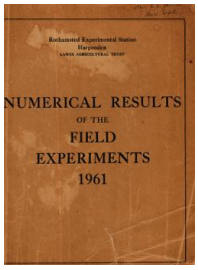
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ROTHAMSTED RESEARCH

Yields of the Field Experiments 1961

Full Table of Content



Long-term Experiments

Rothamsted Research

Rothamsted Research (1962) *Long-term Experiments ;* Yields Of The Field Experiments 1961, pp 25 - 87 **- DOI: https://doi.org/10.23637/ERADOC-1-182**

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LEY AND ARABLE ROTATIONS

Highfield and Fosters Field 1961 - the 13th year.

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

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

Test crops: For new sub plot treatments see below.

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

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

Revised basal fertiliser applications:

Basal dressings in cwt per acre

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

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Basal dressings in cwt per acre

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

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

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

Highfield: 0.0; 0.3; 0.6; 0.9N.

Fosters: 0.0; 0.4; 0.8; 1.2N

Potatoes:

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

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

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

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

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

Phosphate: 0.9; 1.8 P_2O_5 as superphosphate.

Potash: 0.9; 1.8 K_2O as muriate of potash.

Barley:

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

Highfield: 0.0; 0.2 N (all rotations)

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

0.3; 0.6N (arable rotation)

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

Phosphate: 0.9; 0.0 P_2O_5 as superphosphate.

Potash: 0.9; 0.0 K_2O as muriate of potash.

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

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Cultivations, etc.:

HIGHFIELD

1st year Treatment Crops

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

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

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

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

2nd year Treatment Crops

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

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

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

Sugar beet. Ploughed 3 times: June 30, Aug 26 and Dec 15, 1960. Corrective sulphate of potash applied: Jan 24, 1961. Muriate of potash applied: Mar 18. Basal NPK compound (8% N, 8% P_2O_5, 8% K_2O) applied: Mar 21. Seed drilled at 8½ lb per acre: Mar 22. Singled: May 17. Sprayed with demeton methyl at 12 fluid oz in 60 gallons per acre: June 14. Lifted: Nov 3. Variety: Klein E (rubbed and graded seed).

3rd year Treatment Crops

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

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

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

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

1st Test Crop, Wheat

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

2nd Test Crop, Potatoes

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

3rd Test Crop, Barley

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

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

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

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

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

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

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

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

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

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

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

FOSTERS

1st year Treatment Crops

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

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

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

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

2nd year Treatment Crops

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

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

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

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

3rd year Treatment Crops

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

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

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

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

1st Test Crop, Wheat

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

2nd Test Crop, Potatoes

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

3rd Test Crop, Barley

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

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

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

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

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

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

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

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

*2 missing values.

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Summary of Results

Wheat 1st test crop

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

*For use in vertical and interaction comparisons only.

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61/B/1.9

Wheat 1st test crop

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

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Wheat 1st test crop

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

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Wheat 1st test crop

N: cwt per acre	Excluding Lucerne: N to previous treatment crop: Single rate	Excluding Lucerne: N to previous treatment crop: Double rate	Excluding Lucerne: Mean	Arable with hay only: Dung to potatoes 1959: tons per acre: None	Arable with hay only: Dung to potatoes 1959: tons per acre: 12	Arable with hay only: Mean
Straw (at 85% dry matter): cwt per acre						
Highfield						
To test crop						
None	26.2	28.2	27.2	26.4	28.0	27.2
0.3	39.0	39.4	39.2	34.0	37.7	35.8
0.6	48.4	53.6	51.0	49.2	52.4	50.8
0.9	51.5	51.7	51.6	53.4	54.4	53.9
Mean	41.3	43.2	42.2			
To previous treatment crop						
Single rate				41.1	42.0	41.5
Double rate				40.4	44.3	42.3
Mean				40.7	43.1	41.9

Mean dry matter % as harvested: 82.1

Fosters

To test crop						
None	12.4	12.6	12.5	15.0	13.4	14.2
0.4	33.5	32.3	32.9	34.3	37.6	35.9
0.8	41.2	38.4	39.8	46.4	46.4	46.4
1.2	43.1	44.1	43.6	48.8	50.7	49.8
Mean	32.5	31.9	32.2			
To previous treatment crop						
Single rate				35.6	39.1	37.3
Double rate				36.7	35.0	35.8
Mean				36.1	37.0	36.6

Mean dry matter % as harvested: 80.3

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61/B/1.12

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

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

*Including basal dressing

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61/B/1.13

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

Highfield (no dung plots only)

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

Fosters

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

*Including basal dressing

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

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

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

*Including basal dressing.

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61/B/1.15

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

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

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

*Including basal dressing

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

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

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

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

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61/B/1.17

Treatment crops Arable and Hay rotation

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

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

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Cut grass. Dry matter: cwt per acre

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

Lucerne. Dry matter: cwt per acre

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

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

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

Permanent grass. Dry matter: cwt per acre

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

*Aftermath grazing

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61/B/1.20

Reseeded grass. Dry matter: cwt per acre

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

*Aftermath grazing

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61/B/2.1

REFERENCE PLOTS -

ROTHAMSTED (R) GREAT FIELD IV

WOBURN (W) STACKYARD SERIES C 1961

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

Cultivations, etc.:

Great Field IV (R):-

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

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

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

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

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

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

Stackyard Series C (W):-

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

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

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

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

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

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

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

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

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Summary of Results

Great Field IV (R): Original plots

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

64/B/2.3

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Great Field IV (R): Additional plots

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

61/B/2.4

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Stackyard Series C (W)

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

61/B/2.5

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GREEN MANURING EXPERIMENT

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

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

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

Cultivations, etc.:

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

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

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

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

Standard errors per plot.

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

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

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

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

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61/B/3.2

Summary of Results

Early potatoes, total tubers: tons per acre

	Straw: tons per acre		N: cwt per acre (including basal)		Dung to cabbages 1953: tons per acre		Mean
	None	1½	0.6	1.2	None	10	
Excluding plots fallow under old scheme							
Undersown green manures for potatoes	(±0.071)		(±0.071)		(±0.071)		(±0.050)
None	1.88	1.81	1.77	1.92	1.88	1.80	1.84
	(±0.100)		(±0.100)		(±0.100)		(±0.071)
Trefoil	1.97	2.01	1.95	2.03	2.08	1.90	1.99
Ryegrass	2.15	2.15	2.15	2.16	1.94	2.36	2.15
Straw: tons per acre			(±0.071)		(±0.071)		(±0.050)
None			1.88	2.06	1.96	1.98	1.97
1½			1.93	1.95	1.94	1.95	1.94
N: cwt per acre (including basal)							
0.6					1.90	1.92	1.91
1.2					2.00	2.01	2.01
Mean (±0.050)					1.95	1.97	1.96
Plots fallow under old scheme							
Straw: tons per acre			(±0.142)		(±0.142)		(±0.100)
None			1.88	1.63	1.66	1.85	1.75
1½			1.74	1.91	1.85	1.80	1.82
N: cwt per acre (including basal)							
0.6					1.67	1.95	1.81
1.2					1.84	1.70	1.77
Mean (±0.100)					1.75	1.82	1.79

Undersown green manures for potatoes

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

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

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

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

Mean dry matter % as harvested: 82.9

Plots fallow under old scheme

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

61/B/3.3

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LEY AND ARABLE ROTATIONS

Woburn Stackyard 1961 - the 24th year.

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

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

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

Cultivations, etc.,

Treatment crops

Ley rotations

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

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

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

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

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

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

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Arable rotations

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

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

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

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

Test crops

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

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

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Standard errors per plot. Test crops.

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

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Summary of Results

Treatment crops

Ley, sheep days of grazing per acre

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

Lucerne, dry matter: cwt per acre

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

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Treatment crops

	Potatoes		Rye	
	Total tubers: tons per acre	Percentage ware (1⅝" riddle)	Grain: (at 85% D.M.) cwt per acre	Straw: cwt per acre
Dung: tons per acre				
None	11.38	97.6	24.8	37.8
15*	13.34	97.4	25.3	39.8
Difference	+1.96	-0.2	+0.5	+2.0
Previous rotation				
Ley	13.65	97.9	26.8	39.3
Lucerne	13.40	97.4	25.8	41.0
Arable with hay	10.74	96.5	22.4	35.8
Arable with roots	11.67	98.0	25.2	39.3
Mean	12.36	97.5	25.1	38.8

Hay

Yield, dry matter: cwt per acre

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

Carrots

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

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

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

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1st Test crop

Sugar beet

Previous rotation

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

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1st Test Crop

Sugar beet

Previous rotation

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

*For use in horizontal and diagonal comparisons only.

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1st Test Crop

Sugar beet

Plots receiving no additional N or K

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

*For use in horizontal and diagaonal comparisons only.

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2nd Test Crop

Barley

Previous rotation

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

*For use in horizontal and diagonal comparisons only.

Mean dry matter % as harvested: Grain 82.8
Straw 80.8

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61/B/5.1

WOBURN MARKET GARDEN EXPERIMENT

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

Revised treatments commencing 1961:-

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

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

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

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

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

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

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

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

Cultivations, etc.:

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

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

Standard errors per plot.

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

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Summary of Results

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

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

+Excluding 'no organics'.

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

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

(1) For use in vertical and diagonal comparisons

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

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

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

*½½½ NPK ploughed in in seedbed.

(1) For use in vertical and diagonal comparisons.

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

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

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

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

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

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

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61/B/6.1

IRRIGATION EXPERIMENT

The 11th year - revised 1960

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

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

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

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

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

Rainfall and Irrigation: inches

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

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Cultivations, etc.:

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

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

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

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

Standard errors per plot.

Early potatoes, total tubers

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

Barley, (grain at 85% dry matter)

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

Spring beans, (grain at 85% dry matter)

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

Cut grass, dry matter. Total of 6 cuts

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

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Summary of Results

Early potatoes, Total tubers: tons per acre

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

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

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

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

Mean dry matter % as harvested: 82.3

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

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

Mean dry matter % as harvested: 77.9

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

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Cut grass, Dry matter: cwt per acre

Total of 6 cuts

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

Mean dry matter % as cut: 22.9

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

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CONCENTRATED FERTILISER ROTATION

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

Rotation: Kale, ryegrass, barley.

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

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

Treatments (per acre): No fertiliser (0)

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

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

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

PK as treatment B plus

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

Basal dressing: None.

Cultivations, etc.: Ploughed: Jan 11, 1961. Fertilisers broadcast for barley, barley drilled at 2½ bushels per acre: Mar 13. Fertilisers broadcast for ryegrass, ryegrass sown at 30 lb per acre: Mar 17. Fertilisers applied for kale: Apr 11. Kale drilled at 3 lb per acre: Apr 24. Barley and ryegrass sprayed with CMPP at 6 pints in 40 gallons per acre: May 13. Grass cut: July 20. Barley combine harvested: Aug 16. Grass cut second time: Sept 26. Kale harvested: Nov 6 and 16. Varieties: Kale - Thousand head (Canson); ryegrass - S22; barley - Proctor.

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

Standard errors per plot.

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

Ryegrass dry matter:

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

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

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Summary of Results

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

Treatments

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

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61/B/8.1

RESIDUAL PHOSPHATE ROTATIONS

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

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

Rotation: Potatoes, Barley, Swedes.

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

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

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

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

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

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

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

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

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

Standard errors per plot:

Sawyers I

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

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

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

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

Summary of Results

Potatoes

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

(1) (±0.288)

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

(1) (±1.39)

Swedes, Roots: tons per acre

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

(1) (±0.587)

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61/B/9.1

N LEVELS AND RESIDUES ROTATION

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

Rotation: Wheat, potatoes.

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

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

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

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

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

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

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61/B/9.2

Summary of Results

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

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

Mean dry matter % as harvested: 84.9

Potatoes

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

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61/B/10.1

WEEDKILLER CULTIVATION ROTATION

Great Harpenden I - 1961

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

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

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

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

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

Treatments.

Whole plots: All combinations of:-

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

Treatments to individual crops:

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

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

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

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

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

Sub plots:

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

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

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

Basal dressings per acre:

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

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

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

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

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61/B/10.2

Operations in 1961: 1st year

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

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

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

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

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

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

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Standard error per plot.

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

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

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

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

Summary of Results

Spring beans

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

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

Reserve plots: 18.6 (±1.14)

Mean dry matter % as harvested: 82.6

Spring wheat

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

Reserve plots (PH): 36.0 (±0.49)

Mean dry matter % as harvested: 86.0

(1) For use in horizontal and interaction comparisons

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Potatoes

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

Reserve plots (PM): 12.57 (±0.516)

General mean 12.31

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

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

Reserve plots (PH): 95.5

General mean 95.6

Barley

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

Reserve plots (PH): 34.6 (±1.36)

Mean dry matter % as harvested: 84.7

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

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WEEDKILLER CULTIVATION ROTATION

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

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

Rotation (commencing 1960): Potatoes, barley.

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

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

Treatments:

Potatoes: All combinations of:-

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

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

Barley: All combinations of:-

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

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

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

Basal dressings per acre:

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

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

Cultivations, etc.

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

+Because of failure of Sx treatment.

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

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

Summary of Results

Potatoes

Cultivation before planting

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

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61/B/11.3

Barley

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

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

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