41.3	41.5	35.8	32.8	34.4
2nd year (5 cuts)			66.6			71.0

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Permanent grass, cut for silage

Dry matter: cwt per acre

	N: cwt per acre (per cut)		
	None(1)	0.6(2)	Mean
	Highfield		
13th exptl. year			
Blocks 9 and 12	47.6	81.9	64.8
Blocks 10 and 11	48.2	85.4	66.8
14th exptl. year			
Blocks 5 and 8	42.9	84.4	63.6
Blocks 6 and 7	45.9	87.6	66.7
15th exptl. year			
Blocks 1 and 4	53.1	86.2	69.6
Blocks 2 and 3	46.6	85.6	66.1

(1) 'Clover-grass' management
(2) 'All-grass' management

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63/B/1.23

Reseeded grass. Dry matter: cwt per acre

	Highfield N: cwt per acre (per cut) None(1)	0.6(2)	Mean	Fosters N: cwt per acre (per cut) None(1)	0.6(2)	Mean
13th exptl year	47.0	95.9	71.5	43.5	87.8	65.7
14th exptl year	48.6	90.8	69.7	52.0	91.0	71.5
15th exptl year	52.9	91.1	72.0	55.0	90.8	72.9

	Cut for silage Mean	Grazed estimated from sampling cuts Mean
	Highfield	
14th exptl year		
Block 5		52.6
Block 8	30.7	20.2*
15th exptl year		
Block 2		36.6
Block 3	31.1	15.4*
	Fosters	
14th exptl year		
Block 7		37.1
Block 5	25.1	20.6*
15th exptl year		
Block 4		26.1
Block 2	31.6	18.9*

*Aftermath grazing.

(1) 'Clover-grass' management
(2) 'All-grass' management

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63/B/2.1

REFERENCE PLOTS

ROTHAMSTED (R) GREAT FIELD IV

and

WOBURN (W) STACKYARD SERIES C, 1963

(RA, RG and WRA)

Cultivations, etc.:

Great Field IV (R):-

Winter wheat: Dug by hand: Sept 19, 1962. P,K,Mg,Ca and S applied and seed drilled: Oct 5. First N dressings applied: Apr 8, 1963. Second N dressings applied: May 2. Trace element spray applied: May 9. Harvested: Aug 23. Variety: Cappelle.

Kale: Dung applied, all plots dug by hand: Oct 31, 1962. P,K,Mg,Ca and S and first dressings of N applied, all plots rotary cultivated, seed sown: Apr 22, 1963. Second dressing of N applied: June 5. Trace element spray applied: June 10. Harvested: Nov 4. Variety: Thousand Head.

Barley: Dug by hand: Nov 6 - 26, 1962. N,P,K,Ca and S applied, all plots rotary cultivated, seed sown: Apr 20, 1963. Trace element spray applied: June 10. Harvested: Aug 30. Variety: Proctor.

Grass - clover ley: Undersown in barley: Mar 20, 1962. N,P,K,Ca and S applied: Apr 9, 1963. Trace element spray applied: May 9. Cut four times: Oct 10, 1962, June 5, July 22 and Oct 3, 1963. Varieties: S22 Italian Ryegrass and Dorset Marl Red Clover.

Potatoes: Dung applied, all plots dug by hand: Oct 30, 1962. P,K,Mg, Ca and S and first dressing of N applied, all plots rotary cultivated setts planted: Apr 30, 1963. Second dressing of N applied: June 5. Trace element spray applied: June 10. Harvested: Plots receiving neither dung nor K (where haulm died early) - Aug 9, remainder - Aug 28. Variety: King Edward.

Permanent grass: Dung, P, K and first N dressing applied: Mar 6, 1963. Second N dressing applied: June 5. Cut twice: June 5 and Oct 10.

Stackyard Series C (W):-

Oats: P,K and first dressing of N applied, seed drilled: Mar 21, 1963. Second N dressing applied: May 23. Harvested: Aug 19. Variety: Condor.

Sugar beet: Dung applied: Mar 8, 1963. Plots dug by hand: Mar 13. P,K and first N dressing applied all plots rotary cultivated, seed drilled: Apr 22. Second N dressing applied: June 6. Harvested: Oct 22. Variety: Klein E.

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Barley: P, K and first N dressing applied, seed drilled: Apr 22, 1963. Second N dressing applied: May 23. Harvested: Aug 19. Variety: Proctor.

Grass - clover ley: Undersown in barley: Mar 5, 1962. N,P and K applied: Mar 21, 1963. Cut four times: Sept 22, 1962, June 7, July 25 and Oct 11, 1963. Varieties: Italian Ryegrass and Dorset Marl Red Clover.

Potatoes: Dung applied: Mar 8, 1963. Plots dug by hand: Mar 13. P, K and first N dressing applied and rotary cultivated in, setts planted: Apr 26. Second N dressing applied: June 6. Harvested: Plots receiving neither dung nor K (where haulm died early) - Aug 9, remainder - Aug 28. Variety: King Edward.

Permanent grass: Dung applied: Mar 8, 1963. P, K and first N dressing applied: Mar 13. Second N dressing applied: June 6. Cut three times: June 6, Aug 14 and Oct 25.

Soft fruit: New strawberries planted: Oct 22, 1962. Dung, N, P and K applied: Mar 8, 1963. Varieties: Blackcurrants - Wellington XXX, Gooseberry - Careless, Strawberry - Cambridge Vigour.

Note : For details of the previous years' results, and for rates of fertilisers etc., see 'Results of the Field Experiments' 58/Bc/1, 59/Bc/1, 60/B/3, 61/B/2, 62/B/2.

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Summary of Results

Great Field IV (R): Original plots

Treatment	cwt per acre Winter wheat Grain (at 85% D.M.)	cwt per acre Winter wheat Straw (at 85% D.M.)	tons per acre Kale: Total weight	cwt per acre Barley Grain (at 85% D.M.)	cwt per acre Barley Straw (at 85% D.M.)	cwt per acre Ley: dry matter 1st cut	2nd cut	3rd cut	4th cut	Total of 4 cuts	tons per acre Potatoes Total tubers	cwt per acre Permanent grass: dry matter 1st cut	2nd cut	Total of 2 cuts
None	29.6	33.6	9.20	20.5	16.4	2.6	21.7	17.1	12.5	53.9	5.18	9.5	32.3	41.8
N1	30.0	34.7	9.38	19.6	19.1	1.8	24.5	22.6	18.0	66.9	5.78	13.2	26.9	40.1
P	28.7	36.4	14.41	22.6	19.8	6.0	28.8	19.5	13.2	67.5	3.68	8.9	25.0	33.9
N1P	28.1	43.3	21.18	22.5	22.8	2.0	26.8	16.2	11.9	56.9	4.28	26.7	32.1	58.8
K	32.7	37.2	10.42	19.5	18.4	6.4	29.5	27.3	19.0	82.2	9.12	8.9	20.1	29.0
N1K	41.1	50.4	14.58	24.4	23.4	3.6	29.8	27.0	21.3	81.7	9.94	22.8	42.0	64.8
PK	33.9	41.1	10.42	21.4	17.9	9.0	32.1	32.4	20.2	93.7	11.04	11.6	29.5	41.1
N1PK	45.1	55.5	21.36	37.1	45.6	8.1	37.9	30.3	21.8	98.1	13.18	36.2	33.6	69.8
N2PK	56.5	60.5	29.17	44.0	41.9	4.3	40.5	28.0	22.5	95.3	16.26	40.6	47.5	88.1
D	39.2	46.2	17.36	27.5	25.1	5.9	32.8	33.2	24.1	96.0	13.28	34.7	33.4	68.1
N1PKD	51.2	66.5	27.96	42.1	43.1	8.0	45.0	32.7	26.1	111.8	16.60	46.6	37.4	84.0
N2PKD	54.9	73.9	34.03	38.5	61.9	6.1	46.0	34.2	26.5	112.8	20.99	52.0	46.5	98.5
Mean dry matter % as harvested	74.3	60.4		68.8	50.4	16.1	18.2	19.4	17.4	17.8		21.4	22.6	22.0

63/B/2.3

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63/B/2.4

Great Field IV (R): Additional plots

Treatment	cwt per acre Winter wheat Grain (at 85% D.M.)	Straw	tons per acre Kale: total weight	Barley Grain (at 85% D.M.)	Straw	cwt per acre Ley: dry matter 1st cut	2nd cut	3rd cut	4th cut	Total of 4 cuts	tons per acre Potatoes: total tubers
None	34.0	41.1	14.06	23.9	21.4	2.9	19.8	19.1	15.9	57.7	8.12
N2PK	53.5	67.2	37.16	36.6	34.7	4.3	35.8	23.4	21.2	84.7	15.93
N2PK Mg Ca	52.5	72.9	36.12	38.7	48.6	2.7	37.1	30.4	20.7	90.9	14.65
N2PK Mg S	53.9	71.3	35.07	37.6	42.1	3.2	36.4	24.2	20.8	84.6	14.37
N2PK Ca S	51.5	71.8	31.25	36.0	49.8	3.3	38.4	29.1	22.8	93.6	14.84
N2PK Mg Ca S	50.9	66.7	38.20	41.8	48.1	2.7	37.0	27.3	20.8	87.8	14.58
N2PK Mg Ca S TE	55.1	70.2	35.76	36.4	43.2	3.0	36.9	25.4	20.3	85.6	14.30
Mean dry matter % as harvested	75.6	67.6		73.7	52.8	16.4	19.8	18.2	16.2	17.6	

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63/B/2.5

Stackyard Series C (W)

Treatment	cwt per acre Oats Grain (at 85% D.M.)	cwt per acre Oats Straw (at 85% D.M.)	tons per acre Sugar beet roots (washed)	cwt per acre Barley Grain (at 85% D.M.)	cwt per acre Barley Straw (at 85% D.M.)	cwt per acre Ley: dry matter 1st cut	2nd cut	3rd cut	4th cut	Total of 4 cuts	tons per acre Potatoes Total tubers	cwt per acre Permanent grass: dry matter 1st cut	2nd cut	3rd cut	Total of 3 cuts
None	21.3	17.4	8.36	11.9	10.1	10.2	26.0	21.9	12.1	70.2	5.68	22.7	13.2	3.7	39.6
N1	35.4	28.0	10.62	23.9	20.2	7.0	32.1	19.7	12.1	70.9	5.50	32.0	21.2	8.6	61.8
P	16.2	14.8	9.20	14.5	11.4	11.6	28.7	18.8	11.4	70.5	5.38	20.5	11.9	3.2	35.6
N1P	34.4	26.8	9.36	23.2	18.1	6.9	33.1	18.6	11.7	70.3	5.65	31.3	20.1	8.5	59.9
K	17.9	16.7	10.44	15.6	13.2	12.6	31.9	26.1	18.6	89.2	9.49	26.1	21.8	7.9	55.8
N1K	36.7	31.1	14.27	22.8	19.4	7.8	31.1	25.6	18.7	83.2	12.42	43.0	27.4	8.0	78.4
PK	21.6	18.5	9.58	14.9	12.1	14.9	35.4	26.5	17.5	94.3	11.04	26.3	18.1	6.8	51.2
N1PK	39.5	35.6	13.67	30.9	23.4	9.4	31.1	23.1	15.9	79.5	13.04	41.9	28.4	8.5	78.8
N2PK	39.9	38.5	14.26	35.3	34.6	7.1	38.2	24.2	16.8	86.3	13.96	45.8	32.4	17.6	95.8
D	20.2	17.2	13.22	16.9	13.2	14.6	36.2	25.0	15.1	90.9	14.82	29.2	16.6	9.1	54.9
N1PKD	36.6	32.8	16.82	34.7	31.3	10.5	32.5	25.6	18.5	87.1	18.06	46.0	33.3	10.3	89.6
N2PKD	44.7	41.2	17.08	39.2	40.1	7.2	37.3	27.9	18.4	90.8	21.22	48.4	32.7	22.5	103.6
Mean dry matter % as harvested:	74.2	43.0		68.7	50.7	14.9	27.9	23.5	18.3	21.2		32.3	23.7	20.2	25.4

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63/B/2.6

WOBURN STACKYARD SERIES C

Sitka spruce seedbeds 1961 - 63

N, P, K, Mg, Compost, Norway spruce litter and formalin applied to one year seedbeds of Sitka spruce (Picea sitchensis).

The site, which adjoins those under arable crops and soft fruit, has had a similar history, except that it did not receive a dressing of lime. The experiment was started a year later than the agricultural crops.

Design: 2 blocks of 12 plots each.

Area of each plot: 0.00021 acres (1 square yard)

Treatments (spruce litter applied in 1961 and 1962 only, all other treatments applied annually)

None (2 plots per block)
PK Mg
NK Mg
NP Mg
NPK
NPK Mg (2 plots per block)
NPK Mg F
C
C NPK Mg
L NPK Mg

Symbols, rates and forms of materials applied (per sq. yd.)
N: 'Nitro-Chalk' applied in three summer top dressings at 4.5 g.N per occasion
P: superphosphate at 9 g.P
K: potassium chloride at 9 g.K
Mg: kieserite at 3 g.Mg
C: compost made from bracken and hop waste
4.5 kg. in 1961 and 1962
7 kg. in 1963
L: Norway spruce litter, 10 kg. in 1961 and 1962, 5 kg. in 1963
F: formalin drench, 250 ml. of commercial formalin (38% formaldehyde) applied in 5 l. water

Note: 1 g. per square yard = 0.0953 cwt per acre

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Cultivations etc.	1961	1962	1963
formalin applied:	Feb 9 1961	Dec 14 1961	Dec 12 1962
all manures (other than N) dug in:	March 6	Mar 9 1962	Mar 22 1963
seed sown:	March 14	March 16	April 9
T.V.O. pre-emergent spray*:	April 7	April 6	April 30
N top dressed:	June 16 July 21 August 23	July 5 August 1 August 22	July 1 August 8 August 30

*Subsequently weed removed by hand.

Notes: (1) In 1963 on plots without Mg, seedlings showed the yellowing characteristics of Mg deficiency.
(2) In 1961, 1962 and 1963 samples were taken for the determinations of dry matter of tops and roots separately, and for N, P, K, Ca, Mg in total crop.

Standard errors per plot.

1961	Mean height:	0.332 inches	or 28.4%	(13 d.f.)
	Plant number:	93.6 per sq yard	or 11.5%	(13 d.f.)
1962	Mean height:	0.179 inches	or 15.0%	(13 d.f.)
	Plant number:	82.9 per sq yard	or 12.3%	(13 d.f.)
1963	Mean height:	0.128 inches	or 7.7%	(13 d.f.)
	Plant number:	164.3 per sq yard	or 11.9%	(13 d.f.)

Summary of Results

Treatment	1961 Mean height: inches	1961 Plant number: per sq yard
	(±0.235)	(±66.2)
None	0.33(1)	998(2)
PK Mg	0.98	738
NK Mg	0.34	882
NP Mg	1.36	747
NPK	1.34	876
NPK Mg	1.33(1)	834(2)
NPK Mg F	2.11	588
C	1.02	885
C NPK Mg	1.81	687
L NPK Mg	1.77	702
Mean	1.17	814
(1) (±0.166)	(2) (±46.8)	

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63/B/2.8

Treatment	1962 Mean height: inches	1962 Plant number: per sq yard
	(±0.127)	(±58.6)
None	0.56(3)	832(4)
PK Mg	0.88	741
NK Mg	0.64	693
NP Mg	1.72	606
NPK	1.40	702
NPK Mg	1.34(3)	696(4)
NPK Mg F	1.68	696
C	0.92	567
C NPK Mg	1.55	606
L NPK Mg	1.78	444
Mean	1.19	676

Treatment	1963 Mean height: inches	1963 Plant number: per sq yard
	(±0.091)	(±116.2)
None	0.89(5)	1368(6)
PK Mg	1.03	1302
NK Mg	1.52	1407
NP Mg	2.01	1416
NPK	1.82	1413
NPK Mg	2.03(5)	1377(6)
NPK Mg F	2.19	1572
C	1.42	1269
C NPK Mg	1.95	1425
L NPK Mg	2.24	1323
Mean	1.67	1385

(3) (± 0.090) (4) (±41.4) (5) (±0.064) (6) (±82.2)

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63/B/3.1

GREEN MANURING EXPERIMENT

(WGM)

Woburn Stackyard - 1963, the 10th year of the revised scheme.

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

Area of each sub-plot (acres): 0.0195. Area harvested: Sugar beet - 0.0109, barley - 0.0146.

The early potato crop is now replaced by sugar beet. The tops are carted off.

Revised manurial treatments (in cwt N per acre): All plots are split (half-length) to test 2 rates of nitrogen per plot as follows:-

Barley: Either none v 0.6, or 0.3 v 0.9.

Sugar beet: Either none v 1.33, or 0.67 v 2.0.

All nitrogen as 'Nitro-Chalk'.

Basal dressing per acre: 1.5 cwt P_2O_5, 3.0 cwt K_2O per acre as compound fertiliser, 14% P_2O_5, 28% K_2O, to sugar beet, none to barley.

Cultivations, etc.:

Green manures after barley 1962 (for sugar beet 1963): Trefoil at 30 lb per acre, ryegrass at 40 lb per acre, undersown: Apr 28, 1962. Varieties: Trefoil - English, Ryegrass - Italian.

Sugar beet: Straw applied (green manure and 'fallow' plots): Aug 31, 1962. 'Fallow' plots ploughed: Oct 12. Ryegrass and trefoil plots ploughed: Mar 8, 1963. Basal fertiliser applied: Apr 3. 'Nitro-Chalk' applied: Apr 20. Seed drilled at 5.4 lb per acre: Apr 22. Singled: May 27. Sprayed with demeton-methyl at 6 fluid oz in 40 gallons per acre (against leaf miner and first appearance of aphids): June 5. Lifted: Nov 4. Variety: Klein E.

Green manures after early potatoes 1962 (for barley 1963): Ground chalk applied at 20 cwt per acre: July 20, 1962. Trefoil sown at 30 lb per acre: July 21. Ryegrass sown at 40 lb per acre: July 23. Varieties: Trefoil - English, Ryegrass - Western Wolths.

Barley: 'Fallow' plots and 'early' green manure plots ploughed: Nov 8, 1962. 'Late' green manure plots ploughed: Mar 8, 1963. 'Nitro-Chalk' applied: Apr 3. Seed drilled at 2.25 bushels per acre: Apr 8. Trefoil and ryegrass undersown: May 6. Combine harvested: Sept 12. Variety: Proctor.

Note: One sub-plot, which should have received no nitrogen, received 2 cwt N per acre in error. Estimated values were used in the analysis.

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Standard errors per plot.

Sugar beet.	Roots (washed)	Whole plot:	1.236 tons per acre or 10.1% (14 d.f.)
		Sub plot:	1.081 tons per acre or 8.8% (29 d.f.)
	Total sugar	Whole plot:	4.64 cwt per acre or 11.1% (14 d.f.)
		Sub plot:	3.98 cwt per acre or 9.5% (29 d.f.)
	Tops	Whole plot:	1.546 tons per acre or 13.5% (14 d.f.)
		Sub plot:	1.188 tons per acre or 10.4% (29 d.f,)
Barley.	Grain (at 85% dry matter)	Whole plot:	3.68 cwt per acre or 13.0%(16 d.f.)
		Sub plot:	3.27 cwt per acre or 11.5%(26 d.f.)

(Excluding plots fallow under old scheme)

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

	Green manures	Ploughed in	Dry matter	Nitrogen
For sugar beet	Trefoil		17.5	0.504
	Ryegrass		15.4	0.221
For barley	Trefoil	Early	35.0	0.932
	Ryegrass	Early	39.3	0.762
	Trefoil	Late	6.2	0.184
	Ryegrass	Late	15.5	0.390

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63/B/3.3

Summary of Results

Sugar beet. Roots (washed): tons per acre

	Straw: tons per acre		N: cwt per acre				Dung to cabbages 1953: tons per acre		
	None	1.5	None	0.67	1.33	2.00	None	10	Mean
Excluding plots fallow under old scheme									
Undersown green manures for sugar beet	(±0.437)			(1) and (2)			(±0.437)		(±0.309)
None	11.67	11.48	6.66	11.62	13.84	14.18	11.45	11.70	11.58
	(±0.618)			(3) and (4)			(±0.618)		(±0.437)
Trefoil	13.25	14.05	11.51	14.31	14.40	14.39	13.28	14.02	13.65
Ryegrass	12.83	13.19	8.86	13.36	15.04	14.77	12.16	13.85	13.01
Straw: tons per acre				(5) and (6)			(±0.437)		(±0.309)
None			8.36	12.76	14.08	14.22	11.78	12.93	12.35
1.5			8.49	12.70	14.47	14.53	12.40	12.69	12.55
N: cwt per acre							(5) and (6)		(7) and (8)
None							8.22	8.63	8.42
0.67							12.23	13.22	12.73
1.33							13.73	14.82	14.28
2.00							14.17	14.58	14.38
Mean (±0.309)							12.09	12.81	12.45

(1) (±0.382) (2) (±0.540) (3) (±0.514) (4) (±0.727) (5) (±0.382) (6) (±0.514)
(7) (±0.270) (8) (±0.363)

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Sugar beet. Roots (washed): tons per acre

	N: cwt per acre				Dung to cabbages 1953: tons per acre		
	None	0.67	1.33	2.00	None	10	Mean
Plots fallow under old scheme							
Straw: tons per acre	(1) and (2)				(±0.874)		(±0.618)
None	6.09	11.17	13.54	14.82	11.71	11.10	11.40
1.5	6.13	11.03	13.83	14.59	11.41	11.38	11.39
N: cwt per acre					(1) and (2)		(±0.540)
None					5.69	6.53	6.11
0.67					11.63	10.57	11.10
1.33					14.23	13.14	13.68
2.00					14.69	14.72	14.71
Mean (±0.618)					11.56	11.24	11.40

Undersown green manures for sugar beet

Old scheme	None Fallow	None	Trefoil	Ryegrass	Mean
		Excluding fallow			
	11.40 (±0.618)	11.58 (±0.309)	13.65 (±0.437)	13.01	12.24

(1) (±0.764) (2) (±1.027)

Note: On all summary sheets - Standard errors 1, 3, 5 and 7 are for use in comparisons within the same whole plot treatment. 2, 4, 6 and 8 are for use in comparisons involving different whole plot treatments, (all except N, None v 1.33 or 0.67 v 2.00).

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63/B/3.5

Sugar beet. Sugar percentage

	Straw: tons per acre		N: cwt per acre				Dung to cabbages 1953: tons per acre		Mean
	None	1.5	None	0.67	1.33	2.00	None	10	
Excluding plots fallow under old scheme									
Undersown green manures for sugar beet									
None	17.0	17.1	17.4	17.7	17.1	16.2	17.0	17.2	17.1
Trefoil	16.9	17.1	17.9	17.5	16.7	16.0	16.9	17.2	17.0
Ryegrass	17.4	17.3	18.0	17.9	17.0	16.4	17.2	17.5	17.3
Straw: tons per acre									
None			17.7	17.6	16.9	16.2	17.0	17.2	17.1
1.5			17.5	17.7	17.1	16.3	17.1	17.3	17.2
N: cwt per acre									
None							17.5	17.7	17.6
0.67							17.6	17.7	17.7
1.33							16.8	17.1	17.0
2.00							16.1	16.3	16.2
Mean							17.0	17.2	17.1

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63/B/3.6

Sugar beet. Sugar percentage

	N: cwt per acre				Dung to cabbages 1953: tons per acre		Mean
	None	0.67	1.33	2.00	None	10	
Plots fallow under old scheme							
Straw: tons per acre							
None	17.7	18.0	17.3	17.2	17.5	17.6	17.5
1.5	17.4	17.8	17.1	16.6	17.3	17.0	17.2
N: cwt per acre							
None					17.8	17.3	17.5
0.67					17.9	17.9	17.9
1.33					17.4	17.0	17.2
2.00					16.6	17.1	16.9
Mean					17.4	17.3	17.4

Undersown green manures for sugar beet

Old scheme	None Fallow	None	Trefoil	Ryegrass	Mean
		Excluding fallow			
	17.4	17.1	17.0	17.3	17.2

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Sugar beet. Total sugar: cwt per acre

	Straw: tons per acre		N: cwt per acre				Dung to cabbages 1953: tons per acre		Mean
	None	1.5	None	0.67	1.33	2.00	None	10	
Excluding plots fallow under old scheme									
Undersown green manures for sugar beet	(±1.64)			(1) and (2)			(±1.64)		(±1.16)
None	39.5	39.2	23.0	41.0	47.2	46.0	38.8	39.8	39.3
	(±2.32)			(3) and (4)			(±2.32)		(±1.64)
Trefoil	44.7	47.9	41.1	50.0	48.1	46.1	44.7	48.0	46.3
Ryegrass	44.4	45.2	31.9	47.9	51.0	48.5	41.5	48.2	44.8
Straw: tons per acre				(5) and (6)			(±1.64)		(±1.16)
None			29.7	44.9	47.5	46.0	39.8	44.2	42.0
1.5			29.8	45.0	49.3	47.3	42.1	43.7	42.9
N: cwt per acre							(5) and (6)		(7) and (8)
None							28.8	30.7	29.8
0.67							43.1	46.9	45.0
1.33							46.1	50.7	48.4
2.00							45.8	47.6	46.7
Mean (±1.16)							40.9	44.0	42.5

(1) (±1.41) (2) (±1.99) (3) (±1.92) (4) (±2.71) (5) (±1.41) (6) (±1.92)
(7) (±0.99) (8) (±1.36)

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Sugar beet. Total sugar: cwt per acre

	N: cwt per acre				Dung to cabbages 1953: tons per acre		
	None	0.67	1.33	2.00	None	10	Mean
Plots fallow under old scheme							
Straw: tons per acre	(1) and (2)				(±3.28)		(±2.32)
None	21.6	40.2	46.9	50.8	40.7	39.0	39.9
1.5	21.2	39.2	47.2	48.3	39.3	38.6	38.9
N: cwt per acre					(1) and (2)		(3) and (4)
None					20.2	22.6	21.4
0.67					41.7	37.7	39.7
1.33					49.4	44.7	47.0
2.00					48.7	50.4	49.5
Mean (±2.32)					40.0	38.8	39.4

Undersown green manures for sugar beet

Old scheme	None Fallow	None	Trefoil	Ryegrass	Mean
			Excluding fallow		
	39.4 (±2.32)	39.3 (±1.16)	46.3 (±1.64)	44.8	41.9

(1) (±2.81) (2) (±3.83) (3) (±1.99) (4) (±2.71)

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Sugar beet. Tops: tons per acre

	Straw: tons per acre		N: cwt per acre				Dung to cabbages 1953: tons per acre		Mean
	None	1.5	None	0.67	1.33	2.00	None	10	
Excluding plots fallow under old scheme									
Undersown green manures for sugar beet	(±0.547)			(1) and (2)			(±0.547)		(±0.387)
None	10.65	10.14	4.38	8.14	13.16	15.90	10.51	10.28	10.40
	(±0.773)			(3) and (4)			(±0.773)		(±0.547)
Trefoil	14.04	15.10	8.34	12.94	17.67	19.35	14.80	14.34	14.57
Ryegrass	12.01	12.38	5.46	9.39	15.11	18.83	11.55	12.84	12.20
Straw: tons per acre				(5) and (6)			(±0.547)		(±0.387)
None			5.41	9.61	15.00	17.33	11.82	11.86	11.84
1.5			5.87	9.70	14.55	17.66	11.87	12.02	11.94
N: cwt per acre							(5) and (6)		(7) and (8)
None							5.54	5.74	5.64
0.67							9.55	9.76	9.65
1.33							14.21	15.34	14.77
2.00							18.09	16.90	17.49
Mean (±0.387)							11.84	11.94	11.89

(1) (±0.420) (2) (±0.594) (3) (±0.622) (4) (±0.880) (5) (±0.420) (6) (±0.622)
(7) (±0.297) (8) (±0.440)

63/B/3.9

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63/B/3.10

Sugar beet. Tops: tons per acre

	N: cwt per acre				Dung to cabbages 1953: tons per acre		Mean
	None	0.67	1.33	2.00	None	10	
Plots fallow under old scheme							
Straw: tons per acre	(1) and (2)				(±1.093)		(±0.773)
None	4.34	7.65	12.84	16.52	10.58	10.09	10.33
1.5	4.28	6.75	11.00	14.73	9.57	8.81	9.19
N: cwt per acre					(1) and (2)		(3) and (4)
None					4.03	4.58	4.31
0.67					7.12	7.28	7.20
1.33					12.61	11.23	11.92
2.00					16.55	14.70	15.62
Mean (±0.773)					10.08	9.45	9.76

Undersown green manures for sugar beet

Old scheme	None Fallow	None	Trefoil	Ryegrass	Mean
		Excluding fallow			
	9.76 (±0.773)	10.40 (±0.387)	14.57 (±0.547)	12.20	11.46

(1) (±0.840) (2) (±1.244) (3) (±0.594) (4) (±0.880)

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63/B/3.11

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

	Green manures: In barley		Green manures: After potatoes for barley		N: cwt per acre				Dung to cabbages 1952: tons per acre		
	None	Under-sown	Trefoil	Rye-grass	None	0.3	0.6	0.9	None	10	Mean
Excluding plots fallow under old scheme											
Green manures ploughed in	(±1.30)		(±1.30)		(1) and (2)				(±1.30)		(±0.92)
Early	27.4	28.9	29.2	27.1	20.1	29.2	31.4	31.8	27.5	28.7	28.1
Late	27.0	29.9	29.0	27.8	20.9	29.4	31.7	31.7	27.2	29.6	28.4
Green manures in barley											
None			27.1	27.2	19.9	27.8	30.3	30.8	25.6	28.7	27.2
Undersown			31.1	27.7	21.1	30.8	32.7	32.8	29.1	29.6	29.4
Green manures after potatoes for barley											
Trefoil					22.0	30.9	32.3	31.1	28.4	29.8	29.1
Ryegrass					19.0	27.7	30.7	32.4	26.4	28.5	27.4
N: cwt per acre									(1) and (2)		(±0.82)
None									20.3	20.7	20.5
0.3									27.7	30.9	29.3
0.6									30.8	32.2	31.5
0.9									30.7	32.8	31.8
Mean (±0.92)									27.4	29.2	28.3

(1) (±1.16) For use in comparisons within the same whole plot treatment.
(2) (±1.54) For use in comparisons involving different whole plot treatments.

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63/B/3.12

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

Old scheme	Green manures after potatoes for barley: None Fallow	Trefoil Excluding	Ryegrass fallow	Mean
	16.9	29.1	27.4	26.0

Plots fallow under old scheme

N: cwt per acre	Dung to cabbages 1952: tons per acre: None	10	Mean
None	4.4	4.7	4.5
0.3	14.0	16.0	15.0
0.6	21.5	22.3	21.9
0.9	24.7	27.4	26.0
Mean	16.1	17.6	16.9

Mean dry matter % as harvested: 75.4

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LEY AND ARABLE ROTATIONS

(WLA)

Woburn Stackyard 1963 - the 26th year.

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

Corrective K dressings (in cwt K_2O per acre, applied to sugar beet). In 1962/3 two thirds of each dressing was applied in autumn before ploughing and one third broadcast on the plough furrow in February.

Continuous rotations	Fertiliser plots	Dung plots
Rotation		
Arable	6.0	6.0
Arable with hay	6.0	6.0
Lucerne	6.0	6.0
Grazed ley	3.0	0.0

Alternating rotations	Fertiliser plots	Dung plots
Last two rotations in order		
Arable/Ley	3.0	3.0
Lucerne/Arable with hay	6.0	6.0
Arable with hay/Lucerne	6.0	6.0
Ley/Arable	6.0	6.0

Revised NPK basal dressings (in cwt N, P_2O_5 and K_2O per acre)

	Fertilisers* and time of application	N	P_2O_5	K_2O
Hay	'Nitro-Chalk' and 0/14/28 in spring	1.0	0.6	1.2
	16/0/16 after 1st cut	0.6	-	0.6
Lucerne				
1st year	'Nitro-Chalk', superphosphate and muriate of potash in seedbed	0.5	1.5	1.0
2nd and 3rd year	'Nitro-Chalk' and muriate of potash in spring	0.5	-	1.5
Grazed ley				
1st year	'Nitro-Chalk', superphosphate and muriate of potash in seedbed	0.3	1.5	1.0
	16/0/16 in 2 equal dressings in early and late summer. Total:	0.6	-	0.6
2nd and 3rd year	16/0/16 in 3 equal dressings in spring, early and late summer. Total:	0.9	-	0.9

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

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Cultivations, etc.,

Treatment crops

Ley rotations

Ley 1st year. Ploughed twice: Sept 3 and Dec 18, 1962. Seedbed fertilisers applied, seed sown: Apr 19, 1963. Compound fertiliser applied: June 14 and Aug 28. Grazed 5 circuits: July 5 - Oct 14.

Ley 2nd year. Compound fertiliser applied: Mar 15, June 6 and Aug 15, 1963. Grazed 6 circuits: Apr 30 - Oct 4.

Ley 3rd year. Compound fertiliser applied: Mar 15, June 14 and Aug 15, 1963. Grazed 5 circuits: May 8 - Sept 14.

Lucerne 1st year. Ploughed: Sept 3, 1962. Treated for control of stem eelworm by injection of 'D.D' soil fumigant at 600 lb per acre: Oct 25. Ploughed second time: Dec 18. Fertilisers applied, fumigated and inoculated seed drilled at 20 lb per acre: Apr 19, 1963. Cut 3 times: June 18, Aug 2, Sept 25.

Lucerne 2nd year. 'Nitro-Chalk' and muriate of potash applied: Mar 15, 1963. Cut 3 times: June 19, Aug 2, Sept 25.

Lucerne 3rd year. 'Nitro-Chalk' and muriate of potash applied: Mar 15, 1963. Cut 3 times: June 18, Aug 2, Sept 25.

Arable rotations

Potatoes. Ploughed twice: Sept 3 and Dec 18, 1962. Fertilisers applied, potatoes machine planted: Apr 19, 1963. Earthed up: June 19. Sprayed with copper oxychloride fungicide at 2.3 lb copper in 20 gallons per acre: July 25, and again at the same rate in 30 gallons plus 0.35 pints menazon per acre: Aug 22. Sprayed with undiluted BOV at 16 gallons per acre: Sept 13. Lifted: Oct 8.

Rye. Ploughed: Oct 11, 1962. Seed combine drilled at 3 bushels per acre with PK compound: Oct 22. 'Nitro-Chalk' applied, seeds hay mixture undersown on 4 plots: Apr 19, 1963. Combine harvested: Sept 14.

Seeds hay. Seeds undersown in rye at 30 lb per acre: Apr 10, 1962. 'Nitro-Chalk' and PK compound applied: Mar 15, 1963. Cut twice: June 18 and Aug 19. Compound fertiliser applied: June 21.

Carrots. Ploughed twice: Sept 10 and Nov 13, 1962. Fertilisers applied: Apr 22, 1963. Seed drilled at 2.25 lb per acre: Apr 23. Sprayed with demeton-methyl at 6 fluid oz in 40 gallons per acre: May 31. Thinned: June 12. Sprayed with demeton-methyl at 6 fluid oz in 40 gallons per acre: June 27. Lifted: Sept 16.

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Test crops

Sugar beet. Dung equivalent K* and two thirds of corrective K applied: Nov 22, 1962. Dung applied, all plots ploughed: Dec 19. One third of corrective K*, basal superphosphate, muriate of potash and magnesium sulphate applied: Mar 21, 1963. 'Nitro-Chalk' and 'test' muriate of potash applied: Apr 22. Seed drilled at 4.9 lb per acre: Apr 23. Singled: May 27. Sprayed with demeton-methyl at 6 fluid oz in 40 gallons per acre: June 5. Lifted: Nov 4.

Barley. Ground chalk applied at 40 cwt per acre: Oct 27, 1962. Ploughed: Oct 29. 'Balancing' muriate of potash applied: Mar 14, 1963. Basal superphosphate applied: Mar 19. 'Nitro-Chalk' applied: Mar 28. Seed drilled at 2.25 bushels per acre: Apr 8. Sprayed with TBA/MCPA at 4 pints in 40 gallons per acre: May 21. Combine harvested: Sept 13.

* The dung equivalent K for plot 58, which receives no dung, was applied in error to dung plot 56. With the spring application of corrective K, this error was rectified on plot 58, but no correction is to be made to plot 56. In calculating the means and analysis of variance no allowance has been made for this error.

Standard errors per plot. Test crops.

Sugar beet.	Roots (washed)	Whole plot:	0.206 tons per acre or 1.1% (4 d.f.)
		1/2 plot:	1.152 tons per acre or 6.2% (4 d.f.)
		1/4 plot:	0.206 tons per acre or 1.1% (24 d.f.)
		1/16 plot:	1.026 tons per acre or 5.5% (32 d.f.)
	Total sugar	Whole plot:	0.82 cwt per acre or 1.2% (4 d.f.)
		1/2 plot:	3.55 cwt per acre or 5.2% (4 d.f.)
		1/4 plot:	2.47 cwt per acre or 3.6% (24 d.f.)
		1/16 plot:	4.03 cwt per acre or 5.9% (32 d.f.)
	Tops	Whole plot:	0.405 tons per acre or 2.6% (4 d.f.)
		1/2 plot:	1.650 tons per acre or 10.6% (4 d.f.)
		1/4 plot:	0.923 tons per acre or 5.9% (24 d.f.)
		1/16 plot:	1.232 tons per acre or 7.9% (32 d.f.)
Barley.	Grain (at 85% dry matter)	Whole plot:	1.26 cwt per acre or 3.8% (4 d.f.)
		1/2 plot:	1.40 cwt per acre or 4.2% (4 d.f.)

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63/B/4.4

Summary of Results

Treatment crops

Ley, sheep days of grazing per acre

1st year	2nd year	3rd year
1482	1807	1301

Lucerne, dry matter: cwt per acre

	1st cut	2nd cut	3rd cut	Total
1st year				
Dung in 1958: tons per acre				
None	1.0	13.6	12.8	27.4
15	2.0	18.1	15.6	35.8
Difference	+1.0	+4.5	+2.8	+8.4
Previous rotation				
Lucerne	0.9	13.4	12.4	26.6
Arable with hay	2.2	18.3	16.0	36.4
Mean	1.6	15.8	14.2	31.5
2nd year				
Dung in 1960: tons per acre				
None	15.2	15.1	16.9	47.2
15	18.8	17.4	19.6	55.8
Difference	+3.6	+2.3	+2.7	+8.6
Previous rotation				
Lucerne	18.5	15.9	18.8	53.2
Arable with hay	15.5	16.6	17.6	49.7
Mean	17.0	16.2	18.2	51.4
3rd year				
Dung in 1959: tons per acre				
None	24.5	11.8	1.8	38.1
15	29.2	9.2	3.5	41.9
Difference	+4.7	-2.6	+1.7	+3.8
Previous rotation				
Lucerne	24.1	11.8	2.4	38.3
Arable with roots	29.6	9.2	2.9	41.7
Mean	26.8	10.5	2.6	40.0

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Treatment crops

	Potatoes		Rye	
	Total tubers: tons per acre	Percentage ware (1.625 in.riddle)	Grain: (at 85% dry matter) cwt per acre	Straw:
Dung: tons per acre				
None	9.07	81.5	29.8	19.7
15*	9.73	82.6	30.0	19.8
Difference	+0.66	+1.1	+0.2	+0.1
Previous rotation				
Ley	12.30	87.5	33.0	23.2
Lucerne	12.10	91.6	29.2	19.8
Arable with hay	6.51	71.0	29.2	18.4
Arable with roots	6.69	78.1	28.4	17.5
Mean	9.40	82.1	30.0	19.7

Hay

Yield, dry matter: cwt per acre

	1st cut	2nd cut	Total
Dung in 1959: tons per acre			
None	44.9	19.5	64.4
15	50.0	19.4	69.4
Difference	+5.1	-0.1	+5.0
Previous rotation			
Ley	53.9	19.6	73.4
Arable with hay	41.0	19.4	60.4
Mean	47.5	19.4	66.9

*Dung applied: Potatoes for test crop sugar beet in 1961
Rye for test crop sugar beet in 1960

Mean dry matter % as harvested: Rye, Grain: 79.2
Straw: 81.9

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63/B/4.6

Carrots

	Roots (washed): tons per acre	Tops: tons per acre
Dung in 1959: tons per acre		
None	18.26	5.96
15	19.71	6.40
Difference	+1.45	+0.44
Previous rotation		
Lucerne	18.89	6.34
Arable with roots	19.08	6.02
Mean	18.98	6.18

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63/B/4.7

1st Test crop

Sugar beet

Roots (washed): tons per acre

	Previous rotation				
	Ley	Lucerne	Arable with hay	Arable with roots	Mean
Mean (±0.145)	18.66	19.50	16.89	19.41	18.61
Dung: tons per acre					
None (±1.680)*	17.94	18.42	15.63	17.71	17.42
15	19.38	20.58	18.15	21.11	19.80
Difference (±1.152)	+1.44	+2.16	+2.52	+3.40	+2.38
Response to additional 0.72 cwt N per acre					
		(±0.146)			(±0.073)
No dung	-0.71	+0.56	+1.61	+2.43	+0.97
Dung 15 tons per acre	-0.31	-0.07	-0.20	+1.27	+0.17
Response to additional 0.9 cwt K_2O per acre					
		(±0.146)			(±0.073)
No dung	+0.03	+0.54	+0.52	-0.92	+0.04
Dung 15 tons per acre	+0.41	-0.79	-0.32	+0.54	-0.04

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63/B/4.8

1st Test crop

Sugar beet

Sugar Percentage

	Previous rotation				
	Ley	Lucerne	Arable with hay	Arable with roots	Mean
Mean	18.2	17.9	19.0	18.6	18.4
Dung: tons per acre					
None	18.5	18.3	19.3	18.8	18.7
15	17.9	17.6	18.6	18.3	18.1
Difference	-0.6	-0.7	-0.7	-0.5	-0.6
Response to additional 0.72 cwt N per acre					
No dung	-0.7	-0.6	-0.4	-0.7	-0.6
Dung 15 tons per acre	-0.5	-0.8	-0.7	-0.2	-0.6
Response to additional 0.9 cwt K_2O per acre					
No dung	-0.3	+0.3	+0.2	+0.1	+0.1
Dung 15 tons per acre	0.0	-0.2	+0.1	-0.1	0.0

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1st Test crop

Sugar beet

Total sugar: cwt per acre

	Previous rotation				
	Ley	Lucerne	Arable with hay	Arable with roots	Mean
Mean (±0.58)	67.7	69.9	63.9	71.9	68.4
Dung: tons per acre					
None (±5.28)*	66.2	67.4	60.2	66.6	65.1
15	69.2	72.4	67.6	77.2	71.6
Difference (±3.55)	+3.0	+5.0	+7.4	+10.6	+6.5
Response to additional 0.72 cwt N per acre					
		(±1.75)			(±0.87)
No dung	-5.2	-0.3	+5.1	+6.6	+1.6
Dung 15 tons per acre	-3.1	-3.2	-3.4	+3.8	-1.4
Response to additional 0.9 cwt K_2O per acre					
		(±1.75)			(±0.87)
No dung	-0.6	+3.0	+2.4	-2.8	+0.6
Dung 15 tons per acre	+1.5	-3.2	-1.0	+1.4	-0.4

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63/B/4.10

1st Test crop

Sugar beet

Tops: tons per acre

	Previous rotation				
	Ley	Lucerne	Arable with hay	Arable with roots	Mean
Mean (±0.286)	17.61	17.74	13.30	13.80	15.61
Dung: tons per acre					
None (±2.470)*	17.34	15.29	11.08	12.05	13.94
15	17.88	20.20	15.52	15.55	17.29
Difference (±1.650)	+0.54	+4.91	+4.44	+3.50	+3.35
Response to additional 0.72 cwt N per acre					
		(±0.653)			(±0.326)
No dung	+4.23	+3.83	+3.48	+4.92	+4.12
Dung 15 tons per acre	+1.67	+1.81	+5.01	+2.88	+2.85
Response to additional 0.9 cwt K_2O per acre					
		(±0.653)			(±0.326)
No dung	+0.13	+0.40	+0.28	+0.11	+0.22
Dung 15 tons per acre	-0.27	-0.42	+0.61	+0.42	+0.09

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63/B/4.11

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	(±0.425)	18.65	19.43	16.29	18.38	18.19
None	(±0.820)*	18.36	17.89	14.32	16.57	16.78
15		18.94	20.97	18.26	20.20	19.59
Difference	(±1.402)	+0.58	+3.08	+3.94	+3.63	+2.81
Sugar percentage						
Mean		18.6	18.2	19.2	18.8	18.7
None		18.9	18.3	19.4	19.2	18.9
15		18.3	18.1	19.0	18.4	18.4
Difference		-0.6	-0.2	-0.4	-0.8	-0.5
Total sugar: cwt per acre						
Mean	(±1.62)	69.3	70.4	62.3	68.9	67.7
None	(±2.84)*	69.4	65.2	55.4	63.4	63.3
15		69.3	75.6	69.2	74.4	72.1
Difference	(±4.66)	-0.1	+10.4	+13.8	+11.0	+8.8
Tops: tons per acre						
Mean	(±0.634)	16.14	15.89	11.07	11.92	13.75
None	(±1.184)*	15.17	12.89	9.09	9.59	11.68
15		17.11	18.89	13.06	14.24	15.82
Difference	(±2.001)	+1.94	+6.00	+3.97	+4.65	+4.14

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63/B/4.12

1st Test crop

Sugar beet

Magnesium sulphate: lb per acre	Previous rotation: Ley	Lucerne	Arable with hay	Arable with roots	Mean
Roots (washed): tons per acre					
		(±0.232)*			
None	18.43	19.39	16.40	19.41	18.41
500	18.88	19.61	17.38	19.40	18.82
Difference (±0.363)	+0.45	+0.22	+0.98	-0.01	+0.41 (±0.181)
Sugar percentage					
None	18.2	17.9	18.9	18.6	18.4
500	18.2	18.0	19.1	18.5	18.4
Difference	0.0	+0.1	+0.2	-0.1	0.0
Total sugar: cwt per acre					
		(±0.92)*			
None	66.9	69.4	61.8	72.0	67.5
500	68.6	70.4	66.1	71.8	69.2
Difference (±1.42)	+1.7	+1.0	+4.3	-0.2	+1.7 (±0.71)
Tops: tons per acre					
		(±0.360)*			
None	17.77	17.74	13.22	13.86	15.64
500	17.46	17.75	13.38	13.74	15.58
Difference (±0.436)	-0.31	+0.01	+0.16	-0.12	-0.06 (±0.218)

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2nd Test crop

Barley

Dung in 1962: tons per acre		Previous rotation: Ley	Lucerne	Arable with hay	Arable with roots	Mean
Grain (at 85% dry matter): cwt per acre						
None	(±1.13)*	31.0	33.8	33.0	33.8	32.9
15		32.5	35.4	35.4	33.7	34.3
Mean	(±0.89)	31.8	34.6	34.2	33.8	33.5
Difference	(±1.40)	+1.5	+1.6	+2.4	-0.1	+1.4 (±0.70)
Straw (at 85% dry matter): cwt per acre						
None		23.7	22.5	22.4	21.8	22.6
15		22.3	25.9	24.6	21.5	23.5
Mean		23.0	24.2	23.5	21.6	23.0
Difference		-1.4	+3.4	+2.2	-0.3	+0.9

*For use in horizontal and diagonal comparisons only.

Mean dry matter % as harvested: Grain 77.5
Straw 85.4

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63/E/5.1

WOBURN MARKET GARDEN EXPERIMENT

(WMG)

Organic manures, N, P and K - Lansome Field 1963, the 22nd year of the experiment, the third year with revised treatments.

Carrots (in place of early potatoes): Crop changed because of an infestation of potato root eelworm (Heterodora rostochiensis). The carrots are unthinned and are sprayed with a systemic insecticide to control Motley Dwarf Virus. Manurial treatments remain the same.

Globe beet: Seed dressing test (to columns of 4 half-plots): No dressing, seed dressed against fungus disease with BHC/organo-mercury at 10 oz of the commercial preparation per 112 lb of seed.

Magnesium sulphate test: This is now discontinued.

Area of each sub plot (acres): 0.0063. Area harvested (acres): Leeks - 0.0011, carrots - 1st harvest 0.0012, 2nd harvest 0.0017, globe beet - 0.0009.

Note: The results for the 1963-64 leeks will be included in the 1964 report.

Cultivations, etc.:

Leeks 1962-63. Dung and NPK applied, plots ploughed: July 25, 1962. Magnesium sulphate and second half of NPK applied: July 27. Leeks planted: July 30. Harvested: 1st lifting - Mar 12, 2nd lifting - Apr 1, 1963. Variety: Musselburgh.

Carrots. PK applied: Mar 7, 1963. Dung applied, plots ploughed: Mar 13. N and second half of PK applied: Apr 11. Seed drilled at 2 lb per acre: Apr 21. Sprayed with demeton methyl at 6 fluid oz in 40 gallons per acre: May 31 and June 27. Lifted - 1st harvest: 15 July, 2nd harvest: 30 - 31 July. Variety: Early Market.

Globe beet. Ground chalk applied at 20 cwt per acre: May 3, 1963. Dung and NPK applied, plots ploughed: May 7. Second half of NPK applied: May 8. Seed drilled (untreated at 13 lb and treated at 14 lb per acre): May 9. Sprayed with demeton methyl at 6 fluid oz in 40 gallons per acre: June 6. Singled: June 14. Lifted: July 22*. Variety: Detroit.

* Through an error only one harvest was taken.

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Summary of Results

Leeks 1962 - 1963. 1st Lifting. Saleable produce: tons per acre

Dung: tons per acre	Organic** manure applied 1942-62	Mean	Mag.sulph. lb p.a. None	Mag.sulph. lb p.a. 500	Diff.	Fertiliser None	Fertiliser N1P1K1	Diff.
10	D1	4.31	4.32	4.30	-0.02	3.87	4.75	+0.88
20	D2	4.25	4.07	4.42	+0.35	3.70	4.80	+1.10
10	C1	3.86	4.04	3.67	-0.37	3.52	4.20	+0.68
20	C2	4.26	4.24	4.27	+0.03	3.64	4.87	+1.23
Mean		4.17	4.17	4.16	-0.01	3.68	4.65	+0.97

Mag.sulph. lb per acre	None	500
None	3.64	4.70
500	3.72	4.61

NPK	Mean	None	500	Diff.
111	3.72	3.42	4.02	+0.60
111*	3.67	3.82	3.52	-0.30
211	3.06	3.22	2.91	-0.31
211*	4.37	4.32	4.42	+0.10
112	3.37	3.12	3.62	+0.50
112*	2.92	3.12	2.71	-0.41
212	3.72	4.02	3.42	-0.60
212*	4.12	4.12	4.12	0.00
Mean	3.62	3.64	3.59	-0.05

* NPK half ploughed in, half in seedbed.

** Last applied to early potatoes 1962.

63/B/5.2

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Leeks 1962 - 1963. 2nd Lifting. Saleable produce: tons per acre

Dung: tons per acre	Organic** manure applied 1942-62	Mean	Mag.sulph. lb p.a. None	Mag.sulph. lb p.a. 500	Diff.	Fertiliser None	Fertiliser N1P1K1	Diff
10	D1	4.64	4.62	4.67	+0.05	4.52	4.77	+0.25
20	D2	4.43	4.35	4.52	+0.17	4.04	4.82	+0.78
10	C1	4.32	4.45	4.20	-0.25	3.77	4.88	+1.11
20	C2	4.37	4.60	4.14	-0.46	3.59	5.15	+1.56
Mean		4.44	4.50	4.38	-0.12	3.98	4.90	+0.92

Mag.sulph. lb per acre		
None	4.01	5.00
500	3.96	4.81

NPK				
111	3.77	3.82	3.72	-0.10
111*	3.92	3.82	4.02	+0.20
211	3.42	3.62	3.22	-0.40
211*	4.78	5.13	4.42	-0.71
112	3.36	3.72	3.01	-0.71
112*	3.67	3.72	3.62	-0.10
212	4.42	4.42	4.42	0.00
212*	4.17	4.22	4.12	-0.10
Mean	3.94	4.06	3.82	-0.24

* NPK half ploughed in, half in seedbed.
** Last applied to early potatoes 1962.

63/B/5.3

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63/B/5.4

Leeks 1962 - 1963. Mean of 2 Liftings. Saleable produce: tons per acre

Dung: tons per acre	Organic** manure applied 1942-62	Mean	Mag.sulph. lb p.a. None	Mag.sulph. lb p.a. 500	Diff.	Fertiliser None	Fertiliser N1P1K1	Diff.
10	D1	4.48	4.47	4.48	+0.01	4.20	4.76	+0.56
20	D2	4.34	4.21	4.47	+0.26	3.87	4.81	+0.94
10	C1	4.09	4.24	3.93	-0.31	3.64	4.54	+0.90
20	C2	4.31	4.42	4.21	-0.21	3.62	5.01	+1.39
Mean		4.30	4.34	4.27	-0.07	3.83	4.78	+0.95

Mag.sulph. lb per acre		
None	3.83	4.85
500	3.84	4.71

NPK				
111	3.74	3.62	3.87	+0.25
111*	3.80	3.82	3.77	-0.05
211	3.24	3.42	3.06	-0.36
211*	4.57	4.72	4.42	-0.30
112	3.37	3.42	3.32	-0.10
112*	3.29	3.42	3.16	-0.26
212	4.07	4.22	3.92	-0.30
212*	4.14	4.17	4.12	-0.05
Mean	3.78	3.85	3.71	-0.14

* NPK half ploughed in, half in seedbed.
** Last applied to early potatoes 1962.

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Carrots. Graded produce. Roots: tons per acre

Dung: tons per acre	Organic manure applied 1942-61	Mean	Fertiliser None	Fertiliser N1P1K1	Diff.	Treatment NPK	
			1st Harvest				
10	D1	3.78	3.58	3.97	+0.39	111	3.68
20	D2	5.33	5.24	5.42	+0.18	111*	4.26
10	C1	4.02	4.65	3.40	-1.25	211	2.42
20	C2	4.00	4.84	3.15	-1.69	211*	3.68
						112	1.74
						112*	5.04
Mean		4.28	4.58	3.98	-0.60	212	1.94
						212*	2.62
						Mean	3.17
			2nd Harvest				
10	D1	5.90	5.94	5.84	-0.10	111	5.56
20	D2	7.09	7.84	6.33	-1.51	111*	5.30
10	C1	6.14	6.10	6.17	+0.07	211	3.75
20	C2	6.73	7.84	5.62	-2.22	211*	3.88
						112	3.23
						112*	5.04
Mean		6.46	6.94	5.99	-0.95	212	3.94
						212*	3.49
						Mean	4.27

*PK half ploughed in, half in seedbed.

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63/B/5.6

Carrots. Graded produce. Roots: tons per acre

Dung: tons per acre	Organic manure applied 1942-61	Mean	Fertiliser None	Fertiliser N1P1K1	Diff.
		Mean of 1st and 2nd Harvest			
10	D1	5.05	5.00	5.09	+0.09
20	D2	6.39	6.80	5.97	-0.83
10	C1	5.29	5.52	5.06	-0.46
20	C2	5.64	6.64	4.63	-2.01
Mean		5.59	6.00	5.19	-0.81

Treatment NPK	
111	4.81
111*	4.88
211	3.22
211*	3.80
112	2.63
112*	5.04
212	3.14
212*	3.14
Mean	3.83

* PK half ploughed in, half in seedbed

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63/B/5.7

Carrots. Tops: tons per acre

Dung: tons per acre	Organic manure applied 1942-61	Mean	Fertiliser None	Fertiliser N1P1K1	Diff.
			1st Harvest		
10	D1	4.22	3.68	4.75	+1.07
20	D2	6.76	7.52	6.01	-1.51
10	C1	4.60	5.14	4.07	-1.07
20	C2	5.84	6.69	4.99	-1.70
Mean		5.36	5.76	4.95	-0.81
			2nd Harvest		
10	D1	4.91	4.16	5.66	+1.50
20	D2	7.45	7.56	7.34	-0.22
10	C1	5.22	5.20	5.24	+0.04
20	C2	6.77	7.50	6.04	-1.46
Mean		6.09	6.10	6.07	-0.03

Treatment NPK	
111	3.10
111*	4.26
211	2.52
211*	4.65
112	1.55
112*	4.46
212	2.04
212*	2.33
Mean	3.11
111	3.62
111*	3.62
211	3.04
211*	2.97
112	2.13
112*	3.42
212	3.81
212*	2.84
Mean	3.18

* PK half ploughed in, half in seedbed.

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63/B/5.8

Carrots. Tops: tons per acre

Dung: tons per acre	Organic manure applied 1942-61	Mean	Fertiliser None	Fertiliser N1P1K1	Diff.
		Mean of 1st and 2nd Harvest			
10	D1	4.63	3.97	5.30	+1.33
20	D2	7.17	7.54	6.81	-0.73
10	C1	4.97	5.18	4.77	-0.41
20	C2	6.40	7.18	5.62	-1.56
Mean		5.80	5.96	5.62	-0.34

Treatment NPK	
111	3.41
111*	3.88
211	2.83
211*	3.64
112	1.90
112*	3.84
212	3.10
212*	2.64
Mean	3.16

* PK half ploughed in, half in seedbed.

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63/B/5.9

Globe beet. Total produce: tons per acre

Dung: tons per acre	Organic manure applied 1942-62**	Mean	Fungicide 0	Fungicide F	Diff.	Fertiliser None	Fertiliser N1P1K1	Diff.
10	D1	12.94	12.21	13.66	+1.45	10.88	14.99	+4.11
20	D2	15.51	14.16	16.86	+2.70	14.47	16.55	+2.08
10	C1	13.41	13.45	13.37	-0.08	9.87	16.96	+7.09
20	C2	15.53	14.65	16.41	+1.76	15.36	15.70	+0.34
Mean		14.35	13.62	15.08	+1.46	12.65	16.05	+3.40
					Fungicide			
					0	12.27	14.97	
					F	13.02	17.13	
NPK								
111		6.40	5.23	7.56	+2.33			
111*		11.28	10.53	12.02	+1.49			
211		8.86	9.63	8.08	-1.55			
211*		7.30	6.98	7.62	+0.64			
112		12.44	12.92	11.95	-0.97			
112*		***	***	***	***			
212		7.36	5.62	9.11	+3.49			
212*		14.76	14.47	15.05	+0.58			
Mean excluding 112*		9.77	9.34	10.20	+0.86			

* NPK half ploughed in, half in seedbed.
** Last applied to early potatoes 1962.
*** Results omitted because of discrepancy between plant counts immediately after singling and at harvest.

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63/B/5.10

Globe beet. Total saleable roots: tons per acre

Dung: tons per acre	Organic manure applied 1942-62**	Mean	Fungicide 0	Fungicide F	Diff.	Fertiliser None	Fertiliser N1P1K1	Diff.
10	D1	5.90	5.86	5.95	+0.09	5.06	6.75	+1.69
20	D2	7.76	7.34	8.20	+0.86	7.57	7.96	+0.39
10	C1	6.31	6.34	6.28	-0.06	4.41	8.20	+3.79
20	C2	7.53	7.29	7.76	+0.47	7.70	7.35	-0.35
Mean		6.88	6.70	7.05	+0.35	6.19	7.56	+1.37
					Fungicide			
					0	6.22	7.19	
					F	6.16	7.94	
NPK								
111		1.93	1.51	2.35	+0.84			
111*		4.55	4.26	4.84	+0.58			
211		3.79	4.42	3.16	-1.26			
211*		2.16	1.91	2.41	+0.50			
112		5.32	5.57	5.08	-0.49			
112*		***	***	***	***			
212		2.64	2.01	3.28	+1.27			
212*		6.10	6.10	6.10	0.00			
Mean excluding 112*		3.79	3.68	3.89	+0.2			

* NPK half ploughed in, half in seedbed.
** Last applied to early potatoes 1962.
*** Results omitted because of discrepancy betweenplant counts immediately after singling and at harvest.

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63/B/5.11

Globe beet. Plant number: thousands per acre

Dung: tons per acre	Organic manure applied 1942-62**	Mean	Fungicide 0	Fungicide F	Diff.	Fertiliser None	Fertiliser N1P1K1	Diff.
10	D1	126.9	109.2	144.6	+35.4	133.3	120.6	-12.7
20	D2	126.5	113.2	139.9	+26.7	131.1	122.0	-9.1
10	C1	131.8	126.9	136.8	+9.9	130.7	133.0	+2.3
20	C2	123.8	111.7	135.9	+24.2	128.2	119.4	-8.8
Mean		127.3	115.3	139.3	+24.0	130.8	123.7	-7.1

	Fungicide	None	N1P1K1
	0	119.9	110.6
	F	141.8	136.8

NPK				
111	104.0	80.5	127.4	+46.9
111*	145.0	127.4	162.7	+35.3
211	106.5	99.0	114.0	+15.0
211*	120.4	123.9	116.9	-7.0
112	129.1	134.3	123.9	-10.4
112*	***	***	***	***
212	87.2	71.8	102.5	+30.7
212*	135.2	127.9	142.4	+14.5
Mean excluding 112*	118.2	109.3	127.1	+17.8

* NPK half ploughed in, half in seedbed.
** Last applied to early potatoes 1962.
*** Results omitted because of discrepancy between plant counts immediately after singling and at harvest.

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63/B/6.1

IRRIGATION EXPERIMENT

(WIR)

Revised 1963, the 13th year

The effects of irrigation and nitrogen - Woburn Butt Close, 1963.

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

The 3 course rotation is now as follows:-
1st year: sugar beet (following spring beans 1962).
2nd year: barley - undersown (following early potatoes 1962).
3rd year: clover (following barley 1962) - Crimson clover in 1963, double-cut red clover in following years.

Revised treatments.
Sugar beet: A test of early v normal singling is applied on strips of 4 half plots, north v south.
The original nitrogen test to sub plots (as for early potatoes) is continued at the following rates: None, 0.75 cwt N as sulphate of ammonia (in addition to basal dressing).
The trefoil green manure sown after early potatoes for barley and the comparison of normal and chemical weed control to early potatoes are discontinued.
Lucerne: Irrigation treatments are now: nil (O), early (A), late (B), full (C).

Revised basal dressing per acre:
Sugar beet: 0.75 cwt each of N, P_2O_5 and K_2O as compound fertiliser (10% N, 10% P_2O_5, 10% K_2O), 5 cwt agricultural salt, applied in winter and ploughed in in spring (applied in spring after ploughing in 1963).
Clover: 0.75 cwt P_2O_5, 1.5 cwt K_2O as compound fertiliser (14% P_2O_5, 28% K_2O), applied in winter (in spring 1963 to Crimson clover).

Area harvested (acres): Sugar beet, sub sub plot - 0.0056, Barley, whole plot - 0.0092, Clover, whole plot - 0.0117, Lucerne, sub plot - 0.0165.

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Rainfall and Irrigation: inches

Week ending	Rain-fall	Barley C	Sugar beet A	Sugar beet B	Sugar beet C	Clover A	Clover B	Clover C	Lucerne A	Lucerne B	Lucerne C
May 6	0.55										
13	0.35										
20	0.12										
27	0.48								0.50		0.50
June 3	0.03	0.50	0.50		0.50	0.50		0.50			
10	0.03								0.50		0.50
17	0.19	1.00	1.00		1.00	1.00		1.00	1.00		1.00
24	0.41	0.75	0.75		0.75	0.75		0.75			
July 1	0.63	0.50	0.50		0.50	0.50		0.50		0.75	0.75
8	0.80										
15	0.37										
22	0.23			1.00							
29	0.08			1.00	0.50		0.50	0.50		0.50	0.50
Aug 5	1.01										
12	0.26										
19	0.51										
26	0.63										
Sept 2	1.03										
9	0.98										
16	0.15										
23	0.03										
30	0.65										
Total	9.52	2.75	2.75	2.00	3.25	2.75	0.50	3.25	2.00	1.25	3.25

Cultivations, etc.:

Sugar beet. Ploughed: Oct 10, 1962. Salt applied: Mar 4, 1963. Basal compound and sulphate of ammonia applied: Apr 8. Seed drilled at 6 lb per acre: Apr 22. Singled: early - May 27, late - June 7. Sprayed with demeton methyl at 6 fluid oz in 40 gallons per acre (against leaf miner and first appearance of aphids): June 5. Lifted: Nov 5. Variety: Klein E.

Barley. Ground chalk applied at 40 cwt per acre: Feb 15, 1963. Ploughed: Mar 13. Basal compound and 'Nitro-Chalk' applied: Apr 9. Seed drilled at 2.3 bushels per acre, clover sown at 30 lb per acre: Apr 18. Combine harvested: Sept 10. Variety: Proctor.

Clover. Ploughed twice: Aug 27, Nov 1, 1962. Basal compound fertiliser applied: Apr 8, 1963. Seed sown at 30 lb per acre: Apr 18. Cut: July 10. Samples cut for estimation of dry matter ploughed in: Aug 19. Variety: Crimson clover (inoculated seed).

Lucerne. Ground chalk applied at 20 cwt per acre: Feb 15, 1963. 'Nitro-Chalk', muriate of potash and basal P applied: Mar 7. Cut 3 times: June 19, July 29, Sept 27. Muriate of potash applied after first 2 cuts. Variety: Du Puits.

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Standard errors per plot.

Sugar beet.	Roots (washed)	Whole plot:	0.724 tons per acre or 4.1% (6 d.f.)
		Sub plot:	0.606 tons per acre or 3.4% (8 d.f.)
		Strip:	0.989 tons per acre or 5.6% (16 d.f.)
	Total sugar	Whole plot:	2.63 cwt per acre or 4.0% (6 d.f.)
		Sub plot:	2.16 cwt per acre or 3.3% (8 d.f.)
		Strip:	4.61 cwt per acre or 7.0% (16 d,f.)
	Tops	Whole plot:	1.382 tons per acre or 12.2% (6 d.f.)
		Sub plot:	1.007 tons per acre or 8.9% (8 d.f.)
		Strip:	0.928 tons per acre or 8.2% (16 d.f.)
Clover, dry matter			1.51 cwt per acre or 7.1% (8 d.f.)

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Summary of Results

Sugar beet

	Irrigation O	A	B	C	Mean
	Roots (washed): tons per acre				
Mean (±0.418)	16.94	17.12	18.85	17.73	17.66
N: cwt per acre including basal		(1) and (2)			(±0.175)
0.75	16.35	16.30	18.47	16.47	16.90
1.50	17.54	17.93	19.24	19.00	18.43
Singled		(±0.404)*			
Early	16.47	16.56	18.88	17.81	17.43
Late	17.42	17.67	18.82	17.65	17.89
	Sugar percentage				
Mean	18.6	18.7	18.7	18.8	18.7
N: cwt per acre including basal					
0.75	19.0	18.8	18.9	19.1	19.0
1.50	18.2	18.5	18.5	18.5	18.4
Singled					
Early	18.6	18.6	18.6	18.8	18.7
Late	18.6	18.7	18.7	18.8	18.7

* For use in interaction comparisons only

(1) (±0.350). For use in horizontal and interaction comparisons only
(2) (±0.485). For use in vertical and diagonal comparisons only

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63/B/6.5

Sugar beet

	Irrigation O	A	B	C	Mean
	Total sugar: cwt per acre				
Mean (±1.52)	63.0	64.0	70.5	66.6	66.0
N: cwt per acre including basal		(1) and (2)			(±0.62)
0.75	62.3	61.4	69.8	62.9	64.1
1.50	63.7	66.5	71.3	70.4	68.0
Singled		(±1.88)*			
Early	61.3	61.8	70.6	67.1	65.2
Late	64.7	66.2	70.5	66.2	66.9
	Tops: tons per acre				
Mean (±0.798)	11.51	11.32	11.98	10.53	11.34
N: cwt per acre including basal		(3) and (4)			(±0.291)
0.75	9.36	9.47	10.32	8.99	9.54
1.50	13.65	13.17	13.65	12.06	13.13
Singled		(±0.379)*			
Early	11.38	10.74	11.96	10.16	11.06
Late	11.64	11.90	12.01	10.90	11.61

* For use in interaction comparisons only

(1) (±1.25). For use in horizontal and interaction comparisons only
(2) (±1.75). For use in vertical and diagonal comparisons only
(3) (±0.581). For use in horizontal and interaction comparisons only
(4) (±0.897). For use in vertical and diagonal comparisons only

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

Weed control**	Irrigation O	Irrigation C
Normal cultivation	22.9	28.3
Trietazine spray	25.6	27.2

Green manure	Weed control** Normal cultivation	Weed control** Trietazine spray
None	24.2	23.9
Trefoil	26.2	27.6

N: cwt per acre including basal	Irrigation O	Irrigation C	Weed control** Normal cultivation	Weed control** Trietazine spray	Green manure None	Green manure Trefoil	Mean
0.3	20.1	23.3	21.3	22.1	18.7	23.2	21.7
0.6	28.3	32.2	29.9	30.7	29.4	30.8	30.3
Mean	24.2	27.8	25.6	26.4	24.1	27.0	26.0

Mean dry matter % as harvested: 79.7

Clover. Dry matter: cwt per acre

	Irrigation O	Irrigation C	Mean
	17.0 (±0.62)	25.8	21.4

Mean dry matter % as cut: 11.2

** To early potatoes 1962

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63/B/6.7

Lucerne. Dry matter: cwt per acre

	Irrigation O	A	B	C	Mean
		1st cut			
Mean	26.0	28.6	27.7	25.9	27.0
N: cwt per acre					
None	23.6	27.9	27.1	25.8	26.1
0.3	28.4	29.2	28.2	25.9	27.9
K_2O: cwt per acre*					
0.3	26.5	27.7	25.9	22.9	25.8
0.9	25.5	29.4	29.4	28.8	28.3
		2nd cut			
Mean	18.2	16.6	19.1	12.5	16.6
N: cwt per acre					
None	17.1	17.0	19.0	12.4	16.4
0.3	19.3	16.3	19.3	12.7	16.9
K_2O: cwt per acre*					
0.3	18.3	16.2	17.9	10.1	15.6
0.9	18.1	17.0	20.4	15.0	17.7
		3rd cut			
Mean	19.9	19.8	20.2	17.0	19.2
N: cwt per acre					
None	19.3	20.2	20.0	16.8	19.1
0.3	20.6	19.4	20.4	17.3	19.4
K_2O: cwt per acre*					
0.3	20.3	19.9	19.5	15.9	18.9
0.9	19.6	19.6	20.9	18.2	19.6

Mean dry matter % as cut:
1st cut 19.4
2nd cut 19.6
3rd cut 19.8

* For each cut

Note: For 1st cut O = B
A = C.

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63/B/6.8

Lucerne. Dry matter: cwt per acre

	Irrigation O	A	B	C	Mean
	Total of 3 cuts				
Mean	64.1	65.0	67.0	55.5	62.8
N: cwt per acre					
None	60.0	65.1	66.0	55.0	61.5
0.3	68.3	64.8	68.0	55.9	64.3
K_2O: cwt per acre					
0.3	65.1	63.9	63.3	48.9	60.3
0.9	63.2	66.1	70.8	62.0	65.5

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

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CONCENTRATED FERTILISERS ROTATION

(CF)

Concentrated compound fertiliser and forms of N - West Barnfield I 1963, the fourth year - Barley.

Rotation: 1960 - 1962: kale, ryegrass, barley in all phases.
1963: All blocks sown to barley.

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

Area of each plot: 0.0174 acres. Area harvested: 0.0105 acres.

Treatments. 1960 - 1962 (per acre): No fertiliser (C)

- P_2O_5 and K_2O each at 0.3 cwt to barley and each at 1.0 cwt to kale and ryegrass, as triple superphosphate and potassium bicarbonate (B)
- Compound fertiliser, 20% N, 10% P_2O_5, 10% K_2O at 0.3(1), 0.6(2) cwt N to barley and 1.0(1), 2.0(2) cwt N to kale and ryegrass (F)
- Sulphate of ammonia, granular superphosphate and muriate of potash at rates equivalent to treatments F(1) and (2) (P)
- PK as treatment B plus
  - Sulphate of ammonia (S)
  - Calcium nitrate (C)
  - Urea (U)
  - Ammonium nitrate (A)

  each at rates 1 and 2 of N.

Basal dressing to barley 1963: 0.6 cwt N per acre as 'Nitro-Chalk' combine drilled.

Cultivations, etc.: Ploughed (after barley): Sept 13, 1962. Ploughed (after kale and ryegrass): Mar 20, 1963. Seed drilled at 2 bushels per acre: Apr 19. Undersown with grass and clover: May 8. Combine harvested: Sept 14. Variety: Proctor.

Note: For details of the previous years' results see 'Results of the Field Experiments' 60/B/8, 61/B/7 and 62/B/7.

Standard error per plot.
Grain (at 85% dry matter): 2.21 cwt per acre or 5.9% (39 d.f.)

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Summary of Results

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

1960 1961 1962	Previous crop Kale Ryegrass Barley	Ryegrass Barley Kale	Barley Kale Ryegrass	Mean
Fertiliser		(±1.57)*		(±0.90)
O	37.2	39.6	27.3	34.7
B	39.4	38.3	27.7	35.1
F1	38.5	39.9	30.7	36.4
F2	40.8	37.3	36.3	38.2
P1	41.5	40.2	29.8	37.2
P2	38.7	39.1	36.3	38.0
S1	44.1	37.8	29.7	37.2
S2	39.0	36.4	34.9	36.8
C1	43.2	38.0	30.7	37.3
C2	41.4	41.2	36.1	39.6
U1	43.8	41.0	30.2	38.3
U2	41.1	40.7	34.1	38.6
A1	41.3	38.9	28.7	36.3
A2	39.5	42.5	36.8	39.6
Mean	40.7	39.4	32.1	37.4

*For use in vertical and interaction comparisons only.

Mean dry matter % as harvested: 82.1

For explanation of treatment symbols see page 63/B/7.1

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63/B/8.1

RESIDUAL PHOSPHATE ROTATION

(RP)

The long term and residual effects of a number of phosphate fertilisers compared with superphosphate - Great Field IV and Sawyers I 1963, the fourth year.

Rotation: Potatoes, barley, swedes.

Note: Swede tops are ploughed in.

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

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

Treatments:
Granular superphosphate treatments broadcast in spring before sowing or ridging:-

1. No phosphate.
2. 0.25 cwt P_2O_5 per acre per year.
3. 0.50 cwt P_2O_5 per acre per year.
4. 0.75 cwt P_2O_5 per acre in 1962.
5. 1.50 cwt P_2O_5 per acre in 1962.

Phosphate fertilisers ploughed in at 3.0 cwt P_2O_5 per acre in September 1959.

6. Nitrophosphate I (17.1% P_2O_5, none water soluble).
7. Nitrophosphate II (18.8% P_2O_5, one quarter water soluble).
8. Nitrophosphate III (22.4% P_2O_5, half water soluble).
9. Gafsa rock phosphate (28.9% P_2O_5).
10. Bessemer basic slag (15.2% P_2O_5).
11. Potassium metaphosphate (57.9% P_2O_5, 38.8% K_2O).
12. Granular superphosphate (20.4% P_2O_5).

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

Basal dressings per acre: Broadcast in spring before sowing or ridging:
N as 'Nitro-Chalk' 21:-
To potatoes: 1.2 cwt, to barley: None on Great Field IV, 0.6 cwt on Sawyers I, to swedes: 0.5 cwt.
K_2O as sulphate of potash:-
To potatoes: 1.0 cwt, to barley: 1.0 cwt, to swedes: 1.0 cwt.

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Cultivations, etc. (both fields, except as indicated): Ploughed:
Great Field IV - Mar 27, 1963, Sawyers I - Apr 3.
Potatoes: Fertilisers applied, potatoes planted: May 7, 1963.
Earthed up: Great Field IV - June 28, Sawyers I - July 4.
Sprayed with maneb at 1.2 lb in 20 gallons per acre: July 10.
Great Field IV sprayed with copper oxychloride fungicide at 2.3 lb copper plus 0.35 pints menazon in 20 gallons per acre: Aug 14.
Sawyers I sprayed with copper oxychloride fungicide at 2.3 lb copper in 40 gallons per acre: Sept 3. Sprayed with undiluted BOV at 16 gallons per acre: Sept 23. Lifted: Oct 14. Variety: Majestic.
Barley: Fertilisers applied: Apr 11, 1963. Seed drilled at 2 bushels per acre: Apr 13. Sprayed with mecoprop/2,4-D at 6 pints in 40 gallons per acre: June 12. Combine harvested: Sept 13. Variety: Proctor.
Swedes: Ground chalk applied to Sawyers I at 23 cwt per acre: Apr 23, 1963. Fertilisers applied: Sawyers I - May 18, Great Field IV - May 21. Seed drilled at 1.5 lb per acre: May 22. Singled: July 3. Lifted: Nov 6. Variety: Wilhelmsburger.

Note: For details of previous years' results see 'Results of the Field Experiments' 60/B/9, 61/B/8 and 62/B/8.

Standard errors per plot.
Sawyers I
Potatoes, Total tubers: 0.695 tons per acre or 7.7% (11 d.f.)
Barley, Grain (at 85% dry matter): 1.71 cwt per acre or 4.4% (11 d.f.)
Swedes, Roots: 2.125 tons per acre or 11.1% (11 d.f.)

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63/B/8.3

Summary of Results

Potatoes

Phosphate		Total tubers: tons per acre				Percentage ware (1.5 inch riddle)			
		Great Field IV		Sawyers I		Great Field IV		Sawyers I	
		Mean	Increase	Mean	Increase	Mean	Increase	Mean	Increase
				(±0.491)	(±0.695)				
None	1	11.26		7.75		95.5		93.7	
	2	12.35	+1.09	9.01	+1.26	93.2	-2.3	93.5	-0.2
	3	13.49	+2.23	8.97	+1.22	94.5	-1.0	94.6	+0.9
	4	10.81	-0.45	8.05	+0.30	95.0	-0.5	94.3	+0.6
	5	12.45	+1.19	8.88	+1.13	93.6	-1.9	93.0	-0.7
	6	13.11	+1.85	9.52	+1.77	93.4	-2.1	94.3	+0.6
	7	12.42	+1.16	9.09	+1.34	93.0	-2.5	94.0	+0.3
	8	12.49	+1.23	9.65	+1.90	93.9	-1.6	94.7	+1.0
	9	12.75	+1.49	9.03	+1.28	94.8	-0.7	94.8	+1.1
	10	12.93	+1.67	9.25	+1.50	96.0	+0.5	95.6	+1.9
	11	12.40	+1.14	9.35	+1.60	94.5	-1.0	94.2	+0.5
	12	11.55	+0.29	9.31	+1.56	95.6	+0.1	93.4	-0.3
Mean		12.33		8.99		94.4		94.1	

Barley

Phosphate		Grain (at 85% dry matter): cwt per acre				Straw (at 85% dry matter): cwt per acre			
				(±1.21)	(±1.71)				
None	1	25.1		35.5		21.9		22.9	
	2	33.9	+8.8	40.1	+4.6	29.6	+7.7	29.3	+6.4
	3	27.9	+2.8	38.5	+3.0	30.6	+8.7	27.8	+4.9
	4	34.2	+9.1	37.7	+2.2	30.6	+8.7	26.7	+3.8
	5	35.5	+10.4	38.3	+2.8	31.1	+9.2	26.0	+3.1
	6	30.3	+5.2	36.9	+1.4	27.0	+5.1	25.2	+2.3
	7	30.6	+5.5	39.6	+4.1	29.6	+7.7	30.1	+7.2
	8	25.8	+0.7	39.9	+4.4	29.9	+8.0	27.7	+4.8
	9	34.5	+9.4	39.7	+4.2	32.4	+10.5	26.6	+3.7
	10	25.8	+0.7	38.9	+3.4	24.4	+2.5	28.9	+6.0
	11	32.0	+6.9	38.2	+2.7	31.3	+9.4	30.6	+7.7
	12	33.4	+8.3	39.4	+3.9	27.2	+5.3	27.4	+4.5
Mean		30.8		38.5		28.8		27.4	

Mean dry matter % as harvested	78.8	80.1	62.2	75.6

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Phosphate		Great Field IV Mean	Great Field IV Increase	Sawyers I Mean	Sawyers I Increase
Swedes, Roots: tons per acre					
				(±1.503)	(±2.125)
None	1	11.81		11.24	
	2	20.65	+8.84	19.87	+8.63
	3	25.28	+13.47	23.24	+12.00
	4	18.20	+6.39	16.06	+4.82
	5	28.75	+16.94	21.66	+10.42
	6	24.40	+12.59	21.47	+10.23
	7	25.56	+13.75	21.51	+10.27
	8	23.89	+12.08	21.20	+9.96
	9	23.66	+11.85	17.24	+6.00
	10	22.18	+10.37	19.89	+8.65
	11	21.44	+9.63	18.69	+7.45
	12	23.80	+11.99	17.49	+6.25
Mean		22.47		19.13	

For explanation of treatment symbols see page 63/B/8.1

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63/B/9.1

N LEVELS AND RESIDUES ROTATION

(NL)

Direct and residual effects of sulphate of ammonia - Long Hoos III 1963, the fourth year.

Rotation: Wheat, potatoes.

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

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

Treatments. All combinations of:-
Nitrogen at 3 levels in 1963.
Nitrogen at 3 levels in 1960, and repeated on the same plots in 1962.
Nitrogen at 3 levels in 1961.
To wheat: None, 0.5, 1.0 cwt N per acre.
To potatoes: None, 0.75, 1.50 cwt N per acre.
The nitrogen was applied as sulphate of ammonia.

Note: Ground chalk in addition to basal dressing was applied at 1 cwt for each cwt of sulphate of ammonia applied during the years 1960, 1961 and 1962.

Basal dressings (per acre):
To wheat: 2.25 cwt compound fertiliser (14% P_2O_5, 28% K_2O), combine drilled.
To potatoes: 5 cwt compound fertiliser (14% P_2O_5, 28% K_2O), broadcast on flat.

Cultivations, etc.:
Wheat: Corrective dressings of ground chalk applied: Oct 11, 1962. Basal ground chalk applied at 30 cwt per acre: Oct 22. Ploughed: Nov 15. Seed drilled at 3.25 bushels per acre: Dec 17. Sulphate of ammonia applied: Apr 26, 1963. Sprayed with mecoprop/2,4-D at 3.2 pints in 40 gallons per acre: May 21. Combine harvested: Sept 10. Variety: Cappelle.
Potatoes: Corrective dressings of ground chalk applied: Oct 11, 1962. Basal ground chalk applied at 30 cwt per acre: Oct 22. Ploughed: Nov 14. Basal fertiliser broadcast on flat: Apr 30, 1963. Sulphate of ammonia applied: May 4. Potatoes planted: May 6. Earthed up:

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June 27. Sprayed with maneb at 1.2 lb in 20 gallons per acre: July 11. Sprayed with copper oxychloride fungicide at 2.3 lb copper in 20 gallons per acre: Sept 3. Sprayed with undiluted BOV at 16 gallons per acre: Sept 12. Lifted: Oct 8. Variety: Majestic.

Note: For details of the previous years' results see 'Results of the Field Experiments' 60/B/10, 61/B/9 and 62/B/9.

Standard errors per plot.
Wheat, Grain (at 85% dry matter): 2.60 cwt per acre or 7.9% (15 d.f.)
Potatoes, Total tubers: 0.566 tons per acre or 4.8% (15 d.f.)

Summary of Results

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

N: cwt per acre in 1961	N: cwt per acre in 1960 and 1962			N: cwt per acre in 1963			Mean
	None	0.75	1.50	None	0.5	1.0	
	(±1.50)			(±1.50)			(±0.87)
None	29.8	30.7	36.8	25.1	33.2	38.9	32.4
0.5	28.3	32.5	36.7	26.0	30.5	41.1	32.5
1.0	28.2	35.0	38.2	27.9	34.8	38.8	33.8
	N: cwt per acre in 1960 and 1962						
		None		19.9	30.7	35.7	28.8
		0.75		27.2	32.1	38.9	32.7
		1.50		31.9	35.7	44.2	37.3
		Mean (±0.87)		26.3	32.8	39.6	32.9

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Potatoes

N: cwt per acre in 1961	N: cwt per acre in 1960 and 1962			N: cwt per acre in 1963			Mean
	None	0.5	1.0	None	0.75	1.50	
	Total tubers: tons per acre						
	(±0.327)			(±0.327)			(±0.189)
None	11.19	11.54	12.06	8.62	12.44	13.72	11.59
0.75	11.44	11.89	12.26	8.80	12.52	14.27	11.86
1.50	12.35	11.54	12.43	8.84	13.45	14.03	12.10
	N: cwt per acre in 1960 and 1962						
	None			8.21	12.43	14.34	11.66
	0.5			8.67	12.87	13.42	11.65
	1.0			9.38	13.11	14.26	12.25
	Mean (±0.189)			8.75	12.80	14.01	11.85
	Percentage ware (1.5 inch riddle)						
None	95.1	94.3	94.9	93.2	95.3	95.9	94.8
0.75	94.6	95.7	95.5	94.0	95.8	95.9	95.2
1.50	94.7	96.1	95.3	94.1	95.7	96.2	95.3
	N: cwt per acre in 1960 and 1962						
	None			93.7	95.3	95.3	94.8
	0.5			93.8	95.8	96.5	95.4
	1.0			93.8	95.7	96.1	95.2
	Mean			93.8	95.6	96.0	95.1

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63/B/10.1

CULTIVATION - WEEDKILLER ROTATION

(CW)

Great Harpenden I 1963, the third year

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

For previous history, rotation treatments etc., see 'Numerical Results of the Field Experiments' 61/B/10 and 62/B/10.

Area harvested (acres): Winter beans - 0.0201. Spring wheat, potatoes, barley - 0.0107.

The weedkiller used on potatoes is now a mixture of 2 lb prometryne and 0.75 lb paraquat in 40 gallons per acre. X and Y treatments for potatoes were identical.

Basal dressings per acre: Spring wheat and barley: 2.5 cwt compound fertiliser, 20% N, 10% P_2O_5, 10% K_2O. Potatoes and beans, as 1961.

Operations in 1963

Note: Spring wheat was again sown instead of winter wheat.

Cultivations, etc.:

Winter beans: R plots rotary cultivated, T plots rigid-tine cultivated 3 times: Oct 22, 1962. R plots rotary cultivated second time: Oct 23. P and reserve plots ploughed: Oct 25. T, P and reserve plots spring-tine cultivated twice: Oct 29, Nov 30. Seed drilled at 275 lb per acre, all plots spring-tine cultivated: Dec 1. X and Y* plots sprayed with simazine: Dec 19. Y* plots sprayed with simazine: Apr 19, 1963. M and reserve plots tractor hoed twice: May 21, May 29. All plots sprayed with menazon at 5.6 fluid oz in 40 gallons per acre: June 22. Combine harvested: Oct 5. Variety: Pedigree.

Spring wheat: Sprayed with dalapon at 7.4 lb in 40 gallons per acre: Oct 20, 1962 and again at 3.7 lb in 40 gallons per acre: Oct 30. T plots rigid-tine cultivated twice, P and reserve plots ploughed: Apr 3, 1963. T, P and reserve plots spring-tine cultivated: Apr 18. R plots rotary cultivated, T, P and reserve plots spring-tine harrowed, seed drilled at 3 bushels per acre: Apr 19. Rolled: May 8. H sub plots and reserve plots sprayed with methoxychlorobenzoic acid/MCPA (MBA/MCPA) at 4 pints in 40 gallons per acre: June 6. Combine harvested: Sept 19. Variety: Jufy I.

Potatoes: R plots rotary cultivated, T plots rigid-tine cultivated twice: Oct 22, 1962. P and reserve plots ploughedd: Oct 25. T, P and reserve plots spring-tine cultivated: Apr 25, 1963. R plots

* half-rate

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rotary cultivated: Apr 27. Basal compound fertiliser applied: Apr 30. T, P and reserve plots spring-tine cultivated, seed machine planted: May 3. Rolled: May 6. X and Y plots sprayed with prometryne at 2 lb plus paraquat at 0.75 lb in 40 gallons per acre, M plots chain harrowed: May 31. M and reserve plots grubbed: June 7. M and reserve plots mechanially weeded and grubbed: June 17. Reserve plots earthed up: June 26. M and ME sub-plots earthed up (round and pointed ridges), E sub-plots of X and Y plots grubbed twice and earthed up: June 28. Sprayed with maneb at 1.2 lb in 20 gallons per acre: July 19. Sprayed with copper oxyhloride fungicide at 2.3 lb Cu in 20 gallons per acre: Sept 4. Sprayed with undiluted BOV at 16 gallons per acre: Sept 13. Lifted: Oct 23. Variety: Majestic.

Barley: All plots spring-tine cultivated twice: Nov 27, 1962, Mar 27, 1963. T plots rigid-tine cultivated: Apr 3. P and reserve plots ploughed: Apr 4. All plots except R plots disc-harrowed: Apr 11. R plots rotary ultivated, P and reserve plots spring-tine cultivated: Apr 19. T, P and reserve plots spring-tine harrowed, seed drilled at 2 bushels per acre: Apr 20. Rolled: May 8. H sub-plots and reserve plots sprayed with methoxychloro-benzoic aid/MCPA (MBA/MCPA) at 4 pints in 40 gallons per acre: June 6. Combine harvested: Sept 7. Variety: Proctor.

Standard errors per plot:

Winter beans, grain (at 85% dry matter): 3.63 cwt per acre or 10.9% (9 d.f.)

Spring wheat, grain (at 85% dry matter):
- Whole plot: 2.42 cwt per acre or 6.6% (15 d.f.)
- Sub plot: 2.00 cwt per are or 5.4% (18 d.f.)

Potatoes, total tubers:
- Whole plot: 0.752 tons per acre or 5.5% (15 d.f.)
- Sub plot: 0.456 tons per acre or 3.3% (18 d.f.)

Barley, grain (at 85% dry matter):
- Whole plot: 1.91 cwt per acre or 4.5% (12 d.f.)
- Sub plot: 3.28 cwt per acre or 7.8% (15 d.f.)

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Summary of Results

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

Treatment after planting	Initial cultivation P	R	T	Mean
		(±2.57)		(±1.48)
M	39.1	27.5	31.5	32.7
X	33.8	33.9	29.7	32.4
Y	33.0	32.5	34.8	33.4
Mean (±1.48)	35.3	31.3	32.0	32.8

Reserve plots: 36.5 (±1.82)
General mean: 33.5

Mean dry matter % as harvested: 68.2

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

	Initial cultivation P	R	T	Mean
Mean (±0.99)	36.3	36.7	35.6	36.2
Treatment in 1962				
M (±1.71)	35.4	36.4	36.4	36.1 (±0.99)
X (±1.21)	36.8	36.8	35.2	36.2 (±0.70)
Spray in 1963				
		(±1.14)*		
-	37.5	36.3	35.4	36.4
H	35.2	37.1	35.7	36.0
Diff (±1.15)	-2.3	+0.8	+0.3	-0.4 (±0.67)

Reserve plots: 38.8 (±0.99)
General mean: 36.8

Mean dry matter % as harvested: 79.0

* For use in horizontal and diagonal comparisons only

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Potatoes

Treatment after planting	Initial cultivation P	R	T	Mean	Not earthed up	Earthed up
				Total tubers: tons per acre		
					(±0.186)(1)	(±0.293)(2)
M (±0.532)	14.58	13.37	13.88	13.94 (±0.307)	13.90	13.98
X (±0.376)	13.40	13.90	13.84	13.70 (±0.217)	13.48	13.94
					(±0.132)(1)	(±0.262)(2)
Mean (±0.307)	13.79	13.72	13.85	13.79		

Reserve plots: 13.77 (±0.307)
General mean: 13.78

Percentage ware (1.5 inch riddle)

M	94.8	95.6	95.8	95.4	95.1	95.7
X	95.0	94.8	95.2	95.0	94.7	95.2
Mean	94.9	95.1	95.4	95.1		

Reserve plots: 95.9
General mean: 95.3

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

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63/B/10.5

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

	Initial cultivation			
	P	R	T	Mean
Mean (±0.78)	42.9	39.8	41.9	41.5
Treatment in 1962		(±1.35)		(±0.78)
M	42.8	39.2	43.6	41.8
X	41.4	40.8	41.6	41.2
Y	44.6	39.4	40.5	41.5
Spray in 1963		(±1.22)*		
-	42.8	40.7	40.2	41.2
H	43.0	38.8	43.6	41.8
Diff (±1.89)	+0.2	-1.9	+3.4	+0.6 (±1.09)

Reserve plots: 44.0 (±0.78)
General mean: 42.1

Mean dry matter % as harvested: 71.8

* For use in horizontal and diagonal comparisons

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63/B/11.1

CULTIVATION - WEEDKILLER ROTATION

(WCW)

A comparison of weed control by various cultivation methods and by a pre-emergence weedkiller - Woburn Great Hill I and II 1963, the fourth year.

For history, rotation etc., see 'Numerical Results of the Field Experiments' 60/B/11, 61/B/11 and 62/B/11.

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

Treatments.

Potatoes: All combinations of:-

Initial cultivations: Ploughed (P), rotary cultivated (R), rigid-tine cultivated (T).

Treatments after planting: Normal cultivations (M), prometryne* plus paraquat* applied immediately before crop emergence (S) - duplicate plots.

Barley: All combinations of:-

Initial cultivations: As for potatoes.

Prometryne to potatoes 1962: None (O), after planting (X), after early cultivations (Y).

*Prometryne at 2 lb, plus 0.75 lb paraquat, in 40 gallons per acre.

Basal dressings per acre:

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

Barley: 3.5 cwt compound fertiliser (16% N, 9% P_2O_5, 9% K_2O) combine drilled.

Cultivations, etc.:

Potatoes: T plots rigid-tine cultivated twice: Nov 6, 1962. R plots rotary cultivated (one stroke), P plots ploughed: Nov 9. Ground chalk applied at 62 cwt per acre: Feb 20, 1963. P and T plots spring-tine cultivated: Apr 18. Basal dressing applied: Apr 22. P and T plots spring-tine cultivated: Apr 23. R plots rotary cultivated, potatoes machine planted: Apr 24. Ridges rolled: Apr 27. M plots chain harrowed: May 9. Prometryne and paraquat treatment applied: May 24. M plots grubbed: May 25 and June 18. M plots earthed up: June 24. Sprayed with copper oxychloride fungicide at 2.3 lb Cu in 20 gallons per acre: July 25, and again at the same rate, plus 0.35 pints of menazon (against aphids) in

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30 gallons per acre: Aug 22. Haulm destroyed with diquat at 0.9 pints in 40 gallons per acre: Sept 23. Lifted: Oct 10. Variety: Majestic.

Barley: T plots rigid-tine cultivated on 2 occasions: Nov 6 and 9, 1962. R plots rotary cultivated, P plots ploughed: Nov 9. Ground chalk applied at 62 cwt per acre: Feb 20, 1963. P and T plots spring-tine cultivated, R plots rotary cultivated: Apr 11. Seed drilled at 2.3 bushels per acre: Apr 18. Sprayed with mecoprop/2,4-D at 6 pints in 40 gallons per acre: May 21. Combine harvested: Sept 9. Variety: Proctor.

Standard errors per plot.

Potatoes, total tubers: 1.702 tons per acre or 13.5% (11 d.f.)

Barley, grain (at 85% dry matter): 1.63 cwt per acre or 6.7% (8 d.f.)

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Summary of Results

Potatoes

Treatments after planting	Initial cultivation P	R	T	Mean
Total tubers: tons per acre				
M (±1.204)	11.48	11.86	10.89	11.41 (±0.695)
S (±0.851)	13.04	12.54	14.14	13.24 (±0.491)
Mean (±0.695)	12.52	12.31	13.05	12.63
Percentage ware (1.5 inch riddle)				
M	81.0	80.5	80.5	80.6
S	82.9	81.4	85.8	83.4
Mean	82.3	81.1	84.0	82.4

Barley

Prometryne to potatoes 1962	Initial cultivation P	R	T	Mean
Grain (at 85% dry matter): cwt per acre				
		(±1.15)		(±0.67)
O	24.4	24.4	23.6	24.2
X	25.8	24.8	24.3	25.0
Y	23.6	23.7	23.1	23.5
Mean (±0.67)	24.6	24.3	23.7	24.2

Mean dry matter % as harvested: 79.4

For explanation of treatment symbols see page 63/B/11.1