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Yields of the Field Experiments 1952

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Yields of the Field 1952

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STAT. DEPT.

Rothamsted Experimental Station
Harpenden
LAWES AGRICULTURAL TRUST

RESULTS
OF THE
FIELD
EXPERIMENTS
1952

Rothamsted Experimental Station

Harpenden

Lawes Agricultural Trust

RESULTS

of the

FIELD

EXPERIMENTS

1952

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

Price: 5/-

Index 1952

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*At Rothamsted unless otherwise stated.

52/A/1

WHEAT - BROADBALK 1952

The 109th year

For history, details of treatments etc. see "Results of the Field Experiments 1939-1947".

Cultivations, etc.:

Crop sections. Dung applied, ploughed all plots: Sept 7.
Autumn fertilizers applied: Oct 22. Seed drilled at $3\frac{1}{4}$ bushels per acre: Nov 5. Spring fertilizers applied: Apr 21. Second dressing of nitrate of soda applied to plot 16: May 13.
Harvested: Aug 22. Variety: Squareheads Master 13/4.
Fallow section. Ploughed: Sept 6, Apr 22, June 26 and Aug 27.

Summary of Results

| Section Years after Fallow | Grain: cwt per acre | | | | | Straw: cwt per acre | | | | |
|-------------------------------------|---------------------|------|------|------|------|---------------------|------|------|------|------|
| | I | III | IV | V | Mean | I | III | IV | V | Mean |
| | 1 | 2 | 3 | 4 | | 1 | 2 | 3 | 4 | |
| 2A | 22.7 | 20.8 | 26.0 | 24.2 | 23.4 | 40.8 | 38.2 | 44.8 | 43.4 | 41.8 |
| 2B | 23.8 | 21.8 | 26.3 | 25.1 | 24.2 | 45.4 | 42.4 | 44.6 | 42.5 | 43.7 |
| 3 | 18.2 | 9.7 | 10.1 | 9.8 | 12.0 | 36.7 | 13.5 | 14.1 | 13.9 | 19.6 |
| 5 | 22.1 | 10.4 | 11.4 | 10.8 | 13.7 | 39.4 | 16.0 | 18.9 | 20.5 | 23.7 |
| 6 | 21.2 | 17.2 | 16.9 | 16.8 | 18.0 | 40.9 | 27.0 | 31.2 | 30.9 | 32.5 |
| 7 | 25.7 | 21.7 | 20.8 | 18.8 | 21.8 | 44.4 | 41.8 | 43.9 | 41.2 | 42.8 |
| 8 | 23.1 | 25.3 | 24.4 | 23.8 | 24.2 | 44.8 | 48.4 | 51.0 | 47.6 | 48.0 |
| 9 | 22.3 | 17.8 | 18.6 | 18.2 | 19.2 | 40.5 | 34.5 | 39.6 | 36.8 | 37.8 |
| 10 | 16.7 | 20.2 | 21.3 | 17.9 | 19.0 | 30.3 | 35.1 | 37.1 | 31.6 | 33.5 |
| 11 | 19.3 | 18.7 | 21.9 | 18.5 | 19.6 | 32.6 | 30.2 | 35.8 | 33.1 | 32.9 |
| 12 | 22.8 | 22.4 | 20.0 | 19.6 | 21.2 | 38.8 | 36.2 | 36.2 | 34.4 | 36.4 |
| 13 | 23.0 | 23.9 | 21.5 | 16.1 | 21.1 | 43.9 | 42.1 | 36.9 | 33.5 | 39.1 |
| 14 | 20.6 | 23.4 | 22.7 | 17.6 | 21.1 | 39.0 | 37.5 | 38.0 | 31.7 | 36.6 |
| 15 | 23.0 | 18.1 | 17.6 | 15.4 | 18.5 | 38.6 | 34.0 | 31.9 | 32.2 | 34.2 |
| 16 | 22.0 | 24.3 | 23.9 | 21.1 | 22.8 | 44.5 | 44.2 | 45.2 | 41.2 | 43.8 |
| 17 | 22.0 | 21.0 | 22.1 | 20.6 | 21.4 | 40.1 | 38.3 | 40.7 | 41.7 | 40.2 |
| 18 | 16.9 | 9.8 | 9.4 | 8.0 | 11.0 | 26.3 | 14.2 | 13.7 | 13.2 | 16.8 |
| 19 | 21.6 | 17.8 | 14.8 | 16.9 | 17.8 | 38.4 | 30.7 | 25.0 | 31.1 | 31.3 |
| 20 | 16.9 | - | - | - | 16.9 | 30.1 | - | - | - | 30.1 |

52/A/2

BARLEY - HOOSFIELD 1952

The 101st year

For history, details of treatments etc. see "Results of Field Experiments 1939-47".

Cultivations, etc.: Ploughed: Sept 21, 1951. Dung applied: Dec 18, Ploughed: Dec 19, Fertilizers applied: Feb 27, 1952. Seed drilled at 3 bushels per acre: Feb 29. Sprayed with D.N.O.C. 1 gallon per acre: May 9. Harvested: Aug 1. Variety: Plumage Archer.

Note: Owing to a very heavy infestation by Wild Oats (*Avena Fatua*): the major part of each plot was cut and carted green before the oats ripened. The remainder (generally 1/25 - 1/50 acre) was left to ripen, and the yields shown are measured from these small areas.

Summary of Results

| Plot | Grain: cwt per acre | Straw: cwt per acre |
|-------|------------------------|------------------------|
| 1 C | 6.8 | 9.1 |
| 2 O | 12.2 | 8.7 |
| 3 O | 6.7 | 10.7 |
| 4 O | 11.9 | 12.3 |
| 5 O | 3.0 | 5.8 |
| 1 A | 13.5 | 18.5 |
| 2 A | 19.3 | 28.2 |
| 3 A | 13.1 | 19.5 |
| 4 A | 12.2 | 17.6 |
| 5 A | 16.1 | 28.2 |
| 1 AA | 13.0 | 20.5 |
| 2 AA | 15.6 | 35.9 |
| 3 AA | 11.9 | 25.3 |
| 4 AA | 16.2 | 22.8 |
| 1 AAS | 14.9 | 25.7 |
| 2 AAS | 21.5 | 37.0 |
| 3 AAS | 9.9 | 27.1 |
| 4 AAS | 19.6 | 23.9 |
| 1 C | 11.9 | 27.5 |
| 2 C | 16.8 | 20.8 |
| 3 C | 8.5 | 10.5 |
| 4 C | 17.0 | 20.3 |
| 7 - 1 | 6.3 | 11.2 |
| 7 - 2 | 18.0 | 20.1 |
| 6 - 1 | 5.2 | 5.7 |
| 6 - 2 | 6.9 | 7.5 |
| 1 N | 10.3 | 24.5 |
| 2 N | 15.8 | 25.0 |

52/A/3

WHEAT AFTER FALLOW - HOOSFIELD 1952

Without manure 1851 and since

For history, details of treatments etc., see "Results of Field Experiments 1939-47".

Cultivations, etc.:

Cropped plots. Ploughed: Sept 18, 1951. Seed drilled at 3 bushels per acre: Oct 19. Harvested: July 31, 1952.

Variety: Squareheads Master 13/4.

Fallow plots. Ploughed: Sept 18, 1951, Feb 8 and Sept 6, 1952.

Summary of Results

Mean yields: cwt per acre.

| Plot No. of years of fallow | A ₁ | A ₄ | A ₂ | Mean |
|--------------------------------------|----------------|----------------|----------------|------|
| | 1 | 1 | 3 | |
| Grain | 10.5 | 8.9 | 8.9 | 9.4 |
| Straw | 19.4 | 15.3 | 14.8 | 16.5 |

CROPS IN ROTATION - AGDELL 1952

Turnips - 1st crop of 27th course 1952-55

Owing to the repeated failures of the turnip crops of this experiment through club root disease, it was decided not to drill turnips, and the field was fallowed.

Cultivations, etc.: Ploughed: Sept 4, 1951, Feb 13, and Sept 5, 1952.

52/A/4.1

MANGOLDS AND SUGAR BEET - BARNFIELD 1952

The 77th and 7th years

For history, details of treatments etc, see "Results of the Field Experiments 1939-47".

Cultivations, etc.: Dung applied: Dec 13, 1951. Ploughed: Feb 13, 1952. Fertilizers applied: Apr 23. Seed drilled, mangolds - 9 lb per acre, sugar beet - 18 lb per acre: Apr 28. Sprayed with DDT emulsion: May 19 and again May 23. Singling commenced: June 18. Top dressings applied: July 8. Mangolds lifted: Nov 11 - Dec 20. Sugar beet lifted: Dec 22-30. Varieties: Mangolds - Yellow Globe, sugar beet - Klein E.

Summary of Results

| Strip | Cross Dressings | | | | |
|---------------------------------|-----------------|------------------------|-------|-------|-------|
| | O | N | A | AC | G |
| Mangolds, Roots: tons per acre | | | | | |
| 1 | 4.89 | 19.69 | 17.42 | 18.10 | 17.89 |
| 2 | 10.10 | 24.97 | 19.33 | 24.15 | 21.02 |
| 4 | 2.29 | (a) 15.23 (b) 18.54 | 9.45 | 14.56 | 16.94 |
| 5 | 1.72 | 15.15 | 6.21 | 8.06 | 10.96 |
| 6 | 1.51 | 13.65 | 8.91 | 15.46 | 15.07 |
| 7 | 1.26 | 14.66 | 11.92 | 18.98 | 15.90 |
| 8 | 0.87 | 6.75 | 4.75 | 2.41 | 4.60 |
| 9 | 10.19 | | | | |
| Mangolds, Leaves: tons per acre | | | | | |
| 1 | 1.47 | 6.41 | 5.72 | 4.82 | 5.43 |
| 2 | 3.23 | 7.39 | 6.09 | 6.36 | 4.45 |
| 4 | 0.98 | (a) 4.65 (b) 6.16 | 3.03 | 5.92 | 5.36 |
| 5 | 0.42 | 4.84 | 2.84 | 3.94 | 5.04 |
| 6 | 0.37 | 3.47 | 3.45 | 6.75 | 5.38 |
| 7 | 0.42 | 2.48 | 3.16 | 7.49 | 4.16 |
| 8 | 0.71 | 2.08 | 2.03 | 1.27 | 2.98 |
| 9 | 3.18 | | | | |

52/A/4-2

| Strip | Cross-Dressings | | | | |
|-------|-----------------|---|---|----|---|
| | O | N | A | AC | C |

Sugar Beet, Roots: tons per acre

| | | | | | |
|---|------|-----------|-------|-------|-------|
| 1 | 7.44 | 15.31 | 13.02 | 13.41 | 15.02 |
| 2 | 6.17 | 13.65 | 8.42 | 10.76 | 14.43 |
| 4 | 1.81 | (b) 11.60 | 8.37 | 13.31 | 11.94 |
| 5 | 1.22 | 9.64 | 3.91 | 5.38 | 7.05 |
| 6 | 1.17 | 8.12 | 6.90 | 11.35 | 9.20 |
| 7 | 0.87 | 10.42 | 9.20 | 13.26 | 9.54 |
| 8 | 1.27 | 5.87 | 5.28 | 6.07 | 5.38 |

Sugar Beet, Tops: tons per acre

| | | | | | |
|---|------|----------|-------|-------|-------|
| 1 | 4.11 | 11.01 | 15.17 | 15.76 | 7.19 |
| 2 | 3.57 | 12.87 | 8.61 | 12.48 | 10.23 |
| 4 | 0.98 | (b) 9.83 | 5.68 | 11.06 | 8.71 |
| 5 | 1.17 | 6.75 | 3.96 | 7.83 | 6.61 |
| 6 | 1.17 | 7.83 | 5.43 | 13.90 | 6.46 |
| 7 | 1.03 | 9.74 | 6.21 | 17.57 | 9.30 |
| 8 | 1.47 | 6.85 | 6.65 | 9.64 | 8.51 |

HAY - THE PARK GRASS PLOTS 1952

The 97th year

For history, details of treatments etc., see "Results of Field Experiments 1939-47."

Cultivations, etc.: Lime applied: Dec 17. Mineral fertilizers applied: Jan 11. Nitrogenous fertilizers applied: 1st dressing - Mar 10, 2nd dressing - Apr 15. 1st cut: June 19. 2nd cut: Sept 22.

Summary of Results

| Plot | Yield of Hay: cwt per acre | | | | | |
|------|----------------------------|----------|-------|----------|----------|-------|
| | Not limed | | | Limed | | |
| | 1st Crop | 2nd Crop | Total | 1st Crop | 2nd Crop | Total |
| 1 | 9.0 | 0.6 | 9.6 | 22.2 | 2.0 | 24.2 |
| 2 | 16.1 | 4.2 | 20.3 | 21.4 | 2.1 | 23.5 |
| 3 | 15.4 | 3.6 | 19.0 | 20.3 | 1.5 | 21.8 |
| 4-1 | 23.3 | 8.6 | 31.9 | 21.5 | 4.0 | 25.5 |
| 4-2 | 15.3 | 0.8 | 16.1 | 32.0 | 4.4 | 36.4 |
| 5-1 | 10.2 | 1.1 | 11.3 | | | |
| 5-2 | 21.2 | 4.6 | 25.8 | | | |
| 6 | 32.0 | 9.4 | 41.4 | | | |
| 7 | 28.5 | 10.1 | 38.6 | 40.8 | 12.9 | 53.7 |
| 8 | 28.4 | 6.4 | 34.8 | 22.0 | 3.0 | 25.0 |
| 9 | 44.1 | 2.9 | 47.0 | 50.4 | 6.6 | 57.0 |
| 10 | 15.7 | 2.0 | 17.7 | 38.8 | 6.0 | 44.8 |
| 11-1 | 43.6 | 10.9 | 54.5 | 59.1 | 10.4 | 69.5 |
| 11-2 | 61.3 | 11.4 | 72.7 | 68.3 | 15.8 | 84.1 |
| 12 | 18.5 | 5.2 | 23.7 | | | |
| 13 | 35.5 | 8.0 | 43.5 | 36.5 | 8.8 | 45.3 |
| 14 | 56.1 | 17.2 | 73.3 | 49.1 | 5.1 | 54.2 |
| 15 | 21.3 | 7.9 | 29.2 | 28.8 | 11.8 | 40.6 |
| 16 | 37.9 | 9.4 | 47.3 | 40.5 | 7.9 | 48.4 |
| 17 | 19.8 | 6.1 | 25.9 | 22.1 | 5.8 | 27.9 |
| 18 | 5.6 | 1.1 | 6.7 | 33.6* | 5.1* | 38.7* |
| | | | | 33.6† | 5.5† | 39.1† |
| 19 | 34.4 | 5.2 | 39.6 | 28.8* | 5.1* | 33.9* |
| | | | | 31.2† | 5.2† | 36.4† |
| 20 | 44.2 | 6.9 | 51.1 | 44.2* | 4.6* | 48.8* |
| | | | | 43.3† | 5.6† | 48.9† |

* Heavy liming.

† Light liming.

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

BARLEY - EXHAUSTION LAND HOOSFIELD 1952

History: From 1852 - 1875 wheat was grown on this field under fertilizer treatments similar to those on some of the Broadbalk plots, on strips $\frac{1}{5}$ acre in area. From 1876 - 1901 potatoes were grown continuously, several of the strips retaining their original treatments.

The field received no fertilizers whatsoever from 1902 - 1939 during which period cereals were grown. In 1940 and thereafter, a top dressing of nitrogen, at present $2\frac{1}{2}$ cwt sulphate of ammonia per acre, has been applied each year, the intention being to study further the residual effects of the fertilizers applied to the potatoes. No yields were taken between 1922 and 1948 except in 1935.

The fertilizers (per acre) applied to potatoes from 1876-1901 as follows:-

- Plot 1 Unmanured
- 2 Previously unmanured
1876-1881 6 years of F.Y.M. at 14 tons
1882-1901 unmanured.
- 3 Previously unmanured
1876-1882 7 years superphosphate at 350 lb. (200 lb. bone ash, 150 lb. sulphuric acid)
1876-1901 26 years F.Y.M. at 14 tons
- 4 Previously unmanured
1876-1882 7 years superphosphate at 350 lb.
1876-1881 6 years nitrate of soda at 550 lb.
1876-1901 26 years F.Y.M. at 14 tons
- 5 Previously 400 lb. ammonium salts
1876-1901 26 years ammonium salts at 400 lb.
- 6 Previously 400 lb. ammonium salts
1876-1901 26 years nitrate of soda at 550 lb.
- 7 Previously 400 lb. ammonium salts and minerals
1876-1901 26 years ammonium salts at 400 lb.
1877-1887 11 years superphosphate (200 lb. bone ash, 150 lb. sulphuric acid)
1888-1896 9 years super at 392 lb. (made from mineral phosphate)
1897-1901 5 years basic slag at 400 lb.
1877-1901 25 years sulphate of potash at 300 lb.
1877-1901 25 years sulphate of magnesia at 100 lb.
1877-1901 25 years sulphate of soda at 100 lb.
- 8 Previously 400 lb. ammonium salts and minerals
1876-1901 26 years nitrate of soda at 550 lb.
1876-1901 minerals as applied to plot 7
- 9 Previously complete minerals
1877-1901 25 years phosphate as applied on plot 7
- 10 Previously complete minerals
1877-1901 minerals as applied to plot 7

52/A/6.2

Cultivations, etc.: Ploughed: Sept 14 and again Dec 17, 1951. Seed drilled at 3 bushels per acre, sulphate of ammonia applied: Feb 28. Harvested: July 31. Variety: Plumage Archer.

Summary of Results

| Manuring to Potatoes 1876 - 1901 [*] | Grain: cwt per acre | Straw: cwt per acre |
|--|------------------------|------------------------|
| 1 Unmanured | 12.9 | 16.7 |
| 2 Unmanured after 6 years dung | 10.1 | 13.0 |
| 3 Dung | 23.2 | 27.2 |
| 4 Dung | 22.8 | 29.4 |
| 5 Ammonium salts | 16.5 | 19.8 |
| 6 Nitrate of soda | 13.1 | 15.5 |
| 7 Ammonium salts and complete minerals | 21.3 | 27.0 |
| 8 Nitrate of soda and complete minerals | 21.4 | 24.3 |
| 9 Superphosphate | 19.7 | 22.2 |
| 10 Complete minerals | 21.8 | 23.9 |

^{*}For certain changes see list of treatments.

52/A/7

WHEAT - WOBURN STACKYARD 1952

For history, details of treatments etc., see "Results of the Field Experiments 1939-47".

Cultivations, etc.: Ploughed: Sept 4, 1951. Seed drilled at 3 bushels per acre: Oct 20. Nitrochalk applied: Apr 23, 1952. Sprayed with D.N.O.C. 2/3 gallon per acre: May 19 and again May 23. Harvested: July 29. Variety: Squareheads Master (13/4).

Summary of Results

| Plot | Nitrochalk dressing cwt per acre | Grain: cwt per acre | Straw: cwt per acre |
|---------|-------------------------------------|------------------------|------------------------|
| 3 | 2 | 3.2 | 8.5 |
| 1 | 4 | 7.0 | 22.7 |
| 7 | 6 | 4.8 | 13.9 |
| 6 | 2 | 4.2 | 11.3 |
| 9 | 4 | 7.7 | 18.6 |
| 4 | 6 | 8.6 | 25.3 |
| 11b (2) | 2 | 6.1 | 13.5 |
| 11b (3) | 4 | 9.3 | 21.4 |
| 11b (1) | 6 | 13.6 | 25.2 |
| 11a | 2 | 3.9 | 13.0 |
| 10a | 4 | 6.5 | 18.4 |
| 10b | 6 | 7.0 | 16.8 |

52/A/8

BARLEY - WOBURN STACKYARD, 1952

For history, details of treatments etc., see "Results of the Field Experiments 1939-47", with the exception that in 1952 it was decided to divide each plot into two, and sow one half with a Winter variety, and the other, as before with a Spring variety.

Cultivations, etc.: Ploughed: Sept 28, 1951. Seed drilled at 3 bushels per acre on "Winter" plots: Dec 3. Seed drilled at 3 bushels per acre on "Spring" plots, nitrochalk applied to all plots: Mar 17, 1952. Sprayed with D.N.O.C.: May 19. Harvested: Winter barley - July 29, Spring barley - Aug 15. Varieties: Winter barley - Pioneer, Spring barley - Plumage Archer.

Summary of Results

| Plot | Nitrochalk dressing cwt per acre | Grain: cwt per acre | | Straw: cwt per acre | |
|---------|-------------------------------------|---------------------|----------------|---------------------|----------------|
| | | Winter sown | Spring sown | Winter sown | Spring sown |
| 1 | 2 | 21.9 | 13.0 | 22.0 | 19.9 |
| 3 | 4 | 21.7 | 12.4 | 25.3 | 16.4 |
| 7 | 6 | 23.5 | 8.1 | 27.8 | 8.6 |
| 6 | 2 | 22.3 | 9.7 | 21.1 | 14.5 |
| 9 | 4 | 26.6 | 9.5 | 27.7 | 14.0 |
| 4 | 6 | 20.3 | 11.3 | 23.4 | 15.9 |
| 11b (3) | 2 | 28.7 | 9.6 | 28.2 | 20.7 |
| 11b (1) | 4 | 37.3 | 6.6 | 40.7 | 10.2 |
| 11b (2) | 6 | 33.7 | 6.5 | 40.5 | 14.9 |
| 10b | 2 | 28.4 | 11.3 | - ⁺ | 18.4 |
| 11a | 4 | 24.2 | 12.7 | 24.3 | 15.4 |
| 10a | 6 | 11.1 | - [*] | 26.2 | - [*] |

^{*} No yields taken owing to bird damage.

⁺ Recorded yield obviously incorrect.

THREE COURSE ROTATION EXPERIMENT

1st year of revised scheme

This experiment was recast commencing with the crops of 1952 from the old design, full details of which can be found in the 1951 Station report page 135, together with a summary of 18 years results.

The present design is as follows. The rotation is as before - 3 series, each in turn carrying potatoes, barley and sugar beet. The compost and magnesium sulphate treatments are stopped, the present experiment being confined to testing straw. The plots formerly receiving only inorganic fertilizers now test inorganic nitrogen applied as sulphate of ammonia in alternate years. One third of the original plots testing straw or compost continue to receive straw in alternate years, while the remainder test, in the presence and absence of sulphate of ammonia, the effect of an amount of muriate of potash equivalent to the K_2O contained in the straw application. In the original experiment the straw received a quantity of nitrogen at the conventional rate - 0.7% of the dry weight of straw, but in the new experiment the straw receives nitrogen at two rates - 0.4% and 1.2% respectively: the straw plots having the lower rate of nitrogen being supplemented by a direct addition of sulphate of ammonia in the second year. No further nitrogen is added in the second year to the straw plots receiving the high level of nitrogen.

Every plot is divided into two to test an addition of muriate of potash. The half plots are only weighed separately when the crop is potatoes, as this crop is most likely to reveal differences in potash responses in the presence and absence of straw.

The above remarks may be summarised as follows:-

For each of the three crops potatoes, barley, sugar beet there are available:-

- (a) 6 main plots of the former Ar treatment, 3 in each phase.
- (b) 12 main plots of the former St₁ and St₂ treatments, 6 in each phase.
- (c) 6 main plots of the former Ad treatment, 3 in each phase.

The main plot treatments for (a) are

| | | | | | | |
|---------|-------|----|------------|----|-------|---------|
| | 0 | v. | 0.4 cwt. N | | 1950 | 1951 |
| Phase 1 | 0.4 N | v. | 0 | v. | 0.4 N | (Ar) |
| Phase 2 | 0 | v. | 0.4N | v. | 0 | Ar (Ar) |

The main plot treatments for (b) are (0 v. 0.4 N) v. (0 v. St0.2N v. K_s) where K_s is muriate of potash supplying as much K₂O as the straw.

| | | | | | | | |
|---------|--------|----|--------|----|----------|------|---|
| | | | | | | 1950 | 1951 |
| Phase 1 | St0.2N | v. | St0.6N | v. | 0.4N | v. | 0 v. K _s 0.4N v. K _s (St) |
| Phase 2 | 0.4N | v. | 0 | v. | 0 v.0.4N | v. | ^s 0 v.0.4N St (St) |

N.B. The brackets indicate treatments applied the previous year.

52/Ba/1.2

The main plot treatments for (c) are:

| | | | | | |
|---------|-----------|---------|---------------------|------|------|
| | | | | 1950 | 1951 |
| Phase 1 | St0.6N v. | 0.4N v. | K _s 0.4N | (Ad) | Ad |
| Phase 2 | 0 v. | 0 v. | 0 | Ad | (Ad) |

All main plots will be split in every crop to test 0 v. 0.5 cwt K₂O. To prevent build up of K₂O on one half of the splits the side which received high potash one year will receive low potash the next.

| Basal Dressings:- | cwt per acre | | |
|-------------------|--------------|-------------------------------|------------------|
| | N | P ₂ O ₅ | K ₂ O |
| Barley | 0 | 0.2 | 0 |
| Sugar beet | 0.2 | 0.4 | 0.25 |
| Potatoes | 0.4 | 0.6 | 0.5 |

The form of fertilizer is:

- (a) nitrogen as sulphate of ammonia.
- (b) phosphate as superphosphate.
- (c) potash as muriate of potash.

All fertilizers are spring applied, including the potash equivalent of the straw.

Potato fertilizers are broadcast on the flat. The land is ridged and the tubers planted by dropper in the ridges.

Area of each plot: Potatoes (sub-plot) - 0.0092 acre; barley - 0.0200 acre; sugar beet - 0.0204 acre.

Cultivations etc.:

Potatoes: Straw applied, ploughed all plots: Dec 15, 1951.
 Fertilizers applied: Apr 18, 1952. Ridged: Apr 22. Potatoes planted with mechanical dropper: Apr 24. Earthed up ridges: July 8. Sprayed with medium volume copper sulphate solution, 5 lb per acre: Aug 12 and again Sept 4. Sprayed with 20% sulphuric acid: Sept 23. Lifted: Oct 6. Variety: Majestic.

Barley: Straw applied, ploughed all plots: Dec 15, 1951 1 ton. Ground chalk per acre applied: Feb 26, 1952. Seed drilled at 3 bushels per acre: Mar 3. Fertilizers applied: Mar 4. Sprayed with low volume MCPA 5 lb per acre: May 10. Harvested: July 30. Variety: Plumage Archer.

Sugar beet. Straw applied, ploughed all plots: Dec 15, 1951. Fertilizer applied, seed drilled at 18 lb per acre: Mar 21, 1952. Singled: May 26. Lifted: Dec 28. Variety: Klein E.

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Summary of Results

Potatoes

Treatments 1952

| Previous Treatments 1951 | 5 3/4 cwt per acre cut straw | | | 0.4 cwt N per acre | | | 0.4 cwt N per acre as sulph. amm. + K ₂ O in 5 3/4 cwt cut straw | | | Mean |
|-----------------------------------|------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---|--------------------|--------------------|-------------------|
| | No N | 0.2 cwt N per acre | 0.6 cwt N per acre | 0.4 cwt N per acre | 0.4 cwt N per acre | 0.4 cwt N per acre | 0.4 cwt N per acre | 0.4 cwt N per acre | 0.4 cwt N per acre | |
| Art | 4.05 [#] | 4.49 [#] | 4.66 [#] | 4.66 | 4.66 | 4.66 | 4.66 | 4.66 | 4.66 | 4.80 |
| Straw | 3.93 | 4.41 | 3.71 [#] | 5.00 [#] | 5.00 [#] | 5.00 [#] | 5.00 [#] | 5.00 [#] | 5.00 [#] | 5.00 [#] |
| Adco | 5.30 [†] | 4.98 [†] | 5.21 [†] | 5.97 [†] | 5.97 [†] | 5.97 [†] | 5.97 [†] | 5.97 [†] | 5.97 [†] | 5.97 [†] |
| Art | 4.22 | 5.14 | 4.41 | 4.75 | 4.75 | 4.75 | 4.75 | 4.75 | 4.75 | 4.75 |
| Straw | 4.87 [†] | 4.58 [†] | 4.27 | 4.56 | 4.56 | 4.56 | 4.56 | 4.56 | 4.56 | 4.56 |
| Adco | 4.87 [†] | 4.58 [†] | 4.27 | 4.56 | 4.56 | 4.56 | 4.56 | 4.56 | 4.56 | 4.56 |
| Mean | | | | | | | | | | 4.80 |
| Total clean tubers: tons per acre | | | | | | | | | | |
| Art | 51.6 [#] | 54.3 [#] | 56.5 [#] | 62.7 [#] | 62.7 [#] | 62.7 [#] | 62.7 [#] | 62.7 [#] | 62.7 [#] | 62.7 [#] |
| Straw | 58.3 | 66.4 | 50.4 | 60.9 [#] | 60.9 [#] | 60.9 [#] | 60.9 [#] | 60.9 [#] | 60.9 [#] | 60.9 [#] |
| Adco | 65.2 [†] | 65.6 [†] | 65.9 [†] | 67.8 [†] | 67.8 [†] | 67.8 [†] | 67.8 [†] | 67.8 [†] | 67.8 [†] | 67.8 [†] |
| Art | 62.1 | 64.5 | 64.4 | 67.8 | 67.8 | 67.8 | 67.8 | 67.8 | 67.8 | 67.8 |
| Straw | 63.1 [†] | 65.4 [†] | 60.8 | 65.3 | 65.3 | 65.3 | 65.3 | 65.3 | 65.3 | 65.3 |
| Adco | 63.1 [†] | 65.4 [†] | 60.8 | 65.3 | 65.3 | 65.3 | 65.3 | 65.3 | 65.3 | 65.3 |
| Mean | | | | | | | | | | 62.8 |
| Percentage Ware | | | | | | | | | | |
| Art | 51.6 [#] | 54.3 [#] | 56.5 [#] | 62.7 [#] | 62.7 [#] | 62.7 [#] | 62.7 [#] | 62.7 [#] | 62.7 [#] | 62.7 [#] |
| Straw | 58.3 | 66.4 | 50.4 | 60.9 [#] | 60.9 [#] | 60.9 [#] | 60.9 [#] | 60.9 [#] | 60.9 [#] | 60.9 [#] |
| Adco | 65.2 [†] | 65.6 [†] | 65.9 [†] | 67.8 [†] | 67.8 [†] | 67.8 [†] | 67.8 [†] | 67.8 [†] | 67.8 [†] | 67.8 [†] |
| Art | 62.1 | 64.5 | 64.4 | 67.8 | 67.8 | 67.8 | 67.8 | 67.8 | 67.8 | 67.8 |
| Straw | 63.1 [†] | 65.4 [†] | 60.8 | 65.3 | 65.3 | 65.3 | 65.3 | 65.3 | 65.3 | 65.3 |
| Adco | 63.1 [†] | 65.4 [†] | 60.8 | 65.3 | 65.3 | 65.3 | 65.3 | 65.3 | 65.3 | 65.3 |
| Mean | | | | | | | | | | 62.8 |

[#] means of 2 sub plots
[†] means of 3 sub plots
 remainder means of 1 sub plot only.

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Barley
Treatments 1952

| Previous Treatments 1950 1951 | No N | 53½ cwt per acre cut straw | | K ₂ O in 53½ cwt cut straw | 0.4 cwt N per acre as sulph. amm.+ K ₂ O in 53½ cwt cut straw | Mean |
|-------------------------------------|-------------------|---|-----------------------|---|---|------|
| | | 0.2 cwt N per acre as sulphate of ammonia | 0.6 cwt N per acre | | | |
| Art | 28.7 [#] | Grain: cwt per acre | | | | |
| Straw | 26.4 [†] | 33.3 [#] | 30.5 | 29.1 | 33.9 | |
| Adco | 27.4 [†] | 31.6 [#] | 19.8 | 29.1 | 33.6 | 29.9 |
| Art | 26.4 [†] | 34.0 [†] | 30.5 | 29.1 | 33.9 | |
| Straw | 28.1 [†] | 33.8 | 35.2 | 29.1 | 33.6 | |
| Adco | 25.1 [†] | 33.9 | 35.2 | 29.1 | 33.6 | |
| Mean | | | | | | 29.9 |
| | | Straw: cwt per acre | | | | |
| Art | 27.2 [#] | 38.4 [#] | 34.5 | 29.2 | 41.3 | |
| Straw | 26.3 | 35.7 [#] | 20.4 | 29.2 | 37.4 | |
| Adco | 26.2 [†] | 40.0 [†] | 39.8 | 29.2 | 37.4 | |
| Art | 28.1 | 35.9 | 39.8 | 29.2 | 37.4 | |
| Straw | 23.0 [†] | 37.7 | 39.8 | 29.2 | 37.4 | |
| Adco | | | | | | |
| Mean | | | | | | 31.8 |

[#] means of 2 sub plots
[†] means of 3 sub plots
remainder means of 1 sub plot only.

52/Ba/1.5

Sugar Beet
Treatments 1952

| Previous Treatments 1950 1951 | 53½ cwt per acre cut straw | | | 0.4 cwt N per acre as sulph. amm. + K ₂ O in 53½ cwt cut straw | Mean |
|-------------------------------|----------------------------|---|--------------------|---|-------|
| | No N | 0.2 cwt N per acre as sulphate of ammonia | 0.6 cwt N per acre | | |
| Art | 10.92 | 12.55 | 12.75 | 11.76 | 11.46 |
| Straw | 9.65 | 13.15 | 12.75 | 11.76 | |
| Adco | 10.29 | 12.80 | 9.76 | 11.85 | |
| Mean | 10.34 | 12.16 | 11.55 | 11.85 | |
| | 11.08 | 12.88 | | | |
| Roots (washed): tons per acre | | | | | |
| Art | 16.63 | 16.53 | 16.65 | 16.42 | 16.51 |
| Straw | 16.39 | 16.56 | 16.65 | 16.42 | |
| Adco | 16.71 | 16.24 | 16.50 | 16.30 | |
| Mean | 16.76 | 15.55 | 16.50 | 16.30 | |
| | 16.56 | 16.59 | | | |
| Sugar percentage | | | | | |
| Art | 16.63 | 16.53 | 16.65 | 16.42 | 16.51 |
| Straw | 16.39 | 16.56 | 16.65 | 16.42 | |
| Adco | 16.71 | 16.24 | 16.50 | 16.30 | |
| Mean | 16.76 | 15.55 | 16.50 | 16.30 | |
| | 16.56 | 16.59 | | | |

52/Ba/1.6

Sugar Beet
Treatments 1952

| Previous Treatments 1950 1951 | 53½ cwt per acre cut straw | | | | 0.4 cwt N per acre as sulph. amm. + K ₂ O in 53½ cwt cut straw | Mean |
|-------------------------------------|----------------------------------|---|-----------------------|---|--|------|
| | No N | 0.2 cwt N per acre as sulphate of ammonia | 0.6 cwt N per acre | K ₂ O in 53½ cwt cut straw | | |
| Art | 36.3 | 41.5 | | | | |
| Straw | 31.6 | 43.6 | | | | |
| Adco | 34.4 | 41.5 | | | | |
| | 34.7 | 37.8 | 30.4 | 42.4 | 39.2 | 38.6 |
| | 36.6 | 42.7 | | 32.2 | | 38.6 |
| | Total sugar: cwt per acre | | | | | 37.8 |
| | Plant number: thousands per acre | | | | | |
| Art | 23.9 | 23.0 | | | | |
| Straw | 28.2 | 25.2 | | | | |
| Adco | 26.6 | 21.6 | | | | |
| | 25.2 | 26.6 | 24.8 | 24.4 | 25.5 | 19.4 |
| | 25.0 | 23.9 | | 22.3 | | 25.8 |
| | Mean | | | | | 24.5 |

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FOUR COURSE ROTATION EXPERIMENT

The 23rd year

Direct and residual effects of organics and phosphates - Hoosfield 1952.

For details of treatments and rotation see "Results of the Field Experiments 1939-47".

Area of each plot: Potatoes: 0.0242 acre. Barley and wheat: 0.0244 acre. Ryegrass: 0.0233 acre.

Manures (cwt per acre) applied 1951-52

| | Organic manures | | | | Supplementary fertilizers | | |
|-------------------|-----------------|-------|-------------------------------|------------------|---------------------------|--|------------------------------------|
| | Organic matter | N | P ₂ O ₅ | K ₂ O | N as Sulph. of amm. | P ₂ O ₅ as Super | K ₂ O as Mur. of potash |
| Dung [†] | 50 | 1.191 | 0.526 | 2.485 | 0.609 | 0.674 | 0.515 |
| Adco | 50 | 1.140 | 0.795 | 0.351 | 0.660 | 0.405 | 2.649 |
| Straw | 132 | 0.684 | 0.262 | 1.395 | 1.116 | 0.938 | 1.605 |
| Super | | | None | | 0.36 | 1.2 | 0.6 |
| Rock phosphate | | | None | | 0.36 | 1.2* | 0.6 |

*As rock phosphate

[†]Note: The application of Dung to the Ryegrass and Wheat was made in error at a rate to supply:

| Organic matter | N | P ₂ O ₅ | K ₂ O |
|----------------|-------|-------------------------------|------------------|
| 59 | 1.413 | 0.625 | 2.950 |

Cultivations, etc.:

Potatoes:

Ploughed: Sept 13, 1951. Dung, Adco and supplementary fertilizers and first dressing to straw plots applied: Dec 18. Straw applied, all plots ploughed: Dec 19. Second dressing to straw plots applied: Feb 7, 1952. Ridged: Apr 25. Spring fertilizers, including third dressing to straw plots, and sulphate of ammonia to half plots, applied: Apr 26. Potatoes planted: Apr 28. Earthed up: July 10. Sprayed with copper fungicide 5 lb per acre: Sept 4. Sprayed with sulphuric acid, 20% B.O.V.: Sept 23. Lifted: Oct 7. Variety: Majestic.

Barley:

Dung and Adco applied: Dec 18, 1951. Supplementary fertilizers to dung and Adco, and first dressing to straw plots applied: Dec 19. Straw applied, all plots ploughed: Dec 20. Second dressing to straw plots applied: Feb 7, 1952. Ground chalk 22½ cwt per acre applied: Feb 26. Spring fertilizers and

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third dressing to straw plots applied, seed drilled at 3 bushels per acre: Mar 3. Sprayed with M.C.P.A. 5 pints per acre: May 10. Harvested: July 30. Variety: Plumage Archer.

Ryegrass:

Dung, Adco and supplementary fertilizers, and first dressing to straw plots applied: Sept 24, 1951. Straw applied, all plots ploughed: Sept 25. Autumn fertilizers applied: Oct 22. Seed sown at 112 lb per acre: Oct 25. Second dressing to straw plots applied: Dec 20. Sulphate of ammonia and third dressing to straw plots applied: Apr 16, 1952. Sprayed with M.C.P.A. 5 pints per acre: May 10. Harvested: June 16. Variety: Western Wolths.

Wheat:

Ploughed: Aug 1, 1951. Dung, Adco and supplementary fertilizers, and first dressing to straw plots applied: Sept 25. Straw applied, ploughed all plots: Sept 26. Autumn fertilizers applied, seed drilled at 3 bushels per acre: Oct 20. Second dressing to straw plots applied: Dec 20. Sulphate of ammonia and third dressing to straw plots applied: Apr 24, 1952. Sprayed with M.C.P.A. 5 pints per acre: May 10. Harvested: July 29. Variety: Squareheads Master 13/4.

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Summary of Results

| Manure + | Year of Cycle | Potatoes | | | | Response to N | Percentage Ware | | Response to N | Barley | | Ryegrass | | Wheat | |
|--------------------|---------------|-----------------------------|-------|---------------|--------------|---------------|-----------------|--------------------|---------------|----------------|-------------------------|--------------------|----------------|-------|--|
| | | Total tubers, tons per acre | | Response to N | Additional N | | Mean | Grain cwt per acre | | Straw per acre | Dry Matter cwt per acre | Grain cwt per acre | Straw per acre | | |
| | | Without | With | | Without | | | | | | | | | With | |
| Manure as F. Y. M. | I | 11.59 | 11.62 | 11.60 | 0.03 | 87.1 | 82.4 | 84.8 | -4.7 | 35.0 | 38.1 | 25.0 | 16.6 | 38.0 | |
| | II | 5.93 | 7.07 | 6.50 | 1.14 | 77.1 | 79.3 | 78.2 | 2.2 | 20.0 | 18.3 | 15.6 | 9.9 | 20.4 | |
| | III | 6.56 | 9.19 | 7.88 | 2.63 | 74.1 | 83.0 | 78.5 | 8.9 | 20.4 | 19.0 | 14.0 | 7.0 | 15.5 | |
| | IV | 6.74 | 9.66 | 8.20 | 2.92 | 80.0 | 83.9 | 82.0 | 3.9 | 16.9 | 14.3 | 11.4 | 10.4 | 18.2 | |
| | V | 3.21 | 5.73 | 4.47 | 2.52 | 60.0 | 78.7 | 69.4 | 18.7 | 17.2 | 16.5 | 13.6 | 10.4 | 19.5 | |
| Manure as Adco | I | 7.38 | 7.26 | 7.32 | -0.12 | 79.2 | 73.1 | 76.2 | -6.1 | 31.1 | 34.2 | 23.0 | 19.7 | * | |
| | II | 5.38 | 6.14 | 5.76 | 0.76 | 81.0 | 77.8 | 79.4 | -3.2 | 26.1 | 25.4 | 15.0 | 13.4 | 24.9 | |
| | III | 7.34 | 7.30 | 7.32 | -0.04 | 80.9 | 82.9 | 81.9 | 2.0 | 19.1 | 15.4 | 15.1 | 9.7 | 18.7 | |
| | IV | 5.65 | 8.52 | 7.08 | 2.87 | 76.5 | 85.4 | 81.0 | 8.9 | 20.7 | 18.3 | 15.5 | 8.2 | 14.0 | |
| | V | 5.65 | 6.48 | 6.06 | 0.83 | 72.1 | 78.2 | 75.2 | 6.1 | 14.1 | 12.6 | 12.8 | 11.8 | 23.8 | |
| Manure as Straw | I | 5.89 | 8.55 | 7.22 | 2.66 | 76.9 | 74.6 | 75.8 | -2.3 | 31.9 | 35.6 | 31.4 | 14.3 | 36.6 | |
| | II | 6.60 | 6.95 | 6.78 | 0.35 | 78.9 | 81.1 | 80.0 | 2.2 | 17.4 | 14.3 | 14.2 | 8.7 | 16.4 | |
| | III | 6.68 | 9.46 | 8.07 | 2.78 | 74.6 | 75.0 | 74.8 | 0.4 | 20.1 | 17.8 | 17.5 | 10.7 | 22.4 | |
| | IV | 8.27 | 9.94 | 9.10 | 1.67 | 76.9 | 80.0 | 78.4 | 3.1 | 19.8 | 21.8 | 13.7 | 8.8 | 18.5 | |
| | V | 5.46 | 7.09 | 6.28 | 1.63 | 75.5 | 81.1 | 78.3 | 5.6 | 18.2 | 16.6 | 14.5 | 8.8 | 16.2 | |
| Super-phosphate | I | 8.97 | 8.72 | 8.84 | -0.25 | 76.4 | 75.9 | 76.2 | -0.5 | 28.3 | 28.5 | 24.5 | 13.7 | 32.7 | |
| | II | 8.45 | 9.39 | 8.92 | 0.94 | 82.8 | 81.1 | 82.0 | -1.7 | 24.9 | 26.3 | 24.6 | 8.6 | 23.6 | |
| | III | 4.05 | 5.58 | 4.82 | 1.53 | 64.9 | 77.9 | 71.4 | 13.0 | 23.5 | 29.2 | 26.2 | 10.0 | 19.7 | |
| | IV | 5.10 | 5.22 | 5.16 | 0.12 | 80.3 | 78.5 | 79.4 | -1.8 | 27.5 | 27.5 | 22.5 | 7.3 | 20.0 | |
| | V | 6.52 | 7.82 | 7.17 | 1.30 | 72.3 | 81.2 | 76.6 | 9.2 | 28.2 | 30.1 | 24.3 | 10.6 | 23.1 | |
| Rock phosphate | I | 4.20 | 5.27 | 4.74 | 1.07 | 60.0 | 71.7 | 65.8 | 11.7 | 26.0 | 26.3 | 21.1 | 15.2 | 23.8 | |
| | II | 5.41 | 6.56 | 5.98 | 1.15 | 84.8 | 81.4 | 83.1 | -3.4 | 26.1 | 26.5 | 22.8 | 12.5 | 21.7 | |
| | III | 3.22 | 2.76 | 2.99 | -0.46 | 69.9 | 62.2 | 66.0 | -7.7 | 27.6 | 29.2 | 21.6 | 13.5 | 26.5 | |
| | IV | 3.77 | 6.25 | 5.01 | 2.48 | 76.2 | 79.0 | 77.6 | 2.8 | 24.6 | 25.6 | 25.9 | 10.2 | 20.6 | |
| | V | 6.20 | 6.35 | 6.28 | 0.15 | 82.1 | 87.4 | 84.8 | 5.3 | 25.8 | 28.4 | 21.6 | 16.8 | 31.0 | |

+Note: All manures are supplemented by fertilizers as shown in table on page 52/Ba/2.1

*Recorded yield obviously incorrect. No estimate possible at this stage.

52/Ba/3.1

SIX COURSE ROTATION EXPERIMENT

The 23rd year

Seasonal effects of fertilizers - Rothamsted Long Hoos IV and Woburn Stackyard, 1952.

For details of rotation and treatments etc. see "Results of the Field Experiments 1939-47".

Area of each plot: Rothamsted - 0.0250 acre. Woburn - 0.0266 acre.

Cultivations, etc.:

Rothamsted

Sugar beet.

Ploughed: Aug 28, 1951 and again Dec 22. Fertilizers applied: Mar 18, 1952. Seed drilled at 18 lb per acre: Mar 21. Singled: May 23. Lifted: Dec 31. Variety: Klein E.

Barley.

Ploughed: Dec 17, 1951. Ground chalk applied at 20 cwt per acre: Feb 25, 1952. Fertilizers applied, seed drilled at 3 bushels per acre: Mar 3. Harvested: July 28. Variety: Plumage Archer.

Clover.

Seed undersown in barley at 40 lb per acre: Apr 17, 1951. Autumn fertilizers applied: Nov 4. Sulphate of ammonia applied: Apr 16, 1952. Cut: June 25. Variety: Late flowering Montgomery Red.

Wheat.

Ploughed: Aug 7, 1951. Autumn fertilizers applied: Oct 18. Seed drilled at 3 bushels per acre: Oct 19. Sulphate of ammonia applied: Apr 24, 1952. Sprayed with M.C.P.A. 5 pints per acre: May 10. Harvested: July 26. Variety: Yeoman.

Potatoes.

Ploughed: Aug 25, 1951 and again Dec 18. Ridged, fertilizers applied, potatoes planted: Apr 25, 1952. Earthed up: July 8. Sprayed with copper fungicide 5 lb per acre: Sept 3. Sprayed with sulphuric acid, 20% B.O.V: Sept 23. Lifted: Oct 7. Variety: Majestic.

Rye.

Cultivated: Oct 10, 1951. 25 cwt ground chalk per acre and autumn fertilizers applied: Oct 17. Seed drilled at 3 bushels per acre: Oct 18. Sulphate of ammonia applied: Apr 17, 1952. Harvested: July 26. Variety: King II.

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Woburn

Sugar beet.

Ploughed: Sept 13, 1951 and again Jan 7, 1952. Fertilizers applied and seed drilled at 18 lb per acre: Apr 18. Singled: May 29. Lifted: Oct 8. Variety: Klein E.

Barley.

Ploughed: Oct 12, 1951 and again Feb 9, 1952. Ground chalk applied at 20 cwt per acre: Feb 29. Fertilizers applied: Mar 13. Seed drilled at 3 bushels per acre: Mar 14. Harvested: July 31. Variety: Plumage Archer.

Clover.

Seed undersown in barley at 40 lb per acre: Apr 18, 1951. Autumn fertilizers applied: Dec 5. Sulphate of ammonia applied: Apr 23, 1952. Cut: June 30. Variety: Late flowering Montgomery Red.

Wheat.

Ploughed: July 24, 1951 and again Sept 7. Autumn fertilizers applied: Oct 23. Seed drilled at 3 bushels per acre: Oct 26. Sulphate of ammonia applied: May 2, 1952. Sprayed with D.N.B.P.: May 24. Harvested: July 28. Variety: Red Standard.

Potatoes.

Ploughed: Sept 7, 1951 and again Jan 9, 1952. Ridged: Apr 23. Fertilizers applied, potatoes planted: Apr 24. Earthed up: June 16. Sprayed with copper fungicide 5 lb per acre: Aug 11 and again Sept 22. Sprayed with sulphuric acid, 15% B.O.V: Sept 22. Lifted: Oct 7. Variety: Majestic.

Rye.

Ploughed: Oct 9, 1951. Autumn fertilizers applied: Oct 23. Ground chalk applied at 20 cwt per acre: Oct 25. Seed drilled at 3 bushels per acre: Oct 26. Sulphate of ammonia applied: May 2, 1952. Harvested: July 25. Variety: King II.

52/Ba/3.3

Summary of Results

Mean yields per acre and responses in yield per cwt of N, P₂O₅ and K₂O

| | Rothamsted | Woburn | Rothamsted | Woburn |
|----------------|---|--------|--|--------|
| | Sugar Beet, roots (washed): tons per acre | | Barley, grain: cwt per acre | |
| Mean | 12.37 | 9.21 | 32.0 | 25.3 |
| Response to: N | +1.39 | +0.73 | +16.5 | +30.7 |
| P | -2.69 | -2.43 | +1.3 | +2.4 |
| K | -2.40 | +3.11 | +1.0 | +2.7 |
| | Sugar Beet, sugar percentage | | Barley, straw: cwt per acre | |
| Mean | 17.07 | 19.58 | 37.2 | 29.8 |
| Response to: N | -0.34 | -0.37 | +40.0 | +47.9 |
| P | -0.05 | +0.37 | +4.1 | -1.1 |
| K | -0.50 | +0.20 | +0.8 | +2.5 |
| | Sugar Beet, total sugar: cwt per acre | | Clover, hay, dry matter: cwt per acre | |
| Mean | 42.2 | 36.1 | 37.6 | 43.8 |
| Response to: N | +3.9 | +1.9 | -7.1 | +10.0 |
| P | -9.3 | -8.8 | +7.1 | -15.3 |
| K | -9.3 | +12.5 | -0.7 | +14.8 |
| | Sugar Beet, tops: tons per acre | | Wheat, grain: cwt per acre | |
| Mean | ⌘ | 4.79 | 34.3 | 8.6 |
| Response to: N | | +2.10 | +14.0 | +10.0 |
| P | | -1.75 | -4.7 | +7.1 |
| K | | +1.76 | +1.0 | -0.2 |
| | Sugar Beet, plant number: thousands per acre | | Wheat, straw: cwt per acre | |
| Mean | 28.6 | ⌘ | 60.6 | 15.8 |
| Response to: N | +2.8 | | +31.8 | +18.2 |
| P | -4.9 | | -1.9 | +6.8 |
| K | 0.0 | | -0.4 | +2.4 |

⌘ not recorded.

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| | Rothamsted | Woburn | Rothamsted | Woburn |
|----------------|--|--------|-----------------------------|--------|
| | Potatoes, total tubers: tons per acre | | Rye, grain: cwt per acre | |
| Mean | 8.15 | 6.29 | 27.3 | 22.8 |
| Response to: N | +1.87 | +4.39 | +12.5 | +24.4 |
| P | +0.26 | +1.79 | +10.8 | -0.7 |
| K | +3.03 | -1.43 | +1.2 | +3.0 |
| | Potatoes, percentage ware | | Rye, straw: cwt per acre | |
| Mean | 75.0 | 86.8 | 38.2 | 26.0 |
| Response to: N | +1.5 | -2.1 | +21.3 | +24.9 |
| P | +7.1 | +11.7 | +17.2 | +1.8 |
| K | +7.4 | -3.6 | +3.3 | +1.8 |

52/Eb/1.1

DEEP CULTIVATION ROTATION EXPERIMENT

The 9th Year

Deep ploughing, fertilizers and dung - Long Hoos I and II 1952.

For details of rotation and treatments etc. see "Results of the Field Experiments 1939-47".

Area of each plot: 0.0312 acre. Area harvested: Sugar beet (half plot), 0.0119 acre; barley, wheat, spring oats, 0.0265 acre; ley, 0.0275 acre; potatoes (half plot), 0.0107 acre.

Cultivations, etc.:

Sugar beet (Series 1)

Fertilizers for ploughing in applied: Sept 28, 1951. Dung applied and ploughed in 'deep': Oct 9. Dung applied and ploughed in 'shallow': Oct 10. Fertilizers for surface application broadcast, seed drilled at 16 lb per acre: Mar 22, 1952. Singled: May 26. Lifted: Jan 2, 1953. Variety: Klein E.

Barley (Series 6)

Ploughed: Dec 18, 1951. Ground chalk applied at 1 ton per acre: Feb 25, 1952. Basic slag and sulphate of ammonia applied: Feb 27. Seed drilled at 3 bushels per acre: Feb 28. Harvested: July 31. Variety: Plumage Archer.

Ley (Series 2)

Seeds undersown in barley: Apr 18, 1951. Out: June 24, 1952. Seeds mixture (per acre): 18 lb S.24 perennial ryegrass, 8 lb Montgomery red clover, 2 lb American Alsike clover.

Wheat (Series 3)

Ploughed 'deep' plots: July 30, 1951. Ploughed 'shallow' plots: Aug 8. Ploughed all plots: Sept 25. Seed drilled at 3 bushels per acre: Oct 20. Basal sulphate of ammonia applied: Apr 16, 1952. Harvested: July 26. Variety: Yeoman.

Potatoes (Series 4)

Fertilizers for ploughing in applied: Sept 28, 1951. Dung applied and ploughed in 'deep': Oct 9. Dung applied and ploughed in 'shallow': Oct 10. Ridged: May 1, 1952. Fertilizers applied in ridges, potatoes planted: May 2. Earthed up ridges: July 10. Sprayed with copper fungicide 5 lb per acre: Aug 12 and again Sept 3. Sprayed with sulphuric acid, 20% B.O.V: Sept 23. Lifted: Oct 18. Variety: Majestic.

52/Bb/1.2

Spring oats (Series 5)

Ploughed: Oct 29, 1951. Ground chalk applied at 1 ton per acre:
Feb 25, 1952. Basal sulphate of ammonia drilled: Feb 27. Seed
drilled at $3\frac{1}{2}$ bushels per acre: Feb 28. Harvested: July 22.
Variety: Star.

Standard errors per plot:

| | | | |
|--------------|---------------------------|------------------------------|---------------------------|
| Sugar beet, | Total sugar, whole plot: | 2.49 cwt per acre or 4.4% | (4 d.f) |
| | sub-plot: | 3.65 cwt per acre or 6.5% | (7 d.f) |
| Barley, | Grain: | 2.16 cwt per acre or 8.4% | (4 d.f) |
| | Ley, | Hay: | 2.48 cwt per acre or 4.0% |
| Wheat, | Grain: | 2.34 cwt per acre or 6.9% | (4 d.f) |
| Potatoes, | Total tubers, whole plot: | 0.510 tons per acre or 7.3% | (4 d.f) |
| | sub-plot: | 1.093 tons per acre or 15.7% | (7 d.f) |
| Spring oats, | Grain: | 2.84 cwt per acre or 8.3% | (4 d.f) |

52/Bb/1.3

Summary of Results

Series 1: Sugar Beet

Responses to treatments

| Response to | Mean | Ploughing | | Dung | | Phosphate | | Potash | |
|--|-------|-----------|-------|-------|-------|-----------|-------|--------|-------|
| | | Shallow | Deep | Abs. | Pres. | Abs. | Pres. | Abs. | Pres. |
| Roots (washed): Mean yield 17.83 tons per acre | | | | | | | | | |
| Ploughing deep-shallow | +2.91 | - | - | +3.42 | +2.40 | +2.85 | +2.97 | +2.60 | +3.22 |
| Dung | +3.63 | +4.14 | +3.12 | - | - | +3.94 | +3.32 | +4.78 | +2.48 |
| Phosphate | +0.24 | +0.18 | +0.30 | +0.55 | -0.07 | - | - | -0.02 | +0.50 |
| Potash | +1.07 | +0.76 | +1.38 | +2.22 | -0.08 | +0.81 | +1.33 | - | - |

Sugar Percentage: Mean 15.77

| | | | | | | | | | |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Ploughing deep-shallow | -0.13 | - | - | -0.08 | -0.18 | -0.05 | -0.21 | -0.20 | -0.06 |
| Dung | -0.16 | -0.11 | -0.21 | - | - | -0.34 | +0.02 | -0.19 | -0.13 |
| Phosphate | +0.06 | +0.14 | -0.02 | -0.12 | +0.24 | - | - | +0.26 | -0.14 |
| Potash | -0.07 | -0.14 | 0.00 | -0.10 | -0.04 | +0.13 | -0.27 | - | - |

Total Sugar: Mean yield 56.2 cwt per acre

| | (±1.25) | | | (±1.76) | | | | | |
|------------------------|---------|------|-----|---------|------|------|------|------|-----|
| Ploughing deep-shallow | 8.7 | - | - | 10.6 | 6.8 | 8.8 | 8.6 | 7.5 | 9.9 |
| Dung | 10.9 | 12.8 | 9.0 | - | - | 11.2 | 10.6 | 14.5 | 7.3 |
| Phosphate | 1.0 | 1.1 | 0.9 | 1.3 | 0.7 | - | - | 1.0 | 1.0 |
| Potash | 3.2 | 2.0 | 4.4 | 6.8 | -0.4 | 3.2 | 3.2 | - | - |

Plant Number: Mean 26.6 thousands per acre

| | | | | | | | | | |
|------------------------|------|------|------|------|------|------|------|------|------|
| Ploughing deep-shallow | +1.2 | - | - | +1.2 | +1.2 | +1.4 | +1.0 | +0.9 | +1.5 |
| Dung | +0.1 | +0.1 | +0.1 | - | - | +0.5 | -0.3 | +0.3 | -0.1 |
| Phosphate | -0.6 | -0.4 | -0.8 | -0.2 | -1.0 | - | - | -0.9 | -0.3 |
| Potash | +0.2 | -0.1 | +0.5 | +0.4 | 0.0 | -0.1 | +0.5 | - | - |

Noxious Nitrogen: Mean 25.0 mg. per 100 g.

| | | | | | | | | | |
|------------------------|------|------|------|------|------|------|------|------|------|
| Ploughing deep-shallow | +0.6 | - | - | +1.2 | 0.0 | +0.6 | +0.6 | -0.6 | +1.8 |
| Dung | +2.5 | +3.1 | +1.9 | - | - | +1.9 | +3.1 | +1.9 | +3.1 |
| Phosphate | -1.9 | -1.9 | -1.9 | -2.5 | -1.3 | - | - | -1.9 | -1.9 |
| Potash | +0.6 | -0.6 | +1.8 | 0.0 | +1.2 | +0.6 | +0.6 | - | - |

52/Bb/1.4

Series 1: Sugar beet

| | Phosphate | | | Potash | | | Mean |
|-------------------------------|-----------|-------------|-------------|--------|-------------|-------------|-------|
| | None | Ploughed in | In seed bed | None | Ploughed in | In seed bed | |
| Roots (washed): tons per acre | | | | | | | |
| Shallow | 16.28 | 16.98 | 15.95 | 16.00 | 17.42 | 16.09 | 16.37 |
| Deep | 19.13 | 19.32 | 19.55 | 18.59 | 19.89 | 20.06 | 19.28 |
| No dung | 15.74 | 16.36 | 16.22 | 14.91 | 17.18 | 17.07 | 16.02 |
| Dung | 19.68 | 19.94 | 19.28 | 19.68 | 20.13 | 19.08 | 19.64 |
| Mean | 17.71 | 18.15 | 17.75 | 17.29 | 18.65 | 18.08 | 17.83 |

| Sugar Percentage | | | | | | | |
|------------------|-------|-------|-------|-------|-------|-------|-------|
| Shallow | 15.76 | 15.64 | 16.16 | 15.90 | 15.70 | 15.82 | 15.83 |
| Deep | 15.71 | 15.71 | 15.69 | 15.71 | 15.62 | 15.79 | 15.71 |
| No dung | 15.91 | 15.58 | 16.00 | 15.90 | 15.77 | 15.82 | 15.85 |
| Dung | 15.57 | 15.77 | 15.84 | 15.71 | 15.55 | 15.78 | 15.69 |
| Mean | 15.74 | 15.68 | 15.92 | 15.80 | 15.66 | 15.80 | 15.77 |

| Total Sugar: cwt per acre | | | | | | | |
|---------------------------|------|-------------|------|------|-------------|------|------|
| | (a) | (b) and (c) | | (a) | (b) and (c) | | |
| Shallow | 51.3 | 53.2 | 51.5 | 50.8 | 54.7 | 50.9 | 51.8 |
| Deep | 60.1 | 60.7 | 61.3 | 58.3 | 62.1 | 63.3 | 60.5 |
| No dung | 50.1 | 51.0 | 51.8 | 47.4 | 54.2 | 54.1 | 50.7 |
| Dung | 61.3 | 62.9 | 61.0 | 61.8 | 62.6 | 60.2 | 61.6 |
| Mean | 55.7 | 56.9 | 56.4 | 54.6 | 58.4 | 57.1 | 56.2 |

| Plant Number: thousands per acre | | | | | | | |
|----------------------------------|------|------|------|------|------|------|------|
| Shallow | 26.2 | 25.8 | 25.8 | 26.1 | 25.9 | 26.0 | 26.0 |
| Deep | 27.6 | 26.9 | 26.7 | 26.9 | 27.2 | 27.8 | 27.2 |
| No dung | 26.7 | 26.6 | 26.2 | 26.3 | 26.7 | 26.9 | 26.6 |
| Dung | 27.1 | 26.1 | 26.2 | 26.6 | 26.4 | 26.9 | 26.6 |
| Mean | 26.9 | 26.3 | 26.2 | 26.5 | 26.5 | 26.9 | 26.6 |

- (a) ± 1.25 for use in comparisons other than horizontal.
- (b) ± 1.82 for use in horizontal comparisons.
- (c) ± 1.79 as (a).

52/Bb/1.5

Series 1: Sugar beet

| | Phosphate | | | Potash | | | Mean |
|-----------------------------------|-----------|-------------|-------------|--------|-------------|-------------|------|
| | None | Ploughed in | In seed bed | None | Ploughed in | In seed bed | |
| Noxious Nitrogen: mg. per 100 mg. | | | | | | | |
| Shallow | 25.6 | 23.8 | 23.8 | 25.0 | 25.0 | 23.8 | 24.7 |
| Deep | 26.2 | 25.0 | 23.8 | 24.4 | 27.5 | 25.0 | 25.3 |
| No dung | 25.0 | 22.5 | 22.5 | 23.8 | 23.8 | 23.8 | 23.8 |
| Dung | 26.9 | 26.2 | 25.0 | 25.6 | 28.8 | 25.0 | 26.2 |
| Mean | 25.9 | 24.4 | 23.8 | 24.7 | 26.2 | 24.4 | 25.0 |

Series 6: Barley

Responses to treatments to previous Sugar Beet

| Response to | Mean | Ploughing | | Dung | | Phosphate | | Potash | |
|-------------------------------------|------|-----------|------|------|-------|-----------|-------|--------|-------|
| | | Shallow | Deep | Abs. | Pres. | Abs. | Pres. | Abs. | Pres. |
| Grain: Mean yield 25.7 cwt per acre | | | | | | | | | |
| (±1.08) (±1.53) | | | | | | | | | |
| Ploughing deep-shallow | -2.6 | - | - | -1.3 | -3.9 | -3.0 | -2.2 | -3.7 | -1.5 |
| Dung | +1.5 | +2.8 | +0.2 | - | - | +1.9 | +1.1 | +2.6 | +0.4 |
| Phosphate | +0.2 | -0.2 | +0.6 | +0.6 | -0.2 | - | - | -0.2 | +0.6 |
| Potash | +1.1 | 0.0 | +2.2 | +2.2 | 0.0 | +0.7 | +1.5 | - | - |
| Straw: Mean yield 26.5 cwt per acre | | | | | | | | | |
| Ploughing deep-shallow | -2.6 | - | - | -0.9 | -4.3 | -2.9 | -2.3 | -3.4 | -1.8 |
| Dung | +3.4 | +5.1 | +1.7 | - | - | +3.5 | +3.3 | +4.2 | +2.6 |
| Phosphate | +0.3 | 0.0 | +0.6 | +0.4 | +0.2 | - | - | 0.0 | +0.6 |
| Potash | +0.5 | -0.3 | +1.3 | +1.3 | -0.3 | +0.2 | +0.8 | - | - |

Series 2: Ley

Hay: Mean yield 62.5 cwt per acre

| | (±1.24) | | | (±1.75) | | | | | |
|------------------------|---------|------|------|---------|------|------|------|------|------|
| | | | | | | | | | |
| Ploughing deep-shallow | -0.1 | - | - | -0.7 | +0.5 | +0.1 | -0.3 | -2.7 | +2.5 |
| Dung | +4.8 | +4.2 | +5.4 | - | - | +4.1 | +5.5 | +6.1 | +3.5 |
| Phosphate | -0.6 | -0.4 | -0.8 | -1.3 | +0.1 | - | - | -2.7 | +1.5 |
| Potash | +1.3 | -1.3 | +3.9 | +2.6 | 0.0 | -0.8 | +3.4 | - | - |

52/Bb/1.6

Series 3: Wheat

Responses to treatments[†]

| Response to | Mean | Ploughing | | Dung | | Phosphate | | Potash | |
|-------------|------|-----------|------|------|-------|-----------|-------|--------|-------|
| | | Shallow | Deep | Abs. | Pres. | Abs. | Pres. | Abs. | Pres. |

Grain: Mean yield 33.7 cwt per acre

| | (±1.17) | (±1.66) | | | | | | | |
|------------------------|---------|---------|------|------|------|------|------|------|------|
| Ploughing deep-shallow | +0.1 | - | - | 0.0 | +0.2 | -1.0 | +1.2 | +0.7 | -0.5 |
| Dung | +0.7 | +0.6 | +0.8 | - | - | -0.1 | +1.5 | -1.7 | +3.1 |
| Phosphate | -1.6 | -2.7 | -0.5 | -2.4 | -0.8 | - | - | +0.9 | -4.1 |
| Potash | -1.0 | -0.4 | -1.6 | -3.4 | +1.4 | +1.5 | -3.5 | - | - |

Straw: Mean yield 62.3 cwt per acre

| | | | | | | | | | |
|------------------------|------|-------|------|------|------|------|-------|------|------|
| Ploughing deep-shallow | +5.1 | - | - | +2.6 | +7.6 | -0.3 | +10.5 | +6.0 | +4.2 |
| Dung | +5.4 | +2.9 | +7.9 | - | - | +8.7 | +2.1 | +1.3 | +9.5 |
| Phosphate | -4.7 | -10.1 | +0.7 | -1.4 | -8.0 | - | - | -4.2 | -5.2 |
| Potash | +2.8 | +3.7 | +1.9 | -1.3 | +6.9 | +3.3 | +2.3 | - | - |

[†] Cultivation treatments direct to wheat, remainder to previous sugar beet.

Series 4: Potatoes

Total tubers: Mean yield 6.96 tons per acre

| | (±0.255) | (±0.361) | | | | | | | |
|------------------------|----------|----------|-------|-------|-------|-------|-------|-------|-------|
| Ploughing deep-shallow | -1.27 | - | - | -1.38 | -1.16 | -1.27 | -1.27 | -1.35 | -1.19 |
| Dung | +2.54 | +2.43 | +2.65 | - | - | +2.10 | +2.98 | +3.60 | +1.48 |
| Phosphate | +1.61 | +1.61 | +1.61 | +1.17 | +2.05 | - | - | +0.72 | +2.50 |
| Potash | +0.99 | +0.91 | +1.07 | +2.05 | -0.07 | +0.10 | +1.88 | - | - |

Percentage Ware: Mean 76.0

| | | | | | | | | | |
|------------------------|------|------|------|------|------|------|------|-------|------|
| Ploughing deep-shallow | -1.0 | - | - | -2.8 | +0.8 | -1.1 | -0.9 | -1.9 | -0.1 |
| Dung | +8.0 | +6.2 | +9.8 | - | - | +6.8 | +9.2 | +10.2 | +5.8 |
| Phosphate | -2.9 | -3.0 | -2.8 | -4.1 | -1.7 | - | - | -1.3 | -4.5 |
| Potash | +5.4 | +4.5 | +6.3 | +7.6 | +3.2 | +7.0 | +3.8 | - | - |

52/Bb/1.7

Series 4: Potatoes

| | Phosphate | | | Potash | | | Mean |
|-----------------------------|-----------|-------------|-----------|--------|-------------|-----------|------|
| | None | Ploughed in | In ridges | None | Ploughed in | In ridges | |
| Total tubers: tons per acre | | | | | | | |
| | (a) | (b) and (c) | | (a) | (b) and (c) | | |
| Shallow | 6.79 | 7.78 | 9.03 | 7.15 | 6.99 | 9.11 | 7.60 |
| Deep | 5.53 | 6.27 | 8.00 | 5.80 | 6.11 | 7.62 | 6.33 |
| No dung | 5.11 | 5.32 | 7.25 | 4.67 | 5.81 | 7.62 | 5.70 |
| Dung | 7.21 | 8.73 | 9.79 | 8.27 | 7.29 | 9.11 | 8.23 |
| Mean | 6.16 | 7.03 | 8.52 | 6.47 | 6.55 | 8.36 | 6.96 |

Percentage Ware

| | | | | | | | |
|---------|------|------|------|------|------|------|------|
| Shallow | 78.0 | 76.0 | 74.0 | 74.2 | 78.1 | 79.4 | 76.5 |
| Deep | 76.8 | 72.1 | 76.1 | 72.3 | 76.9 | 80.4 | 75.5 |
| No dung | 74.0 | 69.6 | 70.3 | 68.2 | 75.4 | 76.2 | 72.0 |
| Dung | 80.9 | 78.6 | 79.7 | 78.4 | 79.6 | 83.6 | 80.0 |
| Mean | 77.4 | 74.1 | 75.0 | 73.3 | 77.5 | 79.9 | 76.0 |

Series 5: Spring Oats

Responses to treatments to previous potatoes

| | Mean | Ploughing | | Dung | | Phosphate | | Potash | |
|-------------------------------------|---------|-----------|------|------|-------|-----------|-------|--------|-------|
| | | Shallow | Deep | Abs. | Pres. | Abs. | Pres. | Abs. | Pres. |
| Grain: Mean yield 34.4 cwt per acre | | | | | | | | | |
| | (±1.42) | (±2.01) | | | | | | | |
| Ploughing deep-shallow | -4.0 | - | - | -1.9 | -6.1 | -4.3 | -3.7 | -3.3 | -4.7 |
| Dung | -1.1 | +1.0 | -3.2 | - | - | -0.5 | -1.7 | -1.2 | -1.0 |
| Phosphate | +1.7 | +1.4 | +2.0 | +2.3 | +1.1 | - | - | +0.3 | +3.1 |
| Potash | -1.4 | -0.7 | -2.1 | -1.5 | -1.3 | -2.8 | 0.0 | - | - |
| Straw: Mean yield 43.6 cwt per acre | | | | | | | | | |
| Ploughing deep-shallow | -3.4 | - | - | -1.8 | -5.0 | -4.1 | -2.7 | -2.9 | -3.9 |
| Dung | +4.1 | +5.7 | +2.5 | - | - | +4.3 | +3.9 | +2.7 | +5.5 |
| Phosphate | +0.9 | +0.2 | +1.6 | +1.1 | +0.7 | - | - | -0.1 | +1.9 |
| Potash | -0.2 | +0.3 | -0.7 | -1.6 | +1.2 | -1.2 | +0.8 | - | - |

- (a) ±0.255 for use in comparisons other than horizontal.
- (b) ±0.547 for use in horizontal comparisons.
- (c) ±0.463 as (a).

52/Bc/1.1

LEY AND ARABLE ROTATIONS

Highfield and Fosters Field 1952 - the 4th year.

This experiment was started in autumn 1948 for cropping in 1949 on two fields, Highfield previously old grassland, and Fosters previously old arable. The cropping treatments tested are:

1. Three year ley grazed by sheep.
2. Three year cut grass, as for drying.
3. Three year lucerne, cut as for hay.
4. Three year arable rotation of hay, potatoes, barley.

The three test crops which follow all the above four cropping treatments are. Wheat in the first year, potatoes in the second and barley in the third. Outside this sequence of treatment and test crops there are permanent grass treatments of old grass and of reseeded grass on Highfield and of reseeded grass only on Fosters. All the permanent grass plots are grazed with sheep for two years and hayed on the third. The experiment on Highfield is set out in blocks of 6 plots and on Fosters in blocks of 5 plots each. The cropping in the 6 plot blocks on Highfield for the first six year cycle is illustrated by the following table.

| Phase | | Plots | | | | | |
|-------|------|-------|-----|-----|-----|-----|-----|
| A | B | (1) | (2) | (3) | (4) | (5) | (6) |
| 1949 | 1952 | L | Lu | CG | H | G | R |
| 1950 | 1953 | L | Lu | CG | P | G | R |
| 1951 | 1954 | L | Lu | CG | B | G | R |
| 1952 | 1949 | W | W | W | W | G | R |
| 1953 | 1950 | P | P | P | P | G | R |
| 1954 | 1951 | B | B | B | B | G | R |

L = 3 year ley Lu = Lucerne CG = Cut grass
 G = Old permanent grass R = Reseeded grass B = Barley
 H = 1 year arable hay. P = Potatoes W = Wheat

Hay = 1 cut then fallow. Lucerne: cut for hay.
 Cut grass: Several cuts. Ley: Grazed with sheep.
 Reseeded and old grass: Grazed 2 years with sheep, hay with aftermath grazing in the 3rd year.

In the first year (1949) two blocks were started in phase A (treatment crops followed by test crops) and a further two blocks in phase B which is 3 years behind phase A, starting with the three test crops before the treatment crops. The arrangement is the same for Fosters except that there is no treatment G.

In 1950 an exactly similar set of four blocks were started on each field, and again in 1951, when all six stages of all the rotations were represented in duplicate.

52/Bc/1.2

In 1952 the fertility effects built up by the leys, lucerne and other treatment crops, can be measured for the first time on the test crops of wheat on two blocks on each field.

Treatment and basal dressings: Tests are made on nitrogen and dung as follows:

Nitrogen: 2 levels appropriate to the crop (none to lucerne) are applied to the treatment crops, and the effects of the treatment crop grown at each level is measured at two levels of nitrogen in the subsequent test crops. Nitrogen is applied as sulphate of ammonia to potatoes and as nitrochalk to the other crops according to the following schedule, which also shows the basal dressing applied.

Dung: None: 12 tons per acre applied in the ridges to potatoes both in the arable rotation and to the test crop. It is applied to quarter plots to test all combinations of (0 v.D) x (N₁ v.N₂).

| Crop | Crop Symbol | Treatments cwt. N per acre as Nitrochalk | | Basal dressing per acre |
|-------------------------------------|-----------------|--|----------------|--|
| | | N ₁ | N ₂ | |
| 1st year Lucerne | Lu ₁ | - | - | |
| 1st year Cut Grass | Cg ₁ | 0.15 (a) | 0.3 | 0.6 cwt.P ₂ O ₅ 0.6 cwt.K ₂ O in seedbed |
| 1st year Grazed Ley | L ₁ | 0.075 (b) | 0.15 | |
| 2nd year Lucerne | Lu ₂ | - | - | |
| 3rd year Lucerne | Lu ₃ | - | - | |
| 2nd year Cut Grass | Cg ₂ | 0.15 (a) | 0.3 | |
| 3rd year Cut Grass | Cg ₃ | 0.15 (a) | 0.3 | |
| 2nd year Grazed Ley | L ₂ | 0.075 (b) | 0.15 | 0.3 cwt.P ₂ O ₅ 0.3 cwt.K ₂ O in winter |
| 3rd year Grazed Ley | L ₃ | 0.075 (b) | 0.15 | |
| Reseeded and Old Permanent Grass | R G | 0.075 (b) | 0.15 | |
| 1st and 2nd years | | | | |
| Reseeded and Old Permanent Grass | R G | 0.15 (b) | 0.30 | 0.6 cwt.P ₂ O ₅ 0.6 cwt.K ₂ O in winter |
| 3rd year | | | | |
| Wheat | W | 0.3 | 0.6 | 0.15 cwt.P ₂ O ₅ 0.15 cwt.K ₂ O Combine drilled with the seed |
| Barley | B | 0.2 | 0.4 | 0.15 cwt.P ₂ O ₅ 0.15 cwt.K ₂ O Combine drilled with the seed |
| 1 year Seeds Hay | H | 0.3 | 0.6 | 0.15 cwt.P ₂ O ₅ 0.15 cwt.K ₂ O in winter |
| Potatoes | P | 0.5 (c) | 1.0 | 0.9 cwt.P ₂ O ₅ 0.9 cwt.K ₂ O in ridges |
| | | OvD (12 tons dung per acre) | | |

For footnote of (a), (b) and (c) see next page.

52/Bc/1.3

A suitable dressing of calcium carbonate will be applied every 6 years before the Test Barley crop.

- (a) 1st dressing of N_1 and N_2 in spring. Repeated dressings of N_1 and N_2 at the same rates after the 1st, 2nd, 3rd, 4th etc. cuts (not the last).
- (b) 1st dressing of N_1 and N_2 in spring. A second dressing at the same rates later in the summer (in third year after hay is cut).
- (c) N as sulphate of ammonia to Potatoes only.

The basal dressing is applied as a Granulated Compound containing 13% P_2O_5 , 13% K_2O .

Sheep Grazing Technique. This has been modified since the experiment started, the present scheme being as follows:

The grazing unit is a half plot of about 1/25 acre. This is presented to the sheep as two or more folds, the team being of such a size that it will graze a single fold to about the level of the sample cut (2") in one day. The intention is to provide fresh untainted grazing every day, leaving the grazed area as a run back. To equalize conditions between the folds within one sub plot, the order of grazing the folds is reversed at every cycle, i.e. the fold which was grazed first on one cycle is grazed last on the next.

Quarter plot area: 0.0220 acre.

Areas harvested (acres): Wheat: 0.0187. Potatoes: 0.0174. Barley: Highfield - 0.0198, Fosters:- 0.0187. Hay, Cut Grass: 0.0199. Grazed ley, Permanent grass, Reseeded: $\frac{1}{2}$ plot - 0.0398. Cut grass 0.000979. Lucerne: $\frac{1}{2}$ plot - 0.0398.

Cultivations, etc:

Highfield

Wheat (Blocks 2 and 3). Ploughed: Oct 4, 1951. Seed drilled at 3 bushels per acre with basal fertilizers: Oct 20. Nitrochalk applied: Apr 30, 1952. Harvested: Aug 1. Variety: Yeoman.

Potatoes (Blocks 9-12). Ploughed: Sept 7, 1951 and again Feb 7, 1952. Ridged, dung, sulphate of ammonia and basal fertilizers applied, potatoes planted: Apr 30. Earthed up: July 9. Sprayed with copper sulphate solution 5 lb per acre, medium volume: Aug 12 and Sept 6. Sprayed with 20% sulphuric acid: Oct 8. Lifted: Oct 16. Variety: Majestic.

Barley (Blocks 5-8). Ploughed: Jan 22, 1952. Ground chalk applied to Blocks 6 and 7: Feb 28. Seed drilled at 3 bushels per acre with basal fertilizers: Feb 29. Nitrochalk applied: Mar 1. Harvested: July 29. Variety: Plumage Archer.

52/Bc/1.4

Cut Grass, Grazed Ley, Lucerne and all 1st year (Blocks 1 and 4).
Ploughed: Oct 4, 1951. Basal fertilizers applied: Apr 5, 1952.
Nitrochalk applied (none to Lucerne): Apr 18.

Cut Grass. Seeds sown at 38 lb per acre: Apr 19. Cut: 3 times -
July 21, Sept 3 and Sept 27. Nitrochalk applied after each
cut except the last.

Grazed Ley. Nitrochalk applied: June 28. Grazed: 6 circuits
plots 11-12, 5 circuits 45 and 46.

Lucerne. Seed drilled at 33 lb per acre: Apr 19. Cut twice:
July 21 and Sept 11. Variety: Du Puits.

Hay 1st year (Blocks 1 and 4). Seeds sown at 38 lb per acre: Apr 18,
1951. Basal fertilizers applied: Dec 20. Nitrochalk applied:
Mar 27, 1952. Cut: June 8.

Reseeded grass 4th year (Blocks 1-4). Basal fertilizers applied:
Dec 20, 1951. Nitrochalk applied: Mar 27, 1952. Cut: May 15.
Nitrochalk applied: June 18. Grazed: 4 circuits, May 29 -
Sept 22.

Permanent grass (Blocks 1-4). Basal fertilizers applied: Dec 20, 1951.
Nitrochalk applied: Mar 27, 1952. Pre-grazing cut: May 15. Nitro-
chalk applied: June 18. Grazed: 3 circuits, May 29-Sept 26.

Cut Grass, Grazed Ley, Lucerne, Reseeded Grass all 2nd year.
Permanent Grass (Blocks 9 and 12, Reseeded and Permanent Grass
9-12). Basal fertilizers applied: Dec 20. Nitrochalk applied
(none to Lucerne): Mar 27.

Cut Grass. Cut: 5 times - May 16, June 16, July 21, Sept 3 and
Sept 26. Nitrochalk applied after each cut except the last.

Grazed Ley. Pre-grazing cut: May 13. Nitrochalk applied:
June 18. Grazed: 4 circuits, May 21-Sept 14.

Lucerne. Cut: 3 times - June 11, July 21, Sept 10.

Reseeded Grass. Pre-grazing cut: May 13. Nitrochalk applied:
June 17 and 28. Grazed: 4 circuits, May 21-Oct 8.

Permanent Grass. Cut: May 14. Nitrochalk applied: June 28.
Grazed: 4 circuits, May 21-Oct 12.

Cut Grass 3rd year (Blocks 5 and 8). Basal fertilizers applied:
Dec 20, 1951. Nitrochalk applied: Mar 27, 1952. Cut: 5 times
May 16, June 16, July 21, Sept 3, Sept 26. Nitrochalk applied
after each cut except the last.

Grazed Ley. 3rd year (Blocks 5 and 8). Basal fertilizers applied:
Dec 20, 1951. Nitrochalk applied: Mar 27, 1952. Pre-grazing
cut: May 15. Nitrochalk applied: June 28. Grazed: 4 circuits,
May 25-Sept 12.

Lucerne 3rd year (Blocks 5 and 8). Basal fertilizers applied:
Dec 20, 1951. Cut: 3 times, June 11, July 21, Sept 10.

52/Bc/1.5

Reseeded grass. 3rd year (Blocks 5-8). Basal fertilizers applied:
Dec 20, 1951. Ground chalk applied to Blocks 6 and 7: Feb 28, 1952.
Nitrochalk applied: Mar 27. Cut: June 13. Nitrochalk applied:
June 17. Grazed: 2 circuits, Aug 29-Sept 30.

Permanent grass. 3rd year (Blocks 5-8). Basal fertilizers applied:
Dec 20, 1951. Ground chalk applied to Blocks 6 and 7: Feb 28, 1952.
Nitrochalk applied: Mar 27. Cut: June 13. Nitrochalk applied:
June 17. Grazed: 2 circuits, Aug 31-Oct 4.

Fosters

Wheat (Blocks 2 and 4). Ploughed: Oct 13, 1951. Seed drilled at
3 bushels per acre with basal fertilizer: Oct 20. Nitrochalk
applied: Apr 29, 1952. Harvested: July 25. Variety: Yeoman.

Potatoes (Blocks 6, 10, 11, 12). Ploughed: Aug 28, 1951 and again
Jan 22, 1952. Ridged, dung and artificials applied, potatoes
planted: Apr 29. Earthed up: June 19. Sprayed with copper
sulphate solution, 5 lb per acre: Aug 12 and again Sept 4.
Sprayed with 20% sulphuric acid: Sept 23. Lifted: Oct 18.
Variety: Majestic.

Barley (Blocks 5, 7, 8, 9). Ploughed: Jan 18, 1952. Seed drilled
at 3 bushels per acre with basal fertilizers, nitrochalk applied:
Feb 29. Sprayed with MCPA low volume, 5 pints per acre: May 10.
Harvested: July 25. Variety: Plumage Archer.

Cut Grass, Grazed Ley, Lucerne, all 1st year (Blocks 1 and 3).
Ploughed: Oct 3, 1951 and again Jan 19, 1952. Basal fertilizer
applied: Apr 5. Nitrochalk applied (none to Lucerne): Apr 17.

Cut grass. Seeds sown at 38 lb per acre: Apr 17. Topped: twice
July 10 and 18. Cut twice: Sept 5 and 27. Nitrochalk
applied: Sept 5.

Grazed Ley. Seeds sown at 55 lb per acre. Topped twice: July 10
and 18. Grazed: 3 circuits, June 3-Sept 14.

Lucerne. Seed drilled at 33 lb per acre: Apr 17. Cut: twice
July 18 and Sept 11. Variety: Du Puits.

Hay 1st year (Blocks 1 and 3). Seeds sown at 38 lb per acre:
Apr 18, 1951. Basal fertilizers applied: Dec 20. Cut:
June 12, 1952.

Reseeded Grass 4th year (Blocks 1-4). Basal fertilizers applied:
Dec 20, 1951. Cut: May 10, 1952. Nitrochalk applied: June 21.
Grazed: 4 circuits, May 30-Sept 30.

Cut Grass 2nd year (Blocks 6 and 11). Basal fertilizers applied:
Dec 20, 1951. Nitrochalk applied: Mar 26, 1952. Cut: 5 times
May 19, June 16, July 18, Sept 4 and Sept 26. Nitrochalk
applied after each cut except the last.

52/Bc/1.6

Grazed Ley 2nd year (Blocks 6 and 11). Basal fertilizers applied:
Dec 20, 1951. Nitrochalk applied: Mar 26, 1952. Pre-grazing
cut: May 9. Nitrochalk applied: June 19. Grazed: 4 circuits,
May 22-Sept 12.

Lucerne 2nd year (Blocks 6 and 11). Basal fertilizers applied:
Dec 20, 1951. Cut: 3 times June 12, July 18 and Sept 9, 1952.

Reseeded grass 2nd year (Blocks 6, 10, 11, 12). Basal fertilizers
applied: Dec 20. Nitrochalk applied: Mar 26. Pre-grazing cut:
May 9. Nitrochalk applied: June 17. Grazed: 4 circuits, May 22-
Oct 4.

Cut Grass 3rd year (Blocks 5 and 7). Basal fertilizers applied:
Dec 20, 1951. Nitrochalk applied: Mar 26, 1952. Cut: 5 times
May 19, June 16, July 18, Sept 4 and Sept 26. Nitrochalk applied
after each cut except the last.

Grazed Ley 3rd year (Blocks 5 and 7). Basal fertilizers applied:
Dec 20, 1951. Nitrochalk applied: Mar 26, 1952. Pre-grazing
cut: May 10. Nitrochalk applied: June 27. Grazed: 4 circuits,
May 26 to Sept 10.

Lucerne 3rd year (Blocks 5 and 7). Basal fertilizers applied:
Dec 20, 1951. Cut: 3 times June 12, July 18 and Sept 9, 1952.

Reseeded grass 3rd year (Blocks 5, 7, 8, 9). Basal fertilizers
applied: Dec 20, 1951. Nitrochalk applied: Mar 26, 1952.
Pre-grazing cut: June 12. Nitrochalk applied: June 17. Grazed:
2 circuits, Aug 26-Sept 26.

Standard errors per $\frac{1}{4}$ plot

Wheat, grain. Highfield: 2.49 cwt per acre or 6.5% (13 d.f.)
Fosters: 0.83 cwt per acre or 2.3% (13 d.f.)

Potatoes, total tubers.

Highfield: 1.61 tons per acre or 12.8% (21 d.f.)
Fosters: 1.35 tons per acre or 10.7% (21 d.f.)

Barley, grain. Highfield: 2.34 cwt per acre or 8.3% (21 d.f.)
Fosters: 1.53 cwt per acre or 4.3% (21 d.f.)

52/Bc/1.7

Summary of Results

Wheat (1st Test Crop)

Grain: cwt per acre

| cwt N per acre | Treatment crops for previous 3 years | | | | Mean |
|----------------------------|--------------------------------------|------|-----------|--------------------|---------------------|
| | Lucerne | Ley | Cut Grass | Arable with hay | |
| Highfield | | | | | |
| Mean (± 0.88) | 40.7 | 36.1 | 34.1 | 43.1 | 38.5 |
| To Test Crop | | | | | |
| 0.3 (± 1.24) | 42.6 | 37.0 | 37.0 | 44.0 | 40.1 |
| 0.6 | 38.9 | 35.2 | 31.1 | 42.3 | 36.9 |
| Diff. (± 1.76) | -3.7 | -1.8 | -5.9 | -1.7 | -3.2 (± 0.88) |
| To Treatment Crops | | | | | |
| Single rate (± 1.24) | | 35.7 | 34.4 | 43.2 | 37.8 |
| Double rate | | 36.4 | 33.8 | 43.1 | 37.8 |
| Diff. (± 1.76) | | +0.7 | -0.6 | -0.1 | 0.0 (± 0.88) |
| Fosters | | | | | |
| Mean (± 0.29) | 40.5 | 34.7 | 36.2 | 35.3 | 36.7 |
| To Test Crop | | | | | |
| 0.3 (± 0.42) | 40.1 | 33.5 | 35.8 | 33.6 | 35.8 |
| 0.6 | 41.0 | 35.8 | 36.5 | 37.1 | 37.6 |
| Diff. (± 0.59) | +0.9 | +2.3 | +0.7 | +3.5 | +1.8 (± 0.29) |
| To Treatment Crops | | | | | |
| Single rate (± 0.42) | | 34.8 | 36.5 | 35.1 | 35.5 |
| Double rate | | 34.6 | 35.8 | 35.6 | 35.3 |
| Diff. (± 0.59) | | -0.2 | -0.7 | +0.5 | -0.2 (± 0.29) |

52/Bc/1.8

Wheat (1st Test Crop)

Straw: cwt per acre

| cwt N per acre | Treatment crops for previous 3 years | | | | Mean |
|--------------------|--------------------------------------|------|-----------|--------------------|------|
| | Lucerne | Ley | Cut grass | Arable with hay | |
| Highfield | | | | | |
| Mean | 83.5 | 79.0 | 72.6 | 88.0 | 80.8 |
| To Test Crop | | | | | |
| 0.3 | 85.1 | 78.9 | 74.5 | 86.9 | 81.3 |
| 0.6 | 82.0 | 79.2 | 70.7 | 89.2 | 80.3 |
| Diff. | -3.1 | +0.3 | -3.8 | +2.3 | -1.0 |
| To Treatment Crops | | | | | |
| Single rate | | 77.8 | 72.2 | 87.3 | 79.1 |
| Double rate | | 80.3 | 73.0 | 88.8 | 80.7 |
| Diff. | | +2.5 | +0.8 | +1.5 | +1.6 |
| Fosters | | | | | |
| Mean | 74.7 | 68.7 | 65.4 | 61.7 | 67.6 |
| To Test Crop | | | | | |
| 0.3 | 73.5 | 67.0 | 62.8 | 58.7 | 65.5 |
| 0.6 | 75.8 | 70.4 | 68.0 | 64.7 | 69.7 |
| Diff. | +2.3 | +3.4 | +5.2 | +6.0 | +4.2 |
| To Treatment Crops | | | | | |
| Single rate | | 69.1 | 65.4 | 61.5 | 65.3 |
| Double rate | | 68.3 | 65.4 | 61.9 | 65.2 |
| Diff. | | -0.8 | -0.0 | +0.4 | -0.1 |

52/Bc/1.9

Wheat (1st Test Crop)

Grain: cwt per acre

| cwt N per acre | N | | | Dung: tons per acre | | |
|-------------------|-------------------------------|----------------|------|----------------------------|----|------|
| | To previous treatment crop | | Mean | To previous potato crop | | Mean |
| | Single rate | Double rate | | None | 12 | |

Highfield

| | (± 1.02) | | | (± 1.76) | | |
|-------------------------------|--------------|------|------|--------------|------|------|
| To Test Crop | | | | | | |
| 0.3 | 39.2 | 39.4 | 39.3 | 44.9 | 43.1 | 44.0 |
| 0.6 | 36.3 | 36.1 | 36.2 | 42.1 | 42.5 | 42.3 |
| Mean | 37.8 | 37.8 | 37.8 | 43.5 | 42.8 | 43.1 |
| | (± 0.72) | | | (± 1.24) | | |
| To previous treatment crop | | | | (± 1.76) | | |
| Single rate | | | | 43.0 | 43.4 | 43.2 |
| Double rate | | | | 44.0 | 42.2 | 43.1 |
| Mean | | | | 43.5 | 42.8 | 43.1 |
| | | | | (± 1.24) | | |

Fosters

| | (± 0.34) | | | (± 0.59) | | |
|-------------------------------|--------------|------|------|--------------|------|------|
| To Test Crop | | | | | | |
| 0.3 | 35.0 | 33.6 | 34.3 | 35.4 | 31.9 | 33.6 |
| 0.6 | 35.9 | 37.1 | 36.5 | 36.6 | 37.5 | 37.1 |
| Mean | 35.5 | 35.3 | 35.4 | 36.0 | 34.7 | 35.3 |
| | (± 0.24) | | | (± 0.42) | | |
| To Previous treatment crop | | | | (± 0.59) | | |
| Single rate | | | | 35.8 | 34.3 | 35.1 |
| Double rate | | | | 36.2 | 35.1 | 35.6 |
| Mean | | | | 36.0 | 34.7 | 35.3 |
| | | | | (± 0.42) | | |

52/Bc/1.10

Wheat (1st Test Crop)

Straw: cwt per acre

| cwt N per acre | N | | | Dung: tons per acre | | |
|-------------------|-------------------------------|----------------|------|----------------------------|----|------|
| | To previous treatment crop | | Mean | To previous potato crop | | Mean |
| | Single rate | Double rate | | None | 12 | |

Highfield

| | | | | | | |
|--------------|------|------|------|------|------|------|
| To Test Crop | | | | | | |
| 0.3 | 79.9 | 80.2 | 80.1 | 88.0 | 85.8 | 86.9 |
| 0.6 | 78.2 | 81.2 | 79.7 | 83.7 | 94.7 | 89.2 |
| Mean | 79.1 | 80.7 | 79.9 | 85.8 | 90.3 | 88.0 |

To previous
treatment crop

| | | | | | | |
|-------------|--|--|--|------|------|------|
| Single rate | | | | 85.1 | 89.4 | 87.3 |
| Double rate | | | | 86.6 | 91.1 | 88.8 |
| Mean | | | | 85.8 | 90.3 | 88.0 |

Fosters

| | | | | | | |
|--------------|------|------|------|------|------|------|
| To Test Crop | | | | | | |
| 0.3 | 63.9 | 61.7 | 62.8 | 63.3 | 54.1 | 58.7 |
| 0.6 | 66.7 | 68.7 | 67.7 | 59.6 | 69.9 | 64.7 |
| Mean | 65.3 | 65.2 | 65.3 | 61.4 | 62.0 | 61.7 |

To previous
treatment crop

| | | | | | | |
|-------------|--|--|--|------|------|------|
| Single rate | | | | 62.1 | 60.9 | 61.5 |
| Double rate | | | | 60.7 | 63.0 | 61.9 |
| Mean | | | | 61.4 | 62.0 | 61.7 |

N. B. There are no pages numbered 52/Bc/1.11 and 12.

52/Bc/1.13

Potatoes (2nd Test Crop)

| Dung: tons per acre | Highfield | | | Fosters | | |
|-----------------------------|-----------------------|-------|----------|-----------------------|-------|----------|
| | cwt N per acre 0.5 | 1.0 | Mean | cwt N per acre 0.5 | 1.0 | Mean |
| Total tubers: tons per acre | | | | | | |
| | | | (±0.402) | | | (±0.337) |
| None | 11.32 (±0.568) | 12.31 | 11.81 | 11.51 (±0.447) | 11.91 | 11.71 |
| 12 | 12.60 | 13.88 | 13.24 | 13.48 | 13.66 | 13.57 |
| Mean | 11.96 (±0.402) | 13.09 | 12.53 | 12.49 (±0.337) | 12.79 | 12.64 |
| Percentage ware | | | | | | |
| None | 73.3 | 78.0 | 75.7 | 79.2 | 78.8 | 79.0 |
| 12 | 73.0 | 77.9 | 75.5 | 82.9 | 83.6 | 83.2 |
| Mean | 73.2 | 78.0 | 75.6 | 81.1 | 81.2 | 81.1 |

Barley (3rd Test Crop)

| Dung to potatoes: tons per acre | Highfield | | | Fosters | | |
|------------------------------------|-----------------------|------|---------|-----------------------|------|---------|
| | cwt N per acre 0.2 | 0.4 | Mean | cwt N per acre 0.2 | 0.4 | Mean |
| Grain: cwt per acre | | | | | | |
| | | | (±0.58) | | | (±0.38) |
| None | 27.2 (±0.83) | 26.4 | 26.8 | 34.5 (±0.54) | 35.6 | 35.1 |
| 12 | 30.5 | 29.0 | 29.8 | 35.4 | 36.5 | 35.9 |
| Mean | 28.9 (±0.58) | 27.7 | 28.3 | 34.9 (±0.38) | 36.1 | 35.5 |
| Straw: cwt per acre | | | | | | |
| None | 61.2 | 60.9 | 61.0 | 42.7 | 49.9 | 46.3 |
| 12 | 66.5 | 64.8 | 65.6 | 44.8 | 52.5 | 48.6 |
| Mean | 63.8 | 62.8 | 63.3 | 43.8 | 51.2 | 47.5 |

52/Bc/1.14

One Year Hay

Dry Matter: cwt per acre

| | Nitrogen to 3 previous test crops | | Dung to Potatoes 1950 | | Mean |
|-----------------|-----------------------------------|-------------|-----------------------|------------------|------|
| | Single rate | Double rate | 0 tons per acre | 12 tons per acre | |
| Highfield | | | | | |
| Nitrogen to Hay | | | | | |
| 0.3 cwt | 66.0 | 65.3 | 67.3 | 64.0 | 65.6 |
| 0.6 cwt | 68.4 | 64.4 | 63.7 | 69.1 | 66.4 |
| N to test crop | | | | | |
| Single rate | | | 65.8 | 68.6 | 67.2 |
| Double rate | | | 65.2 | 64.5 | 64.8 |
| Mean | | | 65.5 | 66.6 | 66.0 |

| Fosters | | | | | |
|-----------------|------|------|------|------|------|
| Nitrogen to Hay | | | | | |
| 0.3 cwt | 62.5 | 62.4 | 60.4 | 64.5 | 62.5 |
| 0.6 cwt | 67.3 | 60.5 | 61.7 | 66.1 | 63.9 |
| N to test crop | | | | | |
| Single rate | | | 63.9 | 66.0 | 64.9 |
| Double rate | | | 58.3 | 64.7 | 61.5 |
| Mean | | | 61.1 | 65.3 | 63.2 |

52/Bc/1.15

Cut Grass
Dry Matter: cwt per acre

| Nitrogen (1) to cut grass | Nitrogen to previous 3 test crops | | Dung to potatoes 1950 tons per acre | | Mean |
|------------------------------|--------------------------------------|----------------|---|------|------|
| | Single rate | Double rate | 0 | 12 | |
| <u>1st year</u> | | | | | |
| Highfield | | | | | |
| Single rate | 46.5 | 44.9 | 43.3 | 48.1 | 45.7 |
| Double rate | 44.5 | 47.9 | 46.0 | 46.4 | 46.2 |
| N to test crops | | | | | |
| Single rate | | | 43.6 | 47.5 | 45.5 |
| Double rate | | | 45.8 | 47.0 | 46.4 |
| Mean | | | 44.7 | 47.2 | 46.0 |

| | N to cut grass (1) | | Mean |
|--------------------------|--------------------|----------------|------|
| | Single rate | Double rate | |
| <u>2nd year</u> (5 cuts) | 56.4 | 63.1 | 59.8 |
| <u>3rd year</u> (5 cuts) | 49.2 | 57.4 | 53.3 |

| Nitrogen (1) to cut grass | Nitrogen to previous 3 test crops | | Dung to potatoes 1950 | | Mean |
|------------------------------|--------------------------------------|----------------|--------------------------|------|------|
| | Single rate | Double rate | 0 | 12 | |
| <u>1st year</u> | | | | | |
| Fosters | | | | | |
| Single rate | 11.7 | 10.0 | 11.0 | 10.7 | 10.8 |
| Double rate | 11.3 | 12.5 | 12.3 | 11.5 | 11.9 |
| N to test crops | | | | | |
| Single rate | | | 11.1 | 11.9 | 11.5 |
| Double rate | | | 12.2 | 10.3 | 11.2 |
| Mean | | | 11.7 | 11.1 | 11.4 |

| | N to cut grass (1) | | Mean |
|--------------------------|--------------------|----------------|------|
| | Single rate | Double rate | |
| <u>2nd year</u> (5 cuts) | 59.4 | 68.0 | 63.7 |
| <u>3rd year</u> (5 cuts) | 47.7 | 51.3 | 49.5 |

(1) 0.15 v. 0.3 cwt N as nitrochalk for every cut.

52/Bc/1.16

Ley

Dry Matter: cwt per acre

| | Cutting (1) Nitrogen (2) | | | Grazing from sampling cuts Nitrogen (2) | | |
|-----------|-----------------------------|----------------|------|---|----------------|------|
| | Single rate | Double rate | Mean | Single rate | Double rate | Mean |
| Highfield | | | | | | |
| 1st year | | | | 34.2 | 37.2 | 35.7 |
| 2nd year | 27.3 | 27.2 | 27.3 | 25.2 | 27.1 | 26.1 |
| 3rd year | 26.1 | 28.9 | 27.5 | 19.9 | 21.5 | 20.7 |
| Fosters | | | | | | |
| 1st year | | | | 18.2 | 18.6 | 18.4 |
| 2nd year | 19.6 | 19.7 | 19.7 | 21.0 | 21.6 | 21.3 |
| 3rd year | 16.4 | 18.2 | 17.3 | 22.6 | 23.4 | 23.0 |

- (1) Preliminary before grazing
 (2) The nitrogen applied is 0.15 v. 0.3 cwt per acre in all for the preliminary cut and the grazing

Reseeded Grass

Dry Matter: cwt per acre

| | Cutting Nitrogen (3) | | | Grazing from sampling cuts Nitrogen (3) | | |
|-------------------------|-------------------------|----------------|------|---|---------------------|------|
| | Single rate | Double rate | Mean | Single rate | Double rate | Mean |
| Highfield | | | | | | |
| 4th year grazing (1) | 30.4 | 34.0 | 32.2 | 21.8 | 21.8 | 21.8 |
| 2nd year grazing (1) | 22.3 | 26.1 | 24.2 | 27.1 | 27.6 | 27.3 |
| 3rd year hay | 65.4 | 68.8 | 67.1 | 15.9 ⁽²⁾ | 18.2 ⁽²⁾ | 17.0 |
| Fosters | | | | | | |
| 4th year grazing (1) | 18.2 | 19.7 | 18.9 | 22.3 | 25.0 | 23.6 |
| 2nd year grazing (1) | 14.2 | 17.3 | 15.8 | 25.1 | 24.8 | 25.0 |
| 3rd year hay | 47.4 | 52.3 | 49.8 | 12.1 ⁽²⁾ | 14.5 ⁽²⁾ | 13.3 |

- (1) Preliminary cut before grazing
 (2) Aftermath grazing
 (3) N for preliminary cut and grazing 0.15 v. 0.3 cwt in all
 N for preliminary cut and hay 0.15 v. 0.3 cwt
 N for preliminary cut and aftermath 0.15 v. 0.3 cwt.

52/Bc/1.17

Permanent Grass

Dry Matter: cwt per acre

| | | Cutting Nitrogen (3) | | | Grazing from sampling cuts Nitrogen (3) | | |
|-------------|--------|----------------------|-------------|------|---|---------------------|------|
| | | Single rate | Double rate | Mean | Single rate | Double rate | Mean |
| | Blocks | Highfield | | | | | |
| Grazing (1) | 1-4 | 28.2 | 29.9 | 29.0 | 17.8 | 18.0 | 17.9 |
| Grazing | 9-12 | 11.2 | 12.6 | 11.9 | 25.7 | 27.7 | 26.7 |
| Hay | 5-8 | 50.1 | 54.6 | 52.4 | 13.2 ⁽²⁾ | 14.5 ⁽²⁾ | 13.9 |

- (1) Preliminary cut before grazing (2) Aftermath grazing.
 (3) N for preliminary cut and grazing 0.15 v. 0.3 cwt in all
 N for preliminary cut and hay 0.15 v. 0.3 cwt
 N for preliminary cut and aftermath 0.15 v. 0.3 cwt.

Lucerne

Dry Matter: cwt per acre

| | | Nitrogen to 3 previous test crops | | | Nitrogen to 3 previous test crops | | |
|--------------------------|---------|-----------------------------------|-------------|------|-----------------------------------|-------------|------|
| | | Single rate | Double rate | Mean | Single rate | Double rate | Mean |
| | | Highfield | | | Fosters | | |
| <u>1st Year</u> (2 cuts) | | | | | | | |
| Dung to potatoes | | | | | | | |
| 1950 | 0 | 44.0 | 42.1 | 43.1 | 29.6 | 33.8 | 31.7 |
| | 12 tons | 46.9 | 45.0 | 45.9 | 35.5 | 20.4 | 27.9 |
| Mean | | 45.4 | 43.5 | 44.5 | 32.5 | 27.1 | 29.8 |
| <u>2nd year</u> (3 cuts) | | Mean = 81.5 | | | Mean = 93.0 | | |
| <u>3rd year</u> (3 cuts) | | Mean = 68.7 | | | Mean = 102.9 | | |

52/Bd/1.1

GREEN MANURING EXPERIMENT

Woburn Stackyard - 1952, the 16th year

For details of treatments etc. see "Results of Field Experiments 1939-47". Since 1950 the fallow, lupin and ryegrass plots of the cabbage crop have been split into two for early and late planting.

Cultivations, etc.:

Green manures. Clover and ryegrass undersown in barley: Apr 18, 1951. Ploughed fallow, lupin and rape plots: Sept 17, 1951 and Jan 6, 1952. Sulphate of ammonia applied: Apr 3. Rape sown: Apr 17. Lupins drilled: Apr 19. Rape dusted with D.D.T: Apr 26 and May 17.

Cabbages. Dung and straw applied to fallow, clover and ryegrass plots, and ploughed in: May 13, 1952. Dung and straw applied to lupin and rape plots, ploughed in: June 23. Basal fertilizers applied: June 24. Cabbages planted and watered in (calomel treated): June 24. Sprayed with Parathion: July 30 and Sept 5. Harvested: Nov 11, 1952 - Mar 18, 1953. Variety: January King.

Barley. Ploughed: Mar 20, 1952. Chalk (46 cwt per acre) applied: Mar 26. Sulphate of ammonia applied: Apr 15. Seed drilled at 3 bushels per acre: Apr 16. Clover and ryegrass undersown: Apr 17. Harvested: Aug 15. Variety: Plumage Archer.

Standard errors per plot:

Cabbages, weight of headed cabbages: 0.383 tons per acre or
28.3% (9 d.f.)

Barley, grain: 2.24 cwt per acre or 24.3% (9 d.f.)

52/Bd/1.2

Summary of Results

Cabbages

| | Green Manure | | | | Rye- grass | Mean |
|--|--------------|--------|----------|------|---------------|------|
| | None | Lupins | Clover | Rape | | |
| Weight of headed cabbages: tons per acre | | | | | | |
| | | | (±0.309) | | (±0.138) | |
| No Dung | 1.40 | 1.62 | 3.14 | 0.11 | 1.38 | 1.53 |
| Dung | 3.31 | 2.30 | 4.39 | 1.59 | 2.64 | 2.85 |
| No Straw | 2.56 | 1.93 | 3.71 | 0.92 | 1.98 | 2.22 |
| Straw | 2.15 | 2.00 | 3.82 | 0.78 | 2.04 | 2.16 |
| Sulph. amm. | | | | | | |
| 2 cwt per acre | 2.27 | 1.56 | 3.54 | 0.74 | 1.53 | 1.93 |
| 4 cwt per acre | 2.44 | 2.36 | 4.00 | 0.96 | 2.48 | 2.45 |
| Sulph. amm. to green manure | | | | | | |
| Low | 2.09 | 1.70 | 4.22 | 0.67 | 1.86 | 2.11 |
| High | 2.62 | 2.22 | 3.32 | 1.03 | 2.16 | 2.27 |
| Mean (±0.219) | 2.36 | 1.96 | 3.77 | 0.85 | 2.01 | 2.19 |

Total produce: tons per acre

| | | | | | | |
|-----------------------------|------|------|------|------|------|------|
| No Dung | 4.43 | 4.29 | 6.28 | 2.44 | 4.46 | 4.38 |
| Dung | 6.57 | 5.08 | 7.46 | 4.50 | 5.59 | 5.84 |
| No Straw | 5.68 | 4.70 | 6.70 | 3.62 | 5.06 | 5.15 |
| Straw | 5.32 | 4.66 | 7.04 | 3.32 | 4.99 | 5.07 |
| Sulph. amm. | | | | | | |
| 2 cwt per acre | 5.62 | 4.30 | 6.78 | 3.20 | 4.46 | 4.87 |
| 4 cwt per acre | 5.38 | 5.06 | 6.95 | 3.74 | 5.58 | 5.34 |
| Sulph. amm. to green manure | | | | | | |
| Low | 5.14 | 4.38 | 7.24 | 2.93 | 4.79 | 4.89 |
| High | 5.86 | 4.99 | 6.50 | 4.01 | 5.26 | 5.32 |
| Mean | 5.50 | 4.68 | 6.87 | 3.47 | 5.02 | 5.11 |

52/Bd/1.4

Barley

| | Green Manure | | | | | Rye-grass | Mean |
|------------------------------|----------------|--------|--------|------|------|-----------|----------------|
| | None | Lupins | Clover | Rape | | | |
| Grain: cwt per acre | | | | | | | |
| | (± 1.12) | | | | | | (± 0.50) |
| No Dung to cabbages 1951 | 7.0 | 8.7 | 10.3 | 10.3 | 9.8 | 9.2 | |
| Dung to cabbages | 5.5 | 9.8 | 10.2 | 10.6 | 9.9 | 9.2 | |
| No Straw to cabbages 1951 | 5.6 | 9.0 | 10.0 | 10.8 | 8.9 | 8.9 | |
| Straw to cabbages | 6.9 | 9.5 | 10.5 | 10.1 | 10.8 | 9.6 | |
| Sulph. amm. to cabbages 1951 | | | | | | | |
| 2 cwt per acre | 7.0 | 9.2 | 10.2 | 10.4 | 8.6 | 9.1 | |
| 4 cwt per acre | 5.5 | 9.4 | 10.3 | 10.5 | 11.1 | 9.4 | |
| Sulph. amm. to barley | | | | | | | |
| Nil | 5.0 | 7.1 | 11.1 | 9.3 | 7.1 | 7.9 | |
| $1\frac{1}{2}$ cwt per acre | 7.5 | 11.4 | 9.5 | 11.6 | 12.6 | 10.5 | |
| Mean (± 0.79) | 6.2 | 9.3 | 10.3 | 10.5 | 9.9 | 9.2 | |

Straw: cwt per acre

| | | | | | | |
|------------------------------|-----|------|------|------|------|------|
| No Dung to cabbages 1951 | 6.9 | 10.9 | 12.2 | 12.6 | 11.7 | 10.9 |
| Dung to cabbages | 7.6 | 12.0 | 16.3 | 13.4 | 13.5 | 12.5 |
| No Straw to cabbages 1951 | 7.0 | 10.5 | 12.8 | 14.2 | 12.0 | 11.3 |
| Straw to cabbages | 7.5 | 12.4 | 15.7 | 11.8 | 13.1 | 12.1 |
| Sulph. amm. to cabbages 1951 | | | | | | |
| 2 cwt per acre | 7.6 | 11.6 | 13.0 | 12.4 | 11.1 | 11.1 |
| 4 cwt per acre | 6.9 | 11.3 | 15.5 | 13.6 | 14.0 | 12.3 |
| Sulph. amm. to barley | | | | | | |
| Nil | 6.6 | 8.8 | 13.1 | 12.0 | 9.1 | 9.9 |
| $1\frac{1}{2}$ cwt per acre | 7.9 | 14.2 | 15.4 | 14.0 | 16.1 | 13.5 |
| Mean | 7.3 | 11.5 | 14.2 | 13.0 | 12.6 | 11.7 |

52/Bd/1.5

Barley

Differential Responses

| Response to | Mean | Dung to Cabbages | | Straw to Cabbages | | Sulph. amm. to cabbages | | Sulph. amm. to barley | |
|-------------|------|------------------|-----------|-------------------|-----------|-------------------------|--------------|-----------------------|--------------|
| | | Abs.Pres. | Abs.Pres. | Abs.Pres. | Abs.Pres. | cwt per acre | cwt per acre | cwt per acre | cwt per acre |
| | | | | | | 2 | 4 | 0 | 1½ |

Grain: cwt per acre

| | (±0.71) | | | (±1.01) | | | | | |
|-----------------------------|---------|------|------|---------|------|------|------|------|------|
| Dung to cabbages 1951 | 0.0 | - | - | +0.1 | -0.1 | +0.6 | -0.6 | -1.5 | +1.5 |
| Straw to cabbages 1951 | +0.7 | +0.8 | +0.6 | - | - | -0.4 | +1.8 | +1.4 | 0.0 |
| Sulph. amm to cabbages 1951 | +0.3 | +0.9 | -0.3 | -0.8 | +1.4 | - | - | +0.8 | -0.2 |
| Sulph. amm to barley | +2.6 | +1.1 | +4.1 | +3.3 | +1.9 | +3.1 | +2.1 | - | - |

Straw: cwt per acre

| | | | | | | | | | |
|-----------------------------|------|------|------|------|------|------|------|------|------|
| Dung to cabbages 1951 | +1.7 | - | - | +1.4 | +2.0 | +1.6 | +1.8 | -0.9 | +4.3 |
| Straw to cabbages 1951 | +0.8 | +0.5 | +1.1 | - | - | -1.1 | +2.7 | +0.8 | +0.8 |
| Sulph. amm to cabbages 1951 | +1.1 | +1.0 | +1.2 | -0.8 | +3.0 | - | - | +1.2 | +1.0 |
| Sulph. amm. to barley | +3.6 | +1.0 | +6.2 | +3.6 | +3.6 | +3.7 | +3.5 | - | - |

LEY AND ARABLE ROTATIONS

Woburn Stackyard - 1952 the 15th year.

For details of rotations and treatments etc., see "Results of Field Experiments 1939-47".

Cultivations, etc.:

Block I. Ley - first year. Ploughed: Sept 7, 1951 and again Jan 9, 1952. Basal fertilizers applied, seeds sown: Apr 17. Topped: June 6 and Aug 19. Grazed by sheep: 2 circuits - Aug 26-Sept 3 and Sept 19-24. Seeds mixture per acre: 21 lb S23 Perennial Ryegrass, 12 lb S143 Cocksfoot, 6 lb Late flowering Montgomery Red Clover, 3 lb S100 White Clover.

Lucerne - first year. Ploughed: Sept 7, 1951 and again Jan 9, 1952. Basal fertilizers applied, seed drilled at 28 lb per acre: Apr 17. Dusted with D.D.T: Apr 29 and again May 17. Cut twice: July 23 and Oct 2. Variety: Du Ruits.

Potatoes. Ploughed: Sept 7, 1951 and again Jan 9, 1952. Ridged, basal fertilizers applied: Apr 17. Potatoes planted: Apr 19. Earthed up ridges: June 16. Sprayed with copper fungicide, 5 lb per acre: Aug 8 and again Sept 2. Sprayed with sulphuric acid, 15% B.O.V: Sept 22. Lifted: Oct 6. Variety: Majestic.

Block II. Ley - second year. Nitrochalk applied: June 26. Grazed by sheep: 6 circuits - May 9-17, May 31-June 9, June 17-25, July 8-16, Aug 18-26 and Sept 11-19.

Lucerne - second year. Cut three times: June 17, July 23 and Oct 2.

Rye. Ploughed: Oct 10, 1951. Seed drilled at 3 bushels per acre: Oct 26. Nitrochalk applied: Apr 25, 1952. Harvested: July 25. Variety: King II.

Block III. Barley. Ploughed: Jan 7. Ground chalk applied: Feb 29. Basal fertilizers applied: Mar 13. Seed drilled at 3 bushels per acre: Mar 14. Sprayed with M.C.P.A: May 22. Harvested: Aug 14. Variety: Plumage Archer.

Block IV. Ley - third year. Grazed by sheep: 6 circuits - May 1-9, 22-31, June 9-17, June 25-July 3, Aug 7-14 and Sept 3-11.

Lucerne - third year. Cut three times: June 17, July 23 and Oct 2.

Hay. Seeds undersown in Rye: Apr 19, 1951. 2 cwt nitrochalk per acre applied: Apr 17, 1952. First cut: June 6. 1 cwt nitrochalk applied: June 10. Second cut: Oct 2. Seeds mixture per acre: 27 lb S24 Perennial Ryegrass, 12 lb Montgomery Red Clover, 3 lb Canadian Alsike Clover.

Sugar beet. Ploughed: Sept 7, 1951 and Jan 9, 1952. Basal fertilizers applied, seed drilled at 18 lb per acre: Apr 18. Singled: May 30. Lifted: Oct 8. Variety: Klein E.

52/Be/1.2

Block V. Potatoes. Ploughed: Oct 12, 1951 and Feb 1, 1952.
 Ridged, dung and basal fertilizers applied: Apr 23. Potatoes
 planted: Apr 25. Earthed up ridges: June 17. Sprayed with
 copper fungicide, 5 lb per acre: Aug 8 resprayed Aug 11 and
 Sept 2. Sprayed with sulphuric acid 15% B.O.V.: Sept 22.
 Lifted: Oct 6. Variety: Majestic.

Standard errors per plot:

Block III. Barley.

Grain, whole plot: 1.071 cwt per acre or 4.9% (4 d.f.)
 sub plot: 0.740 cwt per acre or 3.4% (4 d.f.)

Block V. Potatoes.

Total tubers, whole plot: 0.990 tons per acre or 9.8% (4 d.f.)
 sub plot: 1.355 tons per acre or 13.5% (4 d.f.)

Summary of Results

Ley. First year

Block I

Sheep days of
 grazing per acre

Mean 339

Lucerne. First year

Yield of Lucerne Hay (85% Dry Matter) cwt per acre

| | 1st Crop | 2nd Crop | Total |
|-------------------|----------|----------|-------|
| No Dung | 4.4 | 15.1 | 19.5 |
| Dung in 1950 | 10.0 | 25.9 | 35.9 |
| Mean | 7.2 | 20.5 | 27.7 |
| Increase | 5.6 | 10.8 | 16.4 |
| Previous rotation | | | |
| Lucerne | 7.7 | 21.7 | 29.4 |
| Arable with Hay | 6.7 | 19.3 | 26.0 |

52/Be/1.3

Block I

Potatoes

| | Total tubers tons per acre | Percentage Ware |
|------------------------|-------------------------------|--------------------|
| No Dung | 4.26 | 81.6 |
| Dung in 1950 | 6.48 | 88.1 |
| Mean | 5.37 | 84.9 |
| Increase | 2.22 | 6.5 |
| Previous Rotation | | |
| Ley | 6.54 | 86.2 |
| Lucerne | 5.78 | 87.0 |
| Arable with Hay | 4.74 | 85.8 |
| Arable with Sugar Beet | 4.43 | 80.5 |

Block II

Ley. Second year

Sheep days of
grazing per acre

Mean 1962

Lucerne. Second year

Yield of Lucerne Hay (85% Dry Matter) cwt per acre

| | 1st crop | 2nd crop | 3rd crop | Total |
|------------------------|----------|----------|----------|-------|
| No Dung | 36.1 | 16.6 | 16.1 | 68.8 |
| Dung in 1949 | 29.8 | 15.8 | 16.7 | 62.3 |
| Mean | 33.0 | 16.2 | 16.4 | 65.6 |
| Increase | -6.3 | -0.8 | +0.6 | -6.5 |
| Previous Rotation | | | | |
| Lucerne | 36.3 | 14.0 | 13.9 | 64.2 |
| Arable with Sugar Beet | 29.6 | 18.4 | 18.9 | 66.9 |

52/Be/1.4

Block II

Rye

| | Grain: cwt per acre | Straw: cwt per acre |
|------------------------|---------------------|---------------------|
| No Dung | 29.0 | 31.5 |
| Dung in 1949 | 30.8 | 34.7 |
| Mean | 29.9 | 36.2 |
| Increase | 1.8 | -3.0 |
| Previous Rotation | | |
| Ley | 31.6 | 36.5 |
| Lucerne | 32.6 | 34.0 |
| Arable with Hay | 28.8 | 31.6 |
| Arable with Sugar Beet | 26.6 | 30.3 |

Block III

Barley

| | Previous Rotation | | | | Mean |
|---------------------------------------|---------------------|---------|-----------------|------------------------|--------------------|
| | Ley | Lucerne | Arable with hay | Arable with sugar beet | |
| | Grain: cwt per acre | | | | |
| No Dung (± 0.84) ⁽¹⁾ | 23.6 | 22.2 | 14.1 | 16.8 | 19.2 |
| Dung in 1951 | 25.8 | 26.4 | 21.8 | 23.0 | 24.2 |
| Mean (± 0.76) | 24.7 | 24.3 | 17.9 | 19.9 | 21.7 |
| Increase (± 0.74) | 2.2 | 4.2 | 7.7 | 6.2 | 5.0 (± 0.37) |
| | Straw: cwt per acre | | | | |
| No dung | 25.2 | 22.1 | 13.7 | 18.6 | 19.9 |
| Dung in 1951 | 29.7 | 30.5 | 22.3 | 26.3 | 27.2 |
| Mean | 27.5 | 26.3 | 18.0 | 22.4 | 23.5 |
| Increase | 4.5 | 8.4 | 8.6 | 7.7 | 7.3 |

Standard error (1) for use in comparisons other than vertical

52/Be/1.5

Block IV

Ley. Third year

| | Sheep days of grazing per acre |
|------|-----------------------------------|
| Mean | 2089 |

Lucerne. Third year

Yield of Lucerne Hay (85% Dry Matter) cwt per acre

| | 1st crop | 2nd crop | 3rd crop | Total |
|-------------------|----------|----------|----------|-------|
| No Dung | 28.2 | 17.2 | 17.5 | 62.9 |
| Dung in 1948 | 35.4 | 22.5 | 21.5 | 79.4 |
| Mean | 31.8 | 19.8 | 19.5 | 71.2 |
| Increase | 7.2 | 5.3 | 4.0 | 16.5 |
| Previous rotation | | | | |
| Lucerne | 34.1 | 23.2 | 20.0 | 77.3 |
| Arable with Hay | 29.5 | 16.5 | 19.0 | 65.0 |

Hay

Yield (85% Dry Matter) cwt per acre

| | 1st crop | 2nd crop | Total |
|-------------------|----------|----------|-------|
| No Dung | 51.6 | 4.6 | 56.2 |
| Dung in 1948 | 58.2 | 8.4 | 66.6 |
| Mean | 54.9 | 6.5 | 61.4 |
| Increase | 6.6 | 3.8 | 10.4 |
| Previous Rotation | | | |
| Lucerne | 52.7 | 10.0 | 62.7 |
| Arable with Hay | 57.1 | 3.0 | 60.1 |

52/Be/1.6

Sugar Beet

Block IV

| | Roots (washed) tons per acre | Tops tons per acre | Total sugar cwt per acre | Sugar Percent- age |
|------------------------|---------------------------------------|--------------------------|-----------------------------------|--------------------------|
| No Dung | 12.62 | 7.16 | 48.0 | 19.04 |
| Dung in 1948 | 14.99 | 7.76 | 56.0 | 18.68 |
| Mean | 13.80 | 7.46 | 52.0 | 18.86 |
| Increase | +2.37 | +0.60 | +8.0 | -0.36 |
| Previous Rotation | | | | |
| Ley | 13.89 | 7.62 | 52.1 | 18.76 |
| Arable with Sugar Beet | 13.72 | 7.31 | 51.8 | 18.96 |

Potatoes

Block V

Previous Rotation

| | Ley | Lucerne | Arable with hay | Arable with sugar beet | Mean |
|--|-------|---------|-----------------------|---------------------------------|----------------------|
| Total tubers: tons per acre | | | | | |
| No Dung (± 0.974) ⁽¹⁾ | 10.46 | 7.42 | 7.19 | 6.54 | 7.90 |
| Dung in 1952 | 15.05 | 11.45 | 11.20 | 11.28 | 12.24 |
| Mean (± 0.700) | 12.75 | 9.44 | 9.19 | 8.91 | 10.07 |
| Increase (± 1.36) | 4.59 | 4.03 | 4.01 | 4.74 | 4.34 (± 0.678) |
| Percentage Ware | | | | | |
| No Dung | 94.1 | 89.2 | 92.4 | 89.4 | 91.3 |
| Dung in 1952 | 94.0 | 94.2 | 92.5 | 94.2 | 93.7 |
| Mean | 94.0 | 91.7 | 92.4 | 91.8 | 92.5 |
| Increase | -0.1 | +5.0 | +0.1 | +4.8 | +2.4 |

Standard error (1) for use in comparisons other than vertical

52/Bf/1.1

WOBURN MARKET GARDEN EXPERIMENT

Organic manures and nitrochalk - Lansome 1952 the 11th year.

The present cropping comprises two series, each carrying in turn the crops of a two course rotation: 1st year - Globe beet followed by Spring cabbages; 2nd year - Leeks.

System of replication (each series): 4 randomized blocks of 10 plots each, certain interactions being confounded with block differences.

Area of each plot: 0.0125 acre.

Treatments applied to each crop:

Organic manures: Dung; sewage sludge compost; sewage sludge (West Middlesex); vegetable compost, each at 10 and 20 tons per acre.

Nitrochalk; None; 0.3 cwt N per acre on plots receiving organic manure. None; 0.3, 0.6, 0.9 cwt N per acre on plots not receiving organic manure. The last two rates are applied in two equal dressings.

Basal manuring per acre to each crop: 0.3 cwt P_2O_5 ; 0.3 cwt K_2O , applied as granular fertilizer (13% P_2O_5 ; 13% K_2O).

Cultivations, etc.:

Globe beet. Organic manures applied and ploughed in: Apr 1. Nitrochalk applied (first dressing to 0.6 and 0.9 N plots): Apr 23. Basal manure applied: Apr 25. Seed drilled at 13 lb per acre: Apr 26. Dusted against flea beetle: May 1-17. Singled: June 12. Second application of nitrochalk to 0.6 and 0.9 N plots: June 13. Lifted: July 11-Sept 24. Variety: Detroit.

Spring cabbages 1952-53. Organic manures applied and ploughed in: Sept 25, 1952. Basal manures applied: Sept 26. Cabbages planted (calomel treated) and watered in, $2\frac{1}{2}$ cwt of 5% D.D.T. dust broadcast before planting: Sept 29. Owing to damage by birds cabbages had to be ploughed in: Mar 12, 1953. Variety: Durham Early.

Leeks 1952-53. Organic manures applied and ploughed in: July 8, 1952. Basal manures and nitrochalk applied (first dressing to 0.6 and 0.9 N plots): July 30. Leeks planted and watered in: Aug 5-7. Second dressing of nitrochalk to 0.6 and 0.9 N plots: Sept 12. Harvested: Feb 6-Apr 16, 1953. Variety: Musselburgh.

Standard errors per plot:

Globe beet, saleable bulbs: 1.29 tons per acre or 17.1% (17 d.f.)

Leeks, saleable produce: 0.470 tons per acre or 12.6% (17 d.f.)

Summary of Results

Globe Beet

| Organic Manures | Level of manuring (tons per acre) | Nitrochalk, cwt N per acre | | | | Mean |
|-----------------|--------------------------------------|----------------------------|-----|-----|-----|------|
| | | None | 0.3 | 0.6 | 0.9 | |

Saleable bulbs: tons per acre

(±0.911)

(±0.644)

| | | | | | | |
|-------------------|----|-------------------|-------------------|------|------|-------------------|
| None | | 1.59 | 4.88 | 7.63 | 4.24 | 3.24 [⊠] |
| Dung | 10 | 4.98 | 9.58 | | | 7.28 |
| | 20 | 9.74 | 9.60 | | | 9.67 |
| Sludge compost | 10 | 6.01 | 6.69 | | | 6.35 |
| | 20 | 7.06 | 9.56 | | | 8.32 |
| Sludge | 10 | 8.78 | 9.88 | | | 9.33 |
| | 20 | 8.37 | 8.18 | | | 8.27 |
| Vegetable compost | 10 | 7.30 | 8.60 | | | 7.95 |
| | 20 | 6.84 | 10.81 | | | 8.83 |
| Mean (±0.322) | | 7.39 [†] | 9.11 [†] | | | 7.52 |

Total produce: tons per acre

| | | | | | | |
|-------------------|----|--------------------|--------------------|-------|------|-------------------|
| None | | 5.68 | 9.84 | 12.77 | 7.32 | 7.76 [⊠] |
| Dung | 10 | 7.73 | 14.06 | | | 10.89 |
| | 20 | 14.91 | 15.04 | | | 14.97 |
| Sludge compost | 10 | 11.11 | 9.92 | | | 10.52 |
| | 20 | 10.82 | 14.88 | | | 12.85 |
| Sludge | 10 | 14.00 | 16.88 | | | 15.44 |
| | 20 | 12.62 | 11.88 | | | 12.24 |
| Vegetable compost | 10 | 11.82 | 12.64 | | | 12.23 |
| | 20 | 9.97 | 16.03 | | | 13.00 |
| Mean | | 11.62 [†] | 13.91 [†] | | | 11.99 |

Plant number: thousands per acre

| | | | | | | |
|-------------------|----|-------------------|-------------------|-------|------|-------------------|
| None | | 95.4 | 98.7 | 110.5 | 51.4 | 97.1 [⊠] |
| Dung | 10 | 60.1 | 93.0 | | | 76.5 |
| | 20 | 102.3 | 86.9 | | | 94.6 |
| Sludge compost | 10 | 113.4 | 61.2 | | | 87.3 |
| | 20 | 76.4 | 97.3 | | | 86.8 |
| Sludge | 10 | 100.2 | 130.2 | | | 115.2 |
| | 20 | 87.6 | 60.5 | | | 74.0 |
| Vegetable compost | 10 | 86.2 | 93.3 | | | 90.8 |
| | 20 | 64.5 | 102.6 | | | 83.5 |
| Mean | | 86.6 [†] | 90.6 [†] | | | 88.7 |

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

† Excluding 'No organics'.

52/Bf/1.3

Leeks

| Organic Manures (tons per acre) | Level of manuring | Nitrochalk, cwt N per acre | | | | Mean |
|---------------------------------|-------------------|----------------------------|-----|-----|-----|------|
| | | None | 0.3 | 0.6 | 0.9 | |

| | | Saleable produce: tons per acre | | | | |
|----------------------|----|---------------------------------|-------------------|------|------|-------------------|
| | | (± 0.332) | | | | (± 0.235) |
| None | | 1.94 | 3.09 | 3.52 | 2.93 | 2.52 ^x |
| Dung | 10 | 3.98 | 3.83 | | | 3.90 |
| | 20 | 4.44 | 5.03 | | | 4.73 |
| Sludge compost | 10 | 3.48 | 4.05 | | | 3.77 |
| | 20 | 3.71 | 4.01 | | | 3.86 |
| Sludge | 10 | 3.09 | 3.44 | | | 3.27 |
| | 20 | 3.24 | 3.30 | | | 3.27 |
| Vegetable compost | 10 | 4.10 | 4.20 | | | 4.15 |
| | 20 | 4.54 | 4.53 | | | 4.53 |
| Mean (± 0.117) | | 3.82 [†] | 4.05 [†] | | | 3.72 |

Percentage saleable (by number)

| | | | | | | |
|-------------------|----|-------------------|-------------------|------|------|-------------------|
| None | | 87.1 | 92.9 | 93.5 | 92.2 | 90.0 ^x |
| Dung | 10 | 95.6 | 94.9 | | | 95.2 |
| | 20 | 97.1 | 97.6 | | | 97.4 |
| Sludge compost | 10 | 94.3 | 95.5 | | | 94.9 |
| | 20 | 95.7 | 95.6 | | | 95.7 |
| Sludge | 10 | 94.5 | 94.9 | | | 94.7 |
| | 20 | 93.1 | 94.7 | | | 93.9 |
| Vegetable compost | 10 | 98.1 | 95.7 | | | 96.9 |
| | 20 | 96.2 | 97.2 | | | 96.7 |
| Mean | | 95.6 [†] | 95.8 [†] | | | 94.8 |

^x Mean over None and 0.3 cwt N per acre only.

[†] Excluding 'No organics'.

52/Bg/1.1

IRRIGATION EXPERIMENT

The 2nd year

The effects of irrigation and nitrogen - Woburn Butt Close 1952.

The cropping comprises four series; three of these in turn carry the crops of a 3-course rotation:-

1st year: Early potatoes followed by winter cabbages
2nd year: Sugar beet
3rd year: Barley

The fourth series remains in long term grass for cutting.

System of replication: 3 randomized blocks of 4 plots each, plots being split into two for the application of nitrogen.

Area of each sub plot: Cut grass - 0.0264, remainder - 0.0278 acre.

Area harvested: Cut grass - 0.0264, early potatoes - 0.0155,
winter cabbages - 0.0175, sugar beet - 0.0176, barley - 0.0168 acre.

Treatments: All combinations of:-

Whole plots. Irrigation:-

| | Grass | Arable crops |
|---|-----------------|--|
| O | None | None |
| C | Full irrigation | Full irrigation to maintain deficit at 1". |
| B | 2/3 of C | None till mid-season, then as C. |
| A | 1/3 of C | As C till mid-season, then none |

The actual amounts applied are given below.

Sub plots. Nitrogen: 2 levels applied to crops as below.

Rainfall and Irrigation: inches

| Week ending | Rain-fall | Irrigation | | | | | | | | | | | |
|-------------|-----------|----------------|------|------|------------|------|------|--------|------|------|-----------|------|------|
| | | Early Potatoes | | | Sugar beet | | | Barley | | | Cut Grass | | |
| | | A | B | C | A | B | C | A | B | C | A | B | C |
| May 19 | .08 | | | | | | | | | | | | |
| 26 | .40 | | | | | | | | | | | | |
| June 2 | .30 | | | | | | | | | | | | .16 |
| 9 | .19 | 1.00 | | 1.00 | .83 | | .83 | 1.09 | | 1.09 | .51 | .85 | .97 |
| 16 | .62 | .50 | | .50 | .67 | | .68 | .50 | | .50 | | | .50 |
| 23 | .29 | | | | | | | | | | | | |
| 30 | .00 | | .50 | .50 | | | | .50 | .50 | | | .53 | .53 |
| July 7 | .12 | | .75 | .75 | .50 | | .50 | | | | | | |
| 14 | .21 | | | | 1.15 | | 1.15 | .81 | .81 | | .53 | .70 | .80 |
| 21 | .02 | | | | | .52 | .52 | | | | .56 | .56 | .52 |
| 28 | .00 | | | | | 1.21 | 1.21 | | | | .25 | .77 | 1.41 |
| Aug 4 | 1.03 | | | | | | | | | | | | |
| 11 | 1.51 | | | | | | | | | | | | |
| 18 | .27 | | | | | | | | | | | | |
| 25 | .38 | | | | | | | | | | | | |
| Sept 1 | .00 | | | | | | | | | | | | |
| 8 | .90 | | | | | .70 | .70 | | | | | | .20 |
| 15 | .50 | | | | | | | | | | | | |
| 22 | .25 | | | | | | | | | | | | |
| 29 | .53 | | | | | | | | | | | | |
| Total | 7.60 | 1.50 | 1.25 | 2.75 | 3.15 | 2.43 | 5.59 | 1.59 | 1.31 | 2.90 | 1.85 | 3.41 | 5.09 |

Levels of nitrogen (in addition to N in basal dressing):

cwt per acre)

Early Potatoes: None; 0.5 Applied as sulphate of ammonia
 Winter Cabbages
 (after potatoes): 0.5; 1.0 Applied as nitrochalk
 Sugar beet: None; 0.4 Applied as nitrochalk
 Barley: None; 0.2 Applied as nitrochalk
 Cut grass: 0.15; 0.30 Applied as nitrochalk after each cut

Basal manurings: cwt per acre

| | As compound fertilizer | | | |
|----------------------------------|------------------------|-------------------------------|------------------|------|
| | N | P ₂ O ₅ | K ₂ O | Salt |
| Early potatoes | 0.5 | 0.5 | 0.75 | None |
| Winter cabbages (after potatoes) | | None | | None |
| Sugar beet | 0.4 | 0.4 | 0.6 | None |
| Barley | 0.2 | 0.2 | 0.3 | 5.0 |
| Cut grass (yearly) | None | 0.6 | 0.6 | None |

In addition 18 cwt carbonate of lime per acre was applied after early potatoes.

52/Bg/1.3

Cultivations, etc.:

Early potatoes. Ploughed: Sept 20 and again Dec 17, 1951. Potatoes planted by machine: Apr 10, 1952. Ridged: Apr 12. Fertilizers applied: Apr 18. Earthed up ridges: Apr 29. Lifted: July 10. Variety: Ulster Chieftain.

Winter cabbages. 19 cwt chalk per acre applied: July 11, 1952. Irrigated all plots ready for planting, planted cabbages and watered in: July 21. Sprayed with Parathion: Aug 12 and again Sept 8. Variety: January King. The crop was a failure, mainly owing to bird damage.

Sugar beet. Fertilizers applied, seed drilled at 18 lb per acre: Apr 18. Singled: May 26. Lifted: Nov 20. Variety: Klein E.

Barley. Fertilizers applied: Mar 12. Seed drilled at 3 bushels per acre: Mar 14. Harvested: Aug 12. Variety: Plumage Archer.

Cut grass. Basal fertilizers applied: Mar 21. Cut: Apr 29, May 19, June 16, July 9 and Aug 11. Nitrochalk applied after each cut except the last.

Standard errors per plot:

| | | | | |
|-------------------|----------------|------------|---------------------|----------|
| Early potatoes. | Total tubers, | whole plot | 0.506 tons per acre | or 6.3% |
| | | | | (6 d.f.) |
| | | sub plot | 0.446 tons per acre | or 5.6% |
| | | | | (8 d.f.) |
| Sugar beet. | Total sugar, | whole plot | 4.85 cwt per acre | or 8.4% |
| | | | | (6 d.f.) |
| | | sub plot | 1.88 cwt per acre | or 3.3% |
| | | | | (8 d.f.) |
| | Tops, | whole plot | 0.690 tons per acre | or 6.5% |
| | | | | (6 d.f.) |
| | | sub plot | 0.940 tons per acre | or 8.9% |
| | | | | (8 d.f.) |
| Barley. | Grain, | whole plot | 2.27 cwt per acre | or 9.8% |
| | | | | (6 d.f.) |
| | | sub plot | 1.95 cwt per acre | or 8.4% |
| | | | | (8 d.f.) |
| Cut grass | Hay (85% D.M.) | whole plot | 5.59 cwt per acre | or 6.6% |
| (total of 5 cuts) | | | | (6 d.f.) |
| | | sub plot | 6.21 cwt per acre | or 7.3% |
| | | | | (8 d.f.) |

Summary of Results

| cwt N per acre | Irrigation | | | Mean | |
|---|------------|------------------|------|-------|-------------------------|
| | 0 | A | B | | |
| Early Potatoes, total tubers: tons per acre | | | | | |
| | | (± 0.344)* | | | |
| 0 | 6.05 | 8.08 | 6.72 | 9.74 | 7.65 |
| 0.5 | 6.20 | 8.89 | 7.43 | 10.38 | 8.35 |
| Mean (± 0.292) | 6.12 | 8.49 | 7.08 | 10.31 | 8.00 |
| Difference (± 0.364) | 0.15 | 0.81 | 0.71 | 1.14 | 0.70 (± 0.182) |

*for use in comparisons other than vertical.

52/Bg/1.4

| cwt N per acre | Irrigation | | | | Mean |
|---|------------|-------|-------|-------|------------------|
| | 0 | A | B | C | |
| Sugar beet, roots (washed): tons per acre | | | | | |
| 0 | 12.90 | 16.11 | 15.86 | 15.85 | 15.43 |
| 0.4 | 15.06 | 15.60 | 17.37 | 16.52 | 16.14 |
| Mean | 13.98 | 15.86 | 17.11 | 16.18 | 15.78 |
| Difference | +2.16 | -0.51 | +0.51 | +0.67 | +0.71 |
| Sugar beet, sugar percentage | | | | | |
| 0 | 18.22 | 18.39 | 18.27 | 18.20 | 18.27 |
| 0.4 | 18.41 | 17.97 | 18.15 | 18.04 | 18.14 |
| Mean | 18.31 | 18.18 | 18.21 | 18.12 | 18.21 |
| Difference | +0.19 | -0.42 | -0.12 | -0.16 | -0.13 |
| Sugar beet, total sugar: cwt per acre (±2.90)* | | | | | |
| 0 | 47.1 | 59.3 | 61.6 | 57.7 | 56.4 |
| 0.4 | 55.5 | 56.2 | 63.1 | 59.6 | 58.6 |
| Mean (±2.80) | 51.3 | 57.7 | 62.3 | 58.7 | 57.5 |
| Difference (±1.53) | +3.4 | -3.1 | +1.5 | +1.9 | +2.2 (±0.77) |
| Sugar beet, tops: tons per acre (±0.553)* | | | | | |
| 0 | 8.14 | 9.80 | 10.65 | 10.11 | 9.67 |
| 0.4 | 10.32 | 11.29 | 12.71 | 11.58 | 11.43 |
| Mean (±0.398) | 9.23 | 10.54 | 11.63 | 10.85 | 10.58 |
| Difference (±0.768) | +2.18 | +1.49 | +2.06 | +1.47 | 1.31 (±0.384) |
| Sugar beet, noxious nitrogen: mg. per 100 g. | | | | | |
| 0 | 25.0 | 26.7 | 26.7 | 26.7 | 26.2 |
| 0.4 | 25.0 | 25.0 | 26.7 | 25.0 | 25.4 |
| Mean | 25.0 | 25.8 | 26.7 | 25.8 | 25.8 |
| Difference | 0.0 | -1.7 | 0.0 | -1.7 | -0.8 |

* for use in comparisons other than vertical.

| cwt N per acre | Irrigation | | | | 52/Bg/1.5 |
|---|------------|------|------|-------|-----------------------|
| | 0 | A | B | C | Mean |
| Barley, grain: cwt per acre | | | | | |
| (± 1.53) [*] | | | | | |
| 0 | 21.7 | 13.8 | 21.7 | 22.7 | 21.2 |
| 0.2 | 23.1 | 23.3 | 26.3 | 27.2 | 25.0 |
| Mean (± 1.31) | 22.4 | 21.1 | 24.0 | 25.0 | 23.1 |
| Difference (± 1.59) | 1.4 | 4.5 | 4.6 | 4.5 | 3.8 (± 0.80) |
| Barley, straw: cwt per acre | | | | | |
| 0 | 25.2 | 23.3 | 24.6 | 25.6 | 24.7 |
| 0.2 | 27.9 | 27.2 | 32.8 | 34.3 | 30.6 |
| Mean | 26.5 | 25.3 | 28.7 | 30.0 | 27.6 |
| Difference | 2.7 | 3.9 | 3.2 | 8.7 | 5.9 |
| Cut grass, hay at 35% D.M. 7 cuts: cwt per acre | | | | | |
| after each cut | | | | | |
| (± 4.10) [*] | | | | | |
| 0.15 | 63.1 | 76.1 | 93.3 | 97.3 | 82.6 |
| 0.30 | 66.2 | 83.0 | 95.0 | 103.5 | 86.9 |
| Mean (± 3.23) | 64.6 | 79.6 | 94.2 | 100.7 | 84.3 |
| Difference (± 5.07) | 3.1 | 6.9 | 1.7 | 5.7 | 4.3 (± 2.54) |

*for use in comparisons other than vertical.

Winter Cabbages. Crop failed.

52/Ca/1.1

WHEAT

Effect of various crop sequences on incidence of Eyespot (*Cercospora herpotrichoides*) - Little Knott 1952, the 3rd preliminary year.

Arrangement of previous treatment crops: 4 longitudinal and 3 cross strips.

Area of each plot: Variable. Area harvested: 0.034-0.050 acre.

Treatments:

Longitudinal strips, crops grown in 1950: Wheat; Ryegrass; Potatoes; fallow.

Cross strips, crops grown in 1951: Wheat; Ryegrass; Potatoes.

Basal manuring: $2\frac{1}{2}$ cwt sulphate of ammonia per acre.

Cultivations, etc.: Ploughed; Sept 3, 1951. Seed drilled at 3 bushels per acre; Oct 18. Sulphate of ammonia applied: Apr 16, 1952. Harvested: July 28. Variety: Squareheads Master 13/4.

Note. Yields of grain from two of the treatment crops (Oats (S. 147) and Barley (Pioneer)) for the wheat test crop of 1953 were taken and are shown after the wheat figures.

Summary of Results

| Crop in 1951 | Crop in 1950 | | | | Mean |
|----------------------------|--------------|-----------|----------|--------|------|
| | Wheat | Rye-grass | Potatoes | Fallow | |
| Wheat, grain: cwt per acre | | | | | |
| Wheat | 15.2 | 18.3 | 23.1 | 15.3 | 18.0 |
| Ryegrass | 16.3 | 28.6 | 30.5 | 24.3 | 24.9 |
| Potatoes | 26.5 | 28.0 | 30.0 | 22.7 | 26.8 |
| Mean | 19.3 | 25.0 | 27.9 | 20.8 | 23.2 |
| Wheat, straw: cwt per acre | | | | | |
| Wheat | 47.1 | 45.1 | 52.0 | 38.5 | 45.7 |
| Ryegrass | 44.3 | 52.5 | 59.6 | 61.8 | 54.6 |
| Potatoes | 53.7 | 54.8 | 64.8 | 55.0 | 57.1 |
| Mean | 48.4 | 50.8 | 58.8 | 51.8 | 52.5 |

N.B. The crop was damaged when ripe by birds, particularly on the 'Fallow - Potatoes' plot.

52/Ca/1.2

| Crop in 1951 | Treatment Crops | | | | Mean |
|-----------------------------|-----------------|------------------------------|----------|--------|------|
| | Wheat | Crop in 1950 Rye grass | Potatoes | Fallow | |
| Oats, grain: cwt per acre | | | | | |
| Wheat | 32.5 | 37.4 | 38.2 | 35.2 | 35.8 |
| Fallow | 32.6 | 35.3 | 32.8 | 33.2 | 33.5 |
| Mean | 32.6 | 36.4 | 35.5 | 34.2 | 34.7 |
| Barley, grain: cwt per acre | | | | | |
| Fallow | 28.5 | 32.5 | 32.0 | 24.3 | 29.3 |

52/Ca/2.1

WHEAT

Control of Eyespot (*Cercospora Herpotrichoides*) - Great Field I 1952.

System of replication: 8 randomized blocks of 8 plots each, certain high order interactions and the effect of spraying being confounded with block differences. In addition each block contained two extra plots with no nitrogen. The variety x seed rate interaction being confounded.

Area of each plot: 0.0197 acre.

Treatments: All combinations of

Variety: Squareheads Master 13/4; Bersee (V_1 ; V_2).

Seedrate: $1\frac{1}{2}$; 3 bushels per acre (R_1 ; R_2).

Nitrogen: 0.4; 0.8 cwt per acre applied as sulphate of ammonia (N_1 ; N_2).

Time of application of N: At time of sowing; early March; mid-April; 3rd week May (T_1 ; T_2 ; T_3 ; T_4).

Spraying: 4 blocks sprayed with 12 $\frac{1}{2}$ % sulphuric acid at 100 gallons per acre.

Basal manuring: None.

Cultivations, etc.: Ploughed: Oct 8. Seed drilled, T_1 applied: Oct 25. T_2 applied: Mar 13. Sprayed 4 blocks: Mar 14. T_3 applied: Apr 16. Sprayed all plots with D.N.O.C.: Apr 18. T_4 applied: May 22. Harvested: Aug 19. Previous crop: Linseed.

Standard error per plot:

Grain: 2.92 cwt per acre or 10.9% (24 d.f.)

- NB. (1) Counts of incidence of Eyespot were made and are available.
(2) In the Summary of Results:-
(a) The standard errors given are not valid for testing the effects of spraying for any particular treatment level; the interactions of spraying with treatments may however be tested.
(b) The V x R tables do not include the plots receiving no nitrogen.

Summary of Results

Grain: cwt per acre

| | Unsprayed | | | | | Sprayed | | | | | |
|------------------|----------------|----------------|----------------|----------------|-----------------|----------------|----------------|----------------|----------------|-----------------|--|
| | T ₁ | T ₂ | T ₃ | T ₄ | Mean | T ₁ | T ₂ | T ₃ | T ₄ | Mean | |
| | (±1.46) | | | | | | (±1.46) | | | | |
| V ₁ | 23.6 | 20.0 | 21.7 | 24.5 | 22.5 | 32.7 | 31.0 | 33.7 | 33.4 | 32.7 | |
| V ₂ | 37.9 | 33.0 | 31.7 | 31.7 | 33.6 | 46.4 | 45.5 | 45.7 | 42.9 | 45.1 | |
| Diff. (±2.06) | 14.3 | 13.0 | 10.0 | 7.2 | 11.1 (±1.03) | 13.7 | 14.5 | 12.0 | 9.5 | 12.4 (±1.03) | |
| R ₁ | 34.1 | 28.2 | 28.6 | 30.2 | 30.3 | 39.4 | 36.8 | 40.9 | 41.3 | 39.6 | |
| R ₂ | 27.4 | 24.8 | 24.7 | 26.1 | 25.8 | 39.7 | 39.7 | 38.5 | 34.9 | 38.2 | |
| Diff. (±2.06) | -6.7 | -3.4 | -3.9 | -4.1 | -4.5 (±1.03) | +0.3 | +2.9 | -2.4 | -6.4 | -1.4 (±1.03) | |
| N ₁ | 32.1 | 25.5 | 25.8 | 27.8 | 27.8 | 37.9 | 38.7 | 38.0 | 38.3 | 38.2 | |
| N ₂ | 29.4 | 27.5 | 27.5 | 28.4 | 28.2 | 41.2 | 37.8 | 41.4 | 38.0 | 39.6 | |
| Diff. (±2.06) | -2.7 | +2.0 | +1.7 | +0.6 | +0.4 (±1.03) | +3.3 | -0.9 | +3.4 | -0.3 | +1.4 (±1.03) | |
| Mean (±1.03) | 30.7 | 26.5 | 26.7 | 28.1 | 28.0 | 39.6 | 38.2 | 39.7 | 38.1 | 38.9 | |

| | Unsprayed | | | Diff. (±1.46) | Sprayed | | |
|------------------|----------------|----------------|------------------|------------------|----------------|----------------|------------------|
| | R ₁ | R ₂ | Diff. (±1.03) | | R ₁ | R ₂ | Diff. (±1.46) |
| V ₁ | 24.8 | 20.1 | -4.7 | 33.3 | 32.1 | -1.2 | |
| V ₂ | 35.7 | 31.4 | -4.3 | 45.9 | 44.4 | -1.5 | |
| Diff. (±1.46) | +10.9 | +11.3 | +0.4 | +12.6 | +12.3 | -0.3 | |

| | Unsprayed | | | | Mean | Sprayed | | | |
|------------------|---------------------|----------------|----------------|------------------|---------------------|----------------|----------------|------------------|-----------------|
| | N ₀ | N ₁ | N ₂ | Mean (±1.46) | | N ₀ | N ₁ | N ₂ | Mean (±1.03) |
| V ₁ | 22.4 | 22.0 | 22.9 | 22.4 | 31.2 | 33.5 | 31.9 | 32.4 | |
| V ₂ | 28.9 | 33.6 | 33.6 | 32.6 | 36.8 | 42.9 | 47.3 | 43.5 | |
| Diff. (±1.46) | +6.5 ⁽¹⁾ | +11.6 | +10.7 | +10.2 (±0.84) | +5.6 ⁽¹⁾ | +9.4 | +15.4 | +11.1 (±0.84) | |
| R ₁ | 28.7 | 29.9 | 30.7 | 30.0 | 36.6 | 39.4 | 39.8 | 39.0 | |
| R ₂ | 22.6 | 25.7 | 25.8 | 25.1 | 31.5 | 37.0 | 39.4 | 36.9 | |
| Diff. (±1.46) | -6.1 ⁽¹⁾ | -4.2 | -4.9 | -4.9 (±0.84) | -5.1 ⁽¹⁾ | -2.4 | -0.4 | -2.1 (±0.84) | |
| Mean (±0.73) | 25.7 ⁽²⁾ | 27.8 | 28.2 | 27.5 | 34.0 ⁽²⁾ | 38.2 | 39.6 | 37.9 | |

(1) ±2.06 (2) ±1.03

52/Ca/2.3

Straw: cwt per acre

| | Unsprayed | | | | | Sprayed | | | | |
|----------------|----------------|----------------|----------------|----------------|------|----------------|----------------|----------------|----------------|-------|
| | T ₁ | T ₂ | T ₃ | T ₄ | Mean | T ₁ | T ₂ | T ₃ | T ₄ | Mean |
| V ₁ | 67.5 | 67.4 | 68.3 | 61.6 | 66.2 | 69.5 | 73.4 | 69.2 | 68.9 | 70.3 |
| V ₂ | 59.4 | 61.0 | 59.4 | 48.5 | 57.1 | 57.0 | 61.3 | 56.2 | 49.8 | 56.1 |
| Diff. | -8.1 | -6.4 | -8.9 | -13.1 | -9.1 | -12.5 | -12.1 | -13.0 | -19.1 | -14.2 |
| R ₁ | 62.7 | 62.9 | 62.7 | 55.9 | 61.0 | 61.0 | 66.1 | 62.9 | 57.7 | 61.9 |
| R ₂ | 64.2 | 65.5 | 65.0 | 54.2 | 62.2 | 65.5 | 68.7 | 62.5 | 61.0 | 64.4 |
| Diff. | +1.5 | +2.6 | +2.3 | -1.7 | +1.2 | +4.5 | +2.6 | -0.4 | +3.3 | +2.5 |
| N ₁ | 61.6 | 63.4 | 61.9 | 56.2 | 60.8 | 62.8 | 65.9 | 61.4 | 60.9 | 62.7 |
| N ₂ | 65.3 | 65.0 | 65.7 | 53.9 | 62.5 | 63.7 | 68.9 | 64.0 | 57.8 | 63.6 |
| Diff. | +3.7 | +1.6 | +3.8 | -2.3 | +1.7 | +0.9 | +3.0 | +2.6 | -3.1 | +0.9 |
| Mean | 63.4 | 64.2 | 63.8 | 55.1 | 61.6 | 63.2 | 67.4 | 62.7 | 59.3 | 63.2 |

| | R ₁ | R ₂ | Diff. | R ₁ | R ₂ | Diff. |
|----------------|----------------|----------------|-------|----------------|----------------|-------|
| V ₁ | 65.9 | 66.5 | +0.6 | 68.7 | 71.8 | +3.1 |
| V ₂ | 56.2 | 58.0 | +1.8 | 55.1 | 57.0 | +1.9 |
| Diff. | -9.7 | -8.5 | +1.2 | -13.6 | -14.8 | -1.2 |

| | N ₀ | N ₁ | N ₂ | Mean | N ₀ | N ₁ | N ₂ | Mean |
|----------------|----------------|----------------|----------------|------|----------------|----------------|----------------|-------|
| V ₁ | 58.5 | 65.3 | 67.0 | 64.7 | 59.6 | 69.7 | 70.8 | 68.1 |
| V ₂ | 46.0 | 56.2 | 57.9 | 54.9 | 47.3 | 55.8 | 56.4 | 54.3 |
| Diff. | -12.5 | -9.1 | -9.1 | -9.8 | -12.3 | -13.9 | -14.4 | -13.8 |
| R ₁ | 53.5 | 60.7 | 61.4 | 59.5 | 52.3 | 61.0 | 62.8 | 60.0 |
| R ₂ | 51.0 | 60.9 | 63.6 | 60.0 | 54.7 | 64.4 | 64.4 | 62.5 |
| Diff. | -2.5 | +0.2 | +2.2 | +0.5 | +2.4 | +3.4 | +1.6 | +2.5 |
| Mean | 52.3 | 60.8 | 62.5 | 59.8 | 53.5 | 62.7 | 63.6 | 61.2 |

52/Ca/3

WHEAT

Residual effect of dung - Little Hoos 1952.

System of replication: 4 randomized blocks of 12 plots each.

Area of each plot: 0.0318 acre.

Treatments: All combinations of:-

Dung: None; 5; 10; 15 tons per acre applied to potatoes 1950-51.
 Methods of application: Ploughed in, in winter (1950); ploughed in, in spring (1951); placed in ridges (1951).

Basal dressing: 3 cwt sulphate of ammonia per acre.

Cultivations, etc: Cultivated twice: Oct 11. Seed drilled at 3 bushels per acre: Oct 19. Sulphate of ammonia applied: Apr 17. Sprayed with 2 gallons D.N.O.C. plus 6 lb sulphate of ammonia per acre: Apr 30. Harvested: July 29. Variety: Nord Desprez. Previous crop: Potatoes.

Standard error per plot:

Grain: 1.94 cwt per acre or 6.9% (35 d.f.)

Summary of Results

| Method of application | Dung applied to potatoes 1950-51: tons per acre | | | | Mean |
|------------------------|--|------|------|------|---------|
| | 0 | 5 | 10 | 15 | |
| | Grain: cwt per acre | | | | (±0.56) |
| | (±0.97) | | | | |
| Ploughed in, in winter | 28.6 | 29.9 | 29.2 | 29.2 | 29.2 |
| Ploughed in, in spring | 25.9 | 29.2 | 30.1 | 28.4 | 28.4 |
| Placed in ridges | 28.1 | 28.8 | 30.2 | 29.1 | 29.1 |
| Mean (±0.56) | 25.1 | 27.5 | 29.3 | 29.8 | 27.9 |
| | Straw: cwt per acre | | | | |
| Ploughed in, in winter | 41.2 | 42.2 | 42.6 | 42.0 | 42.0 |
| Ploughed in, in spring | 37.4 | 40.5 | 41.5 | 39.8 | 39.8 |
| Placed in ridges | 39.0 | 40.5 | 43.0 | 40.9 | 40.9 |
| Mean | 36.7 | 39.2 | 41.1 | 42.4 | 39.8 |

WHEAT

The control of wireworm by insecticides - Geescroft 1952.

System of replication: 3 randomized blocks of 8 plots each.

Area of each plot: 0.0289 acre.

Treatments:

O = None (triplicate plots)

S = Gammexane seed dressing 2 oz per bushel

G = Gammexane combine drilled with seed at 56 lb per acre 3.5% dust

A = Aldrin " " " " 200 lb " " 1.78% "

C = Chlordane " " " " 100 lb " " 5% "

D = D.D.T. " " " " 150 lb " " 5% "

Basal dressing: 3 cwt sulphate of ammonia per acre.

Cultivations, etc: Ploughed: Nov 9. Seed drilled at 3 bushels per acre with insecticides: Dec 1. Sulphate of ammonia applied: Apr 21.

Sprayed with low volume M.C.P.A: May 7. Harvested: Aug 31.

Variety: Nord Desprez. Previous crop: Old Grass.

Standard error per plot:

Grain: 1.24 cwt per acre or 3.8% (16 d.f.)

Summary of Results

| | O | S | G | A | C | D | Mean |
|-------------------------|---------------------|------|------|------|------|------|------|
| Grain: cwt per acre | | | | | | | |
| Mean (± 0.71) | 31.6 ⁽¹⁾ | 32.9 | 33.6 | 36.3 | 33.7 | 31.7 | 32.9 |
| Increase (± 0.83) | | 1.3 | 2.0 | 4.7 | 2.1 | 0.1 | |
| Straw: cwt per acre | | | | | | | |
| Mean | 43.6 | 46.7 | 45.6 | 47.0 | 44.6 | 42.6 | 44.7 |
| Increase | | 3.1 | 2.0 | 3.4 | 1.0 | -1.0 | |

Standard error (1) 0.41.

52/Ca/5.1

WHEAT

Late application of nitrogen and methods of harvesting - Fosters 1952.

System of replication: 4 randomized blocks of 3 plots each, blocks and plots being split into 2 strips for different methods of harvesting.

Area of each plot: 0.0242 acre. Area harvested: 'binder' plots - 0.0202 acre, 'combine' plots - 0.0091 acre.

Treatments:

Nitrochalk: None; $1\frac{1}{2}$; 3 cwt per acre applied as top dressing.
Methods of harvesting: Binder; N.I.A.E. combine harvester.

Basal manuring: 3 cwt sulphate of ammonia per acre.

Cultivations, etc.: Ploughed: Sept 11. Seed drilled at 3 bushels per acre: Oct 24. Sulphate of ammonia applied: Apr 18. Sprayed with D.N.O.C.: May 15. Nitrochalk applied: June 28. Harvested: 'binder' plots - Aug 12, 'combine' plots - Aug 13. Variety: Yeoman. Previous crop: Wheat.

Standard errors per plot. Grain:

Strip: 1.72 cwt per acre or 8.9% (3 d.f.)
Whole plot: 1.32 cwt per acre or 6.9% (6 d.f.)
Sub plot: 1.68 cwt per acre or 8.7% (6 d.f.)

52/Oa/5.2

Summary of Results

| | Nitrochalk: cwt per acre as top dressing | | | Mean |
|------------------------------------|---|------|------|---------------------|
| | None | 1.5 | 3.0 | |
| Grain: cwt per acre (a) and (b) | | | | |
| Binder | 19.0 | 20.9 | 20.8 | 20.2 |
| Combine | 18.7 | 18.4 | 17.5 | 18.2 |
| Mean (± 0.66) | 18.8 | 19.7 | 19.2 | 19.2 |
| Difference (± 1.55) | -0.3 | -2.5 | -3.3 | -2.0 (± 1.21) |

(a) ± 0.89 for use in horizontal comparisons only

(b) ± 1.13 for use in diagonal comparisons only

Binder Plots

| Straw: cwt per acre | | | | |
|-------------------------------------|------|------|------|------|
| | 33.7 | 34.1 | 35.9 | 34.6 |
| Crude Protein: cwt per acre | | | | |
| Grain | 2.11 | 2.44 | 2.43 | |
| Increase | | 0.33 | 0.32 | |
| Straw | 0.68 | 0.68 | 0.74 | |
| Increase | | 0.00 | 0.06 | |
| Percentage uptake of added nitrogen | | | | |
| Grain | | 23 | 11 | |
| Straw | | 1 | 2 | |

52/Cb/1.1

BARLEY

Late application of nitrogen and methods of harvesting - Great Field II 1952.

System of replication: 4 randomized blocks of 3 plots each, blocks and plots being split into 2 strips for different methods of harvesting.

Area of each plot: 0.0242 acre. Area harvested: 'binder' plots - 0.0242 acre, 'combine' plots - 0.0091 acre.

Treatments:

Nitrochalk: None; $1\frac{1}{2}$; 3 cwt per acre applied as top dressing.
Methods of harvesting: Binder; N.I.A.E. combine harvester.

Basal manuring per acre: $2\frac{1}{4}$ cwt sulphate of ammonia; 1 cwt super-phosphate combine drilled with seed.

Cultivations, etc.: Sulphate of ammonia applied to linseed: Mar 19.
Harrowed in linseed which had failed: May 12. Seed and super-phosphate drilled: May 13. Sprayed with M.C.P.A., medium volume, 5 pints in 30 gallons water per acre: June 9. Nitrochalk applied: June 16. Harvested: 'binder' plots - Sept 16, 'combine' plots - Sept 19. Variety: Plumage Archer. Previous crop: Permanent grass.

Standard errors per plot. Grain:

Strip: 1.09 cwt per acre or 7.6% (3 d.f.)
Whole plot: 1.05 cwt per acre or 7.4% (6 d.f.)
Sub plot: 1.18 cwt per acre or 8.3% (6 d.f.)

52/Cb/1.2

Summary of Results

| | Nitrochalk: cwt per acre as top dressing | | | Mean |
|---------------------------|---|------|------|--------------------|
| | None | 1.5 | 3.0 | |
| Grain: cwt per acre | | | | |
| | (a) and (b) | | | |
| Binder | 13.1 | 13.5 | 13.1 | 13.2 |
| Combine | 14.7 | 15.6 | 15.5 | 15.3 |
| Mean (± 0.53) | 13.9 | 14.5 | 14.3 | 14.2 |
| Difference (± 1.03) | 1.6 | 2.1 | 2.4 | 2.1 (± 0.77) |

(a) ± 0.67 for use in horizontal comparisons only
 (b) ± 0.79 for use in diagonal comparisons only

| | Straw: cwt per acre | | | |
|--------|---------------------|------|------|------|
| Binder | 19.6 | 18.3 | 19.2 | 19.0 |

| | Crude Protein: cwt per acre | | |
|---------------|-----------------------------|-------|-------|
| Grain: Binder | 1.76 | 1.84 | 1.78 |
| Increase | | 0.08 | 0.02 |
| Combine | 2.07 | 2.16 | 2.14 |
| Increase | | 0.09 | 0.07 |
| Straw: Binder | 1.17 | 1.11 | 1.12 |
| Increase | | -0.06 | -0.05 |

| | Percentage uptake of added nitrogen | |
|---------------|-------------------------------------|----|
| Grain: Binder | 6 | 1 |
| Combine | 6 | 2 |
| Straw: Binder | -4 | -2 |

52/Cb/2

BARLEY

Nitrophosphates placement - Highfield 3 1952.

System of replication: 4 randomized blocks of 6 plots each.

Area of each plot (average): 0.0143 acre.

Treatments: Nitrochalk at 0.5 cwt N per acre broadcast (two plots per block), and all combinations of:-

Manures: Nitrophosphate (British) 13.9% N, 14.6% P₂O₅; Nitrochalk and Granular Superphosphate. Each manure provided 0.5 cwt N and 0.53 cwt P₂O₅ per acre.

Method of placement: Broadcast; Combine drilled.

Basal dressing: None.

Cultivations, etc.: Ploughed: Sept 18. Seed drilled at 3½ bushels per acre and all fertilizers applied: Mar 15. Harvested: July 30. Variety: Plumage Archer. Previous crop: Linseed.

Standard errors per plot: Grain.

Yield: 2.37 cwt per acre or 11.0% (16 d.f.)

P₂O₅ uptake: 0.0180 cwt per acre or 16.0% (16 d.f.)

Summary of Results

| | Nitrochalk broadcast | Nitrophosphate broadcast | combine drilled | Nitrochalk and superphosphate broadcast | combine drilled | Mean |
|--|-------------------------|-----------------------------|--------------------|---|--------------------|-------|
| Yield: cwt per acre | | | | | | |
| Grain (±1.18) | 18.9 ⁽¹⁾ | 21.9 | 24.4 | 22.0 | 22.6 | 21.4 |
| Increase (±1.45) | | 3.0 | 5.5 | 3.1 | 3.7 | |
| Straw | 32.6 | 30.5 | 36.7 | 33.2 | 32.9 | 33.1 |
| Increase | | -2.1 | +4.1 | +0.6 | +0.3 | |
| P ₂ O ₅ uptake: cwt per acre | | | | | | |
| Grain (±0.0090) | 0.098 ⁽²⁾ | 0.115 | 0.132 | 0.117 | 0.114 | 0.112 |
| Increase (±0.0110) | | 0.017 | 0.034 | 0.019 | 0.016 | |
| Straw | 0.028 | 0.023 | 0.030 | 0.030 | 0.026 | 0.027 |
| Increase | | -0.005 | +0.002 | +0.002 | -0.002 | |

(1) ±0.84
(2) ±0.0064

52/Cc/1

SPRING OATS

Late application of nitrogen - Long Hoos III 1952.

System of replication: 8 randomized blocks of 3 plots each.

Area of each plot: 0.0145 acre.

Treatments: Nitrochalk: None; $1\frac{1}{2}$; 3 cwt per acre applied as a late top dressing.

Basal dressing: $2\frac{1}{2}$ cwt sulphate of ammonia per acre; 1 cwt superphosphate per acre drilled with the seed.

Cultivations, etc.: Ploughed: Dec 10. Sulphate of ammonia applied: Mar 3. Seed drilled at 4 bushels per acre with superphosphate: Mar 15. Sprayed with M.C.P.A. low volume, $2\frac{1}{2}$ pints in 10 gallons of water: May 13. Nitrochalk applied: June 30. Harvested: July 24. Variety: Star. Previous crop: Wheat.

Standard errors per plot:

Grain*: 1.74 cwt per acre or 4.9% (14 d.f.)
 Straw*: 2.39 cwt per acre or 5.2% (14 d.f.)

Summary of Results

| | Nitrochalk: cwt per acre, as top dressing | | | Mean |
|-------------------------------------|--|----------------|------|------|
| | None | $1\frac{1}{2}$ | 3 | |
| Yield: cwt per acre | | | | |
| Grain* (± 0.62) | 35.5 | 36.4 | 35.2 | 35.7 |
| Straw* (± 0.84) | 45.5 | 45.5 | 45.6 | 45.5 |
| Crude protein: cwt per acre | | | | |
| Grain | 3.57 | 3.87 | 3.81 | |
| Increase | | 0.30 | 0.24 | |
| Straw | 0.87 | 0.92 | 0.97 | |
| Increase | | 0.05 | 0.10 | |
| Percentage uptake of added nitrogen | | | | |
| Grain | | 21 | 8 | |
| Straw | | 3 | 3 | |

*Corrected to 85% dry matter owing to variable conditions during harvesting.

52/Cd/1.1

SPRING BEANS

Fertilizer placement - Great Harpenden II 1952.

System of replication: 8 randomized blocks of 9 plots each.

Area of each plot: 0.0152 acre. Area harvested: 0.0126 acre.

Treatments: All combinations of:-

Superphosphate, cwt per acre: None; 2.6 broadcast on seed bed;
2.6 drilled in band 2" to side of seed.

Sulphate of potash, cwt per acre: None; 1.6 broadcast on seed bed;
1.6 drilled in band 2" to side of seed.

Basal manuring: None.

Cultivations, etc.: Ploughed: Oct 30. 40 cwt ground chalk per acre
applied: Mar 13. Seed drilled at 4 bushels per acre, fertilizers
applied: Mar 18. Sprayed with Nicotine against blackfly: June 19
and again July 7. Harvested: Aug 6. Variety: Ashwells Selection.
Previous crop: Oats.

Standard error per plot:

Grain, Dry Matter: 1.13 cwt per acre or 20.6% (55 d.f.)

Note: The yield of grain, dry matter, has been adjusted to allow for
the omission to spray four of the plots.

52/Ca/1.2

Summary of Results

| Sulphate of potash: 1.6 cwt per acre | Superphosphate: 2.6 cwt per acre | | | Mean |
|---|----------------------------------|-----------------------------|--|------|
| | None | Broadcast on seed bed | Drilled in band 2" to side of seed | |

| | Grain, Dry Matter: cwt per acre | | | Mean (±0.23) |
|--|---------------------------------|---------|---------|--------------|
| | (±0.40) | (±0.40) | (±0.40) | |
| None | 4.1 | 4.9 | 4.5 | 4.5 |
| Broadcast on seed bed | 5.5 | 4.6 | 4.7 | 4.9 |
| Drilled in band 2" to side of seed | 7.0 | 6.7 | 7.2 | 7.0 |
| Mean (±0.23) | 5.5 | 5.4 | 5.5 | 5.5 |

| | Plant number: thousands per acre | | | |
|--|----------------------------------|-----|-----|-----|
| None | 166 | 163 | 157 | 162 |
| Broadcast on seed bed | 166 | 165 | 156 | 163 |
| Drilled in band 2" to side of seed | 172 | 167 | 165 | 168 |
| Mean | 168 | 165 | 159 | 164 |

Mean Dry Matter %: 79.2

52/Ca/2

SPRING BEANS

Control of Black Aphis - Great Harpenden II 1952.

System of replication: 2* randomized blocks of 7 plots each.

Area of each plot: 0.00831 acre.

Treatments - Insecticidal sprays at 300 gallons per acre.

- None. (O)
- Parathion, 0.02% technical W/V. (A)
- Pyrethrum, 0.05% W/V total pyrethrins. (B)
- DDT emulsion, 0.1% W/V DDT. (C)
- DDT suspension, 0.1% W/V DDT. (D)
- Systox, 0.05% W/V. (E)
- Nicotine, 0.1% V/V technical nicotine alkaloid. (F)

Basal dressing, per acre: 1½ cwt nitrochalk, 3 cwt superphosphate, 1½ cwt sulphate of potash.

Cultivations, etc.: Ploughed: Oct 30. 40 cwt ground chalk per acre applied: Mar 13. Basal fertilizers applied: Mar 15. Beans drilled at 4 bushels per acre: Mar 18. Spray treatments applied: June 12. Harvested: Aug 2. Variety: Ashwells selection. Previous crop: Oats.

Standard error per plot:

Grain: 4.50 cwt per acre or 49.7% (6 d.f.)

*Note. The experiment was originally designed as one of 4 blocks of 7, but as at spraying time 2 of the blocks carried a very poor crop these were not used in the experiment.

Summary of Results

| | Spray | | | | | | | Mean |
|---------------------|-------|------|------|------|------|------|------|------|
| | O | A | B | C | D | E | F | |
| Grain: cwt per acre | | | | | | | | |
| Mean (±3.19) | 1.4 | 11.8 | 10.3 | 11.8 | 1.3 | 12.0 | 14.8 | 9.1 |
| Increase (±4.50) | | 10.4 | 8.9 | 10.4 | -0.1 | 10.6 | 13.4 | |
| Straw: cwt per acre | | | | | | | | |
| Mean | 14.2 | 19.3 | 14.4 | 15.4 | 15.4 | 16.7 | 18.3 | 16.2 |
| Increase | | 5.1 | 0.2 | 1.2 | 1.2 | 2.5 | 4.1 | |

52/Ca/3

BROAD BEANS

Fertilizer placement - Great Harpenden II 1952.

System of replication: 4 randomized blocks of 5 plots each.

Area of each plot: 0.00344 acre.

Treatments: No fertilizer; and all combinations of:-

Compound granular PK fertilizer (13 $\frac{3}{4}$ % P₂O₅; 13 $\frac{3}{4}$ % K₂O): 2.7; 4.9 cwt per acre.

Method of placement: Broadcast on seed bed; drilled in band beside seed.

Basal dressing per acre: 1 $\frac{1}{2}$ cwt nitrochalk; 3 cwt superphosphate; 1 $\frac{1}{2}$ cwt sulphate of potash.

Cultivations, etc.: Ploughed: Oct 30. 40 cwt ground chalk per acre applied: Mar 13. Basal fertilizers applied: Mar 15. Beans sown: Mar 18. Harvested: July 1. Variety: Seville Long Pod. Previous crop: Spring Oats.

Standard error per plot:

Yield of green beans in pod: 2.45 cwt per acre or 9.1% (12 d.f.)

Summary of Results

| | Compound PK fertilizer: cwt per acre | | | | | Mean |
|---|--------------------------------------|------------------|----------------|------------------|----------------|------|
| | None | 2.7 Broadcast | 2.7 Drilled | 4.9 Broadcast | 4.9 Drilled | |
| Yield of green beans in pod: cwt per acre | | | | | | |
| Mean (± 1.22) | 22.8 | 24.5 | 29.5 | 26.6 | 31.8 | 27.0 |
| Increase (± 1.73) | | 1.7 | 6.7 | 3.8 | 9.0 | |

52/Ce/1.1

POTATOES

Application of dung - West Barnfield II 1952.

System of replication: 4 randomized blocks of 12 plots each, plots being split into 2 for the application of N, P and K; the three 2-factor interactions being confounded with whole plot differences, and certain high order interactions being confounded with block differences.

Area of each sub plot: 0.0175 acre. Area harvested: 0.0140 acre.

Treatments: All combinations of:-

Whole plots Dung: None; 5; 10; 15 tons per acre.
Method of application: Ploughed in, in winter (W);
Ploughed in, in spring (S); Placed in the ridges
in spring (R).

Sub plots N: None; 0.6 cwt per acre applied as sulphate of
ammonia.
 P_2O_5 : None; 0.6 cwt per acre applied as super-
phosphate.
 K_2O : None; 1.0 cwt per acre applied as muriate of
potash.

Basal dressing: None.

Cultivations, etc.: Dung applied to 'W' plots, ploughed all plots:
Sept 26. Dung applied to 'S' plots, ploughed all plots: Mar 12.
Ridged all plots: May 5. Dung applied to 'R' plots, fertilizers
applied in the ridges, potatoes planted: May 6. Earthed up:
July 17. Sprayed with copper fungicide 5 lb per acre: Aug 12
and again Sept 5. Sprayed with sulphuric acid, 20% B.O.V.:
Sept 24. Lifted: Oct 9. Variety: Majestic. Previous crop:
Wheat.

Standard errors per plot: Total tubers.

Whole plot: 0.755 tons per acre or 7.4% (32 d.f.)
Sub plot: 1.060 tons per acre or 10.4% (29 d.f.)*

* 1 missing value.

52/Ce/1.2

Summary of Results

Total tubers: tons per acre

| | Dung: tons per acre | | | | Mean |
|-------------------------------------|---------------------|-------|-------|-------|---------------------|
| | None | 5 | 10 | 15 | |
| Mean (± 0.218) | 7.76 | 9.64 | 11.09 | 12.45 | 10.24 |
| <u>Method of application</u> | (± 0.378) | | | | (± 0.218) |
| Ploughed in, in winter | | 9.12 | 10.63 | 11.28 | 10.34 |
| Ploughed in, in spring | | 9.17 | 11.16 | 12.90 | 11.08 |
| Placed in ridges in spring | | 10.64 | 11.50 | 13.15 | 11.76 |
| <u>N: cwt per acre</u> | $(\pm 0.307)^*$ | | | | |
| None | 7.02 | 8.72 | 10.58 | 11.75 | 9.52 |
| 0.6 | 8.51 | 10.57 | 11.60 | 13.15 | 10.96 |
| Response to N (± 0.433) | 1.49 | 1.85 | 1.02 | 1.40 | 1.44 ⁽¹⁾ |
| <u>P₂₅: cwt per acre</u> | $(\pm 0.307)^*$ | | | | |
| None | 7.65 | 9.05 | 10.50 | 12.18 | 9.85 |
| 0.6 | 7.88 | 10.24 | 11.68 | 12.71 | 10.63 |
| Response to P (± 0.433) | 0.23 | 1.19 | 1.18 | 0.53 | 0.78 ⁽¹⁾ |
| <u>K₂O: cwt per acre</u> | $(\pm 0.307)^*$ | | | | |
| None | 5.69 | 8.49 | 10.47 | 11.92 | 9.14 |
| 1.0 | 9.84 | 10.80 | 11.72 | 12.97 | 11.33 |
| Response to K (± 0.433) | 4.15 | 2.31 | 1.25 | 1.05 | 2.19 ⁽¹⁾ |

(1) ± 0.216

*Standard error for use in comparisons other than vertical.

52/Ce/1.3

Total tubers: tons per acre

| | Method of application of dung | | |
|-------------------------------------|-------------------------------|---------------------------|----------------------------------|
| | Ploughed in, in winter | Ploughed in, in spring | Placed in ridges in spring |
| <u>N: cwt per acre</u> | (± 0.307)* | | |
| None | 9.70 | 10.32 | 11.03 |
| 0.6 | 10.99 | 11.83 | 12.50 |
| Response to N (± 0.433) | 1.29 | 1.51 | 1.47 |
| <u>P₂₅: cwt per acre</u> | (± 0.307)* | | |
| None | 9.86 | 10.55 | 11.32 |
| 0.6 | 10.83 | 11.60 | 12.21 |
| Response to P (± 0.433) | 0.97 | 1.05 | 0.89 |
| <u>K₂₀: cwt per acre</u> | (± 0.307)* | | |
| None | 9.23 | 10.13 | 11.51 |
| 1.0 | 11.46 | 12.02 | 12.01 |
| Response to K (± 0.433) | 2.23 | 1.89 | 0.50 |

*Standard error for use in comparisons other than vertical.

| Response to: | Responses to treatments (± 0.307)** | | | | | |
|--------------|---|-------|------|-------|------|-------|
| | N | | P | | K | |
| | Abs. | Pres. | Abs. | Pres. | Abs. | Pres. |
| N | - | - | 1.24 | 1.64 | 1.12 | 1.76 |
| P | 0.58 | 0.98 | - | - | 0.17 | 1.39 |
| K | 1.87 | 2.51 | 1.58 | 2.80 | - | - |

**Standard error of horizontal difference between two responses 0.436.

52/Ce/1.4

Percentage Ware (1½" riddle)

| | Dung: tons per acre | | | | Mean |
|---|---------------------|------|------|------|------|
| | None | 5 | 10 | 15 | |
| Mean | 75.8 | 82.5 | 84.8 | 86.0 | 82.3 |
| <u>Method of application</u> | | | | | |
| Ploughed in, in winter | | 82.0 | 84.7 | 85.5 | 84.0 |
| Ploughed in, in spring | | 82.2 | 87.2 | 88.5 | 85.9 |
| Placed in ridges in spring | | 83.3 | 82.6 | 84.1 | 83.3 |
| <u>N: cwt per acre</u> | | | | | |
| None | 75.1 | 82.6 | 85.4 | 86.5 | 82.4 |
| 0.6 | 76.6 | 82.4 | 84.2 | 85.5 | 82.2 |
| Response to N | +1.5 | -0.2 | -1.2 | -1.0 | -0.2 |
| <u>P₂O₅: cwt per acre</u> | | | | | |
| None | 81.8 | 84.9 | 86.1 | 87.5 | 85.1 |
| 0.6 | 69.9 | 80.0 | 83.5 | 84.5 | 79.5 |
| Response to P | -11.9 | -4.9 | -2.6 | -3.0 | -5.6 |
| <u>K₂O: cwt per acre</u> | | | | | |
| None | 65.7 | 77.7 | 82.0 | 85.0 | 77.6 |
| 1.0 | 86.0 | 87.3 | 87.6 | 87.0 | 87.0 |
| Response to K | +20.3 | +9.6 | +5.6 | +2.0 | +9.4 |

52/Ce/1.5

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

| | Method of application of dung | | |
|--------------------------------------|-------------------------------|---------------------------|----------------------------------|
| | Ploughed in, in winter | Ploughed in, in spring | Placed in ridges in spring |
| <u>N: cwt per acre</u> | | | |
| None | 83.8 | 86.0 | 84.7 |
| 0.6 | 84.3 | 85.9 | 81.9 |
| Response to N | +0.5 | -0.1 | -2.8 |
| <u>P₂₋₅: cwt per acre</u> | | | |
| None | 87.2 | 86.5 | 84.9 |
| 0.6 | 80.9 | 85.4 | 81.8 |
| Response to P | -6.3 | -1.1 | -3.1 |
| <u>K₂: cwt per acre</u> | | | |
| None | 79.6 | 83.6 | 81.6 |
| 1.0 | 88.5 | 88.3 | 85.1 |
| Response to K | +8.9 | +4.7 | +3.5 |

Responses to treatments

| Response to: | N | | P | | K | |
|--------------|-------|-------|------|-------|------|-------|
| | Abs. | Pres. | Abs. | Pres. | Abs. | Pres. |
| N | - | - | -0.1 | -0.5 | +0.7 | -1.3 |
| P | -5.4 | -5.8 | - | - | -7.9 | -3.3 |
| K | +10.4 | +8.4 | +7.1 | +11.7 | - | - |

52/Ce/2.1

POTATOES

Methods of planting and fertilizer application - West Barnfield II
1952.

System of replication: 4 randomized blocks of 18 plots each.

Area of each plot: 0.021 acre. Area harvested: 0.014 acre.

Treatments: All combinations of:-

Compound granular fertilizer (7% N, 7% P₂O₅, 10.5% K₂O): None;
7½; 15 cwt per acre.

Methods of planting and fertilizer application: Ridge,
broadcast fertilizer, hand plant and split back at once (A);
Ridge, and expose ridges for 7 days, broadcast fertilizer over
ridges, hand plant same time as A, split back ridges (B);
Broadcast fertilizer on flat, plant from flat with dropper (C);
Plant from flat with dropper, fertilizer placed 2" to side of
seed (D); Broadcast fertilizer on flat, plant in ridges with
dropper (E); Plant in ridges with dropper, fertilizer placed
2" to side of seed (F).

Basal dressing: None.

Cultivations, etc.: Ploughed: Sept 27 and again Mar 12. Ridged 'B'
plots: May 3. Fertilizers applied to 'C' and 'E' plots: May 5.
Ridged 'A' plots, fertilizers applied and potatoes planted on 'A'
and 'B' plots: May 9. Fertilizers applied and potatoes planted
on 'C', 'D', 'E' and 'F' plots: May 10. Earthed up: July 17.
Sprayed with copper fungicide 5 lb per acre: Aug 12 and again
Sept 5. Sprayed with sulphuric acid, 20% B.O.V.: Sept 4.
Lifted: Oct 10. Variety: Majestic. Previous crop: Wheat.

Standard error per plot:

Total tubers: 0.857 tons per acre or 9.1% (51 d.f.)*

*2 missing values.

Note: Treatment B was included to test whether the drying out of the
ridges would depress the yield. Since there was considerable
rain during the period of exposure this effect could not be tested.

52/Ce/2.2

Summary of Results

| Compound Fertilizer cwt per acre | Hand planted Fertilizer Broadcast | | Planted by dropper | | | | Mean |
|--|---|-------------------|---------------------------|--------|---------------------------|--------|------|
| | ridges planted at once | ridges exposed | Broad- cast on flat | Placed | Broad- cast on flat | Placed | |

Total tubers: tons per acre

| | | | | | | | | |
|---------------------------------|-------|-------|---------------------|-------|---------------------|-------|-------------------|----------|
| None | 4.67 | 4.96 | 5.46 ⁽¹⁾ | | 4.94 ⁽¹⁾ | | 5.07 | (±0.175) |
| 7½ (±0.428) | 9.97 | 10.53 | 7.90 | 11.54 | 8.24 | 10.71 | 9.81 | |
| 15 | 14.03 | 14.15 | 11.54 | 14.36 | 11.06 | 14.71 | 13.31 | |
| Mean excluding none (±0.303) | 12.00 | 12.34 | 9.72 | 12.95 | 9.65 | 12.71 | 9.40 [Ⓜ] | |

Percentage Ware (1½" riddle)

| | | | | | | | |
|------------------------|------|------|------|------|------|------|-------------------|
| None | 72.5 | 68.5 | 76.7 | | 74.0 | | 73.7 |
| 7½ | 82.8 | 80.3 | 82.4 | 86.5 | 86.4 | 84.8 | 83.9 |
| 15 | 82.3 | 85.5 | 82.6 | 84.6 | 84.6 | 87.5 | 84.5 |
| Mean excluding none | 82.6 | 82.9 | 82.5 | 85.6 | 85.5 | 86.2 | 80.7 [Ⓜ] |

(1) ±0.303

[Ⓜ]General mean.

52/Ce/3.1

POTATOES

Control of Blight - Little Hoes 1952.

System of replication: 4 x 4 Latin Square, plots being split into 2 for determination of tractor damage.

Area of each sub plot: 0.014 acre.

Treatments:

Whole plots: No Spray; Copper fungicide 5 lb per acre sprayed twice in summer; 100 gallons Sulphuric acid, 15% B.O.V. per acre sprayed to destroy haulms; Copper fungicide and sulphuric acid sprayed as above. The tractor used for spraying was driven over all the plots on each occasion.

Sub plots: The 4 inner rows damaged by three passages of the tractor were compared with the 4 outer and undamaged rows.

Basal dressing: 10 cwt compound granular fertilizer (7% N, 7% P₂O₅, 10½% K₂O) per acre.

Cultivations, etc.: Dung applied: Sept 27. Ploughed: Sept 29 and again Feb 4. Basal fertilizer broadcast, ridged: Apr 24. Potatoes planted: Apr 25. Earthed up: July 7. Sprayed appropriate plots with copper fungicide: Aug 13 and again Sept 4. Sprayed appropriate plots with sulphuric acid: Oct 7. Lifted: Nov 3. Variety: Majestic. Previous crop: Wheat.

Standard errors per plot: Total tubers.

Whole plot: 0.984 tons per acre or 13.5% (6 d.f.)

Sub plot: 0.614 tons per acre or 8.4% (12 d.f.)

Blight counts were made and are available. The mean level of infection was only 0.2%.

52/Ce/3.2

Summary of Results

| | Spray | | | | Mean |
|-----------------------------|-----------|------------------|----------------|-------------------------------------|----------------|
| | None | Copper fungicide | Sulphuric Acid | Copper fungicide and Sulphuric Acid | |
| Total tubers: tons per acre | | | | | |
| | (±0.538)* | | | | |
| Undamaged rows | 7.45 | 7.55 | 7.17 | 6.99 | 7.29 |
| Damaged rows | 7.36 | 7.80 | 7.26 | 6.63 | 7.26 |
| Mean (±0.492) | 7.40 | 7.67 | 7.22 | 6.81 | 7.28 |
| Difference (±0.434) | -0.09 | +0.25 | +0.09 | -0.36 | -0.03 (±0.217) |
| Percentage Ware** | | | | | |
| | 86.1 | 90.7 | 84.9 | 84.1 | 86.4 |

* for use in all comparisons other than vertical.

** estimated from produce of damaged rows only.

52/Ce/4

POTATOES

Nitrophosphates - Highfield 5 1952.

System of replication: 6 x 6 Latin Square.

Area of each plot: 0.0196 acre. Area harvested: 0.0147 acre.

Treatments: None; Superphosphate at 0.3 and 0.6 cwt P₂O₅ per acre; British nitrophosphate (14.2% N, 14.4% P₂O₅) at 0.45 cwt P₂O₅ per acre; French nitrophosphate (12.1% N, 11.9% P₂O₅, 13.0% K₂O) at 0.45 cwt P₂O₅ per acre; Dutch nitrophosphate (19.3% N, 20.2% P₂O₅) at 0.45 cwt P₂O₅ per acre.

Treatments received extra sulphate of ammonia and muriate of potash to bring them to the level of 0.6 cwt N and 1.0 cwt K₂O per acre.

Basal dressing: None.

Cultivations, etc.: Ploughed: Mar 18. Ridged: Apr 30. Fertilizers applied, potatoes planted: May 1. Earthed up: July 9. Sprayed with copper fungicide 5 lb per acre: Aug 13 and again Sept 5. Sprayed with sulphuric acid, 20% B.O.V.: Oct 8. Lifted: Oct 17. Variety: Majestic. Previous crop: Kale.

Standard error per plot:

Total tubers: 1.25 tons per acre or 9.0% (20 d.f.)

Summary of Results

| | No fert- ilizer | Superphosphate at | | Nitrophosphate at | | | Mean |
|------------------------------|-----------------------|--|--|---|---------|--------|-------|
| | | 0.3 cwt P ₂ O ₅ per acre | 0.6 cwt P ₂ O ₅ per acre | 0.45 cwt P ₂ O ₅ per acre | British | French | |
| Total tubers: tons per acre | | | | | | | |
| Mean (±0.511) | 13.87 | 12.97 | 14.89 | 14.00 | 13.89 | 13.41 | 13.84 |
| Increase (±0.722) | | -0.90 | +1.02 | +0.13 | +0.02 | -0.46 | |
| Percentage Ware (1½" riddle) | | | | | | | |
| Mean | 82.1 | 80.4 | 78.4 | 81.2 | 81.9 | 79.8 | 80.6 |
| Increase | | -1.7 | -3.7 | -0.9 | -0.2 | -2.3 | |

52/Cf/1.1

LUCERNE

Fertilizer placement - Highfield 5 1952.

System of replication: 8 randomized blocks of 8 plots each, a high order interaction being confounded with block differences.

Area of each plot: 0.0136 acre.

Treatments: All combinations of:-

Superphosphate: None; 1.0 cwt P_2O_5 per acre.

Muriate of Potash: None; 1.0 cwt K_2O per acre.

Method of placement: Broadcast on seed bed (B): Ploughed in 10" (D)

Starter: None; 2 cwt granular superphosphate per acre placed beneath seed.

Basal dressing: None.

Cultivations, etc.: 'D' fertilizers applied: Mar 17. Ploughed: Mar 18. 'B' fertilizers applied: May 2. Starter applied, seed drilled at 20 lb per acre: May 7. Dusted with D.D.T: June 5. Cut and weighed. green: July 29 and again Oct 10. Variety: Du Puit. Previous crop: Kale.

Standard errors per plot: Dry Matter.

1st cut: 1.18 cwt per acre or 11.8% (42 d.f.)

2nd cut: 1.78 cwt per acre or 8.6% (42 d.f.)

52/Cf/1.2

Summary of Results

Dry Matter: cwt per acre

| Starter | No fertilizer | Superphosphate | | Muriate of potash | | Superphosphate and Muriate of potash | | Mean |
|-----------------------|---------------------|----------------|-------------|-------------------|-------------|--------------------------------------|-------------|--------------------|
| | | Broad-cast | Ploughed in | Broad-cast | Ploughed in | Broad-cast | Ploughed in | |
| 1st cut [*] | | | | | | | | |
| None (±0.57) | 6.8 ⁽¹⁾ | 7.7 | 9.0 | 6.5 | 7.6 | 9.0 | 10.1 | 7.9 |
| Granular Super | 12.0 ⁽¹⁾ | 10.7 | 12.2 | 12.5 | 12.2 | 12.9 | 13.2 | 12.2 |
| Mean (±0.42) | 9.4 ⁽²⁾ | 9.2 | 10.6 | 9.5 | 9.9 | 10.9 | 11.6 | 10.1 |
| Difference (±0.78) | 5.2 ⁽³⁾ | 3.0 | 3.2 | 6.0 | 4.6 | 3.9 | 3.1 | 4.3 ⁽²⁾ |

- (1) ±0.42
- (2) ±0.30
- (3) ±0.59

Mean Dry Matter %: 27.7

* Adjusted for block effects

2nd cut

| | | | | | | | | |
|-----------------------|---------------------|------|------|------|------|------|------|--------------------|
| None (±0.89) | 18.8 ⁽⁴⁾ | 19.5 | 19.4 | 18.6 | 18.6 | 20.6 | 20.6 | 19.4 |
| Granular Super | 21.9 ⁽⁴⁾ | 21.6 | 21.6 | 22.2 | 22.2 | 21.4 | 22.3 | 21.9 |
| Mean (±0.63) | 20.3 ⁽⁵⁾ | 20.6 | 20.5 | 20.4 | 20.4 | 21.0 | 21.5 | 20.6 |
| Difference (±1.26) | 3.1 ⁽⁶⁾ | 2.1 | 2.2 | 3.6 | 3.6 | 0.8 | 1.7 | 2.5 ⁽⁵⁾ |

- (4) ±0.63
- (5) ±0.45
- (6) ±0.89

Mean Dry Matter %: 22.9

52/Cg/1

PERMANENT GRASS

Residual of nitrophosphates - Highfield 9 1952.

System of replication: 6 x 6 Latin Square.

Area of each plot: 0.0102 acre. Area harvested: 0.0093 acre.

Treatments, applied 1951: None; Sulphate of ammonia; Superphosphate; Sulphate of ammonia and superphosphate; British nitrophosphate (12.8% N, 15.25% P₂O₅); Dutch nitrophosphate (20% N, 20.3% P₂O₅). The dressings supply 0.39 cwt N and 0.39 cwt P₂O₅ per acre, the British nitrophosphate receiving extra N to reach this standard.

Basal dressing: 1 1/3 cwt muriate of potash per acre.

Cultivations, etc.: Muriate of potash applied: Mar 12. Cut: June 19 and weighed green.

Standard errors per plot:

Hay, dry matter: 1.97 cwt per acre or 5.2% (20 d.f.)

P₂O₅ uptake: 0.00822 cwt per acre or 4.7% (20 d.f.)

Summary of Results

| | Fertilizers applied 1951 | | | | | | Mean |
|--|--------------------------|---------------------|-----------------|---|-------------------------|-----------------------|------|
| | None | Sulphate of Ammonia | Super-phosphate | Sulphate of Ammonia and Super-phosphate | British Nitro-phosphate | Dutch Nitro-phosphate | |

Hay, dry matter: cwt per acre

| | | | | | | | |
|--|-------|--------|--------|--------|--------|--------|-------|
| Mean (±0.80) | 37.3 | 37.0 | 38.7 | 37.1 | 39.2 | 38.8 | 38.0 |
| Increase (±1.14) | | -0.3 | +1.4 | -0.2 | +1.9 | +1.5 | |
| P ₂ O ₅ uptake: cwt per acre | | | | | | | |
| Mean (±0.0034) | 0.163 | 0.160 | 0.184 | 0.172 | 0.174 | 0.187 | 0.173 |
| Increase (±0.0047) | | -0.003 | +0.021 | +0.009 | +0.011 | +0.024 | |

Mean Dry Matter %: 39.6

52/Ch/1

GLOBE BEET

Fertilizer placement - Long Hoos IV 1952.

System of replication: 4 randomized blocks of 5 plots each.

Area of each plot: 0.00344 acre.

Treatments: No fertilizer; and all combinations of:-

National Compound fertilizer No. 1A (8% N; 6% P₂O₅; 10½% K₂O):
2.5; 5.0 cwt per acre.

Method of placement: Broadcast on seed bed; drilled in band beside seed.

Note. On calibration, the levels of fertilizer actually drilled were found to be 2.0 and 4.5 cwt per acre.

Basal dressing: None.

Cultivations, etc.: Ploughed: Feb 5. Seed drilled at 8 lb per acre, fertilizer applied: May 13. Lifted: Aug 6. Variety: Crimson Globe. Previous crop: Barley.

Standard error per plot:

Saleable produce*: 1.60 tons per acre or 45.2% (12 d.f.)

Summary of Results

| | Compound fertilizer: cwt per acre | | | | | Mean |
|----------------------------------|-----------------------------------|------------------|----------------|------------------|----------------|------|
| | None | 2.5 Broadcast | 2.0 Drilled | 5.0 Broadcast | 4.5 Drilled | |
| Saleable produce*: tons per acre | | | | | | |
| Mean (±0.80) | 3.99 | 3.18 | 3.25 | 3.20 | 4.03 | 3.53 |
| Increase (±1.13) | | -0.81 | -0.74 | -0.79 | +0.04 | |
| Total produce*: tons per acre | | | | | | |
| Mean | 5.50 | 4.72 | 4.58 | 4.65 | 5.31 | 4.95 |
| Increase | | -0.78 | -0.92 | -0.85 | -0.19 | |

*Bulbs and tops.

52/Ci/1.1

SUGAR BEET

Control of Virus Yellows - Great Harpenden II 1952.

System of replication: 5 randomized blocks of 3 plots each, plots being split into 3 for singling dates.

Area of each sub plot: 0.0208 acre. Area harvested: 0.0181 acre.

Treatments:

Whole plots: Sowing date. 1 - As early as possible; 2 - As soon as first sowing above ground; 3 - As soon as second sowing above ground.

Sub plots: Singling date. A - Early (Cotyledons and first leaf less than 1"); B - Normal (Cotyledons and 4 leaves); C - Late (8-12 leaves).

Basal dressing per acre: 3 cwt nitrate of soda; 4 cwt superphosphate; 2 cwt sulphate of potash; 5 cwt salt.

Cultivations, etc.: Ploughed: Oct 30, 1951. 2 tons ground chalk per acre applied: Mar 4, 1952. Basal fertilizers except nitrate of soda applied: Mar 15. Nitrate of soda applied, seed drilled at 18 lb per acre: '1' plots - Mar 17, '2' plots - Apr 17, '3' plots - May 6. DDT dust applied to '1' plots: Apr 15. Singled: Plots '1A' - May 13, '1B' and '2A' - May 22, '1C', '2B' and '3A' - May 29, '2C' and '3B' - June 6, '3C' - June 17. Lifted: Jan 5, 1953. Variety: Klein E. Previous crop: Oats.

Standard errors per plot:

Total sugar: whole plot, 4.18 cwt per acre or 9.5% (8 d.f.)
 sub plot, 6.18 cwt per acre or 14.0% (24 d.f.)

Percentage Virus Yellows
 (transformed values): whole plot, 3.17 or 14.7% (8 d.f.)
 sub plot, 5.14 or 23.9% (24 d.f.)

Note. The analysis of the incidence of Virus Yellows has been carried out on percentages transformed to degrees, and all tests of significance should be applied to the transformed values.

Summary of Results

| Sowing Date | Singling Date | | | Mean |
|-------------------------------|---------------|--------|-------|-------|
| | Early | Normal | Late | |
| Roots (washed): tons per acre | | | | |
| 17th March | 14.86 | 16.98 | 13.68 | 15.17 |
| 17th April | 16.52 | 15.95 | 12.60 | 15.02 |
| 6th May | 13.36 | 12.25 | 10.35 | 11.99 |
| Mean | 14.91 | 15.06 | 12.21 | 14.06 |

52/Ci/1.2

| Sowing Date | Singling Date | | | Mean |
|----------------------------------|---------------|--------|-------|---------|
| | Early | Normal | Late | |
| Sugar Percentage | | | | |
| 17th March | 15.70 | 15.96 | 15.68 | 15.78 |
| 17th April | 15.94 | 15.84 | 15.15 | 15.64 |
| 6th May | 15.54 | 15.27 | 15.21 | 15.34 |
| Mean | 15.73 | 15.69 | 15.35 | 15.59 |
| Total Sugar: cwt per acre | | | | |
| | (a and b) | | | (±1.87) |
| 17th March | 46.7 | 54.2 | 43.1 | 48.0 |
| 17th April | 52.6 | 50.6 | 38.6 | 47.3 |
| 6th May | 41.5 | 37.4 | 31.5 | 36.8 |
| Mean (±1.60) | 46.9 | 47.4 | 37.7 | 44.0 |
| Plant Number: thousands per acre | | | | |
| 17th March | 27.5 | 29.4 | 27.6 | 28.2 |
| 17th April | 29.9 | 28.3 | 23.1 | 27.1 |
| 6th May | 28.2 | 28.6 | 22.0 | 26.2 |
| Mean | 28.5 | 28.7 | 24.2 | 27.2 |
| Noxious Nitrogen: mg per 100 g. | | | | |
| 17th March | 15.0 | 15.0 | 19.0 | 16.3 |
| 17th April | 18.0 | 17.0 | 22.0 | 19.0 |
| 6th May | 17.0 | 21.0 | 22.0 | 20.0 |
| Mean | 16.7 | 17.7 | 21.0 | 18.4 |

- (a) - ±2.76 for use in horizontal comparisons only.
 (b) ±2.93 for use in all other comparisons.

52/Ci/1.3

| Sowing Date | Singling Date | | | Mean |
|--|---------------|--------|------|------|
| | Early | Normal | Late | |
| Percentage Virus Yellows (means calculated from transformed values) | | | | |
| 17th March | 12.6 | 15.6 | 12.8 | 13.7 |
| 17th April | 18.3 | 10.8 | 19.4 | 15.9 |
| 6th May | 10.7 | 10.8 | 11.7 | 11.0 |
| Mean | 13.7 | 12.2 | 14.4 | 13.4 |

| Sowing Date | Percentage Virus Yellows (transformed values) | | | Mean |
|--------------|--|------|------|------|
| | (a and b) | | | |
| (±1.42) | | | | |
| 17th March | 20.8 | 23.3 | 20.9 | 21.7 |
| 17th April | 25.3 | 19.2 | 26.1 | 23.5 |
| 6th May | 19.1 | 19.2 | 20.0 | 19.4 |
| Mean (±1.33) | 21.7 | 20.5 | 22.3 | 21.5 |

- (a) ±2.30 for use in horizontal comparisons only.
 (b) ±2.35 for use in all other comparisons.

52/Ci/2.

SUGAR BEET

Kriliium - Rothamsted, Great Harpenden II; Woburn, Butt Close, 1952.

System of replication: Rothamsted - 3 x 3 Latin square. Woburn - 3 randomized blocks of 3 plots each.

Area of each plot: 0.00083 acre.

Treatments:

Kriliium: None; 5 cwt per acre broadcast and harrowed into seed bed; 1 cwt per acre drilled in 3" band.

Basal manuring per acre: 2 cwt sulphate of potash; 4 cwt superphosphate; 3 cwt nitrate of soda; 5 cwt salt.

Cultivations, etc.:

Rothamsted. Ploughed: Oct 30, 1951. 2 cwt ground chalk per acre applied: Mar 4, 1952. Sulphate of potash and superphosphate drilled: Mar 15. Kriliium applied, seed drilled at 18 lb per acre: Mar 21. Nitrate of soda applied: Mar 26. Singled: May 17. Lifted: Jan 12, 1953. Variety: Klein E.

Woburn. Ploughed: Apr 5, 1952. Kriliium and basal fertilizers applied, seed drilled at 18 lb per acre: Apr 28. Singled: May 27. Lifted: Dec 10. Variety: Klein E.

Summary of Results

| <u>Rothamsted</u> | | | | <u>Woburn</u> | | | |
|----------------------------------|-----------|---------|-------|------------------------|-----------|---------|-------|
| Kriliium: cwt per acre | | | | Kriliium: cwt per acre | | | |
| 5 | 1 | | | 5 | 1 | | |
| None | Broadcast | Drilled | Mean | None | Broadcast | Drilled | Mean |
| Clean Beet: tons per acre | | | | | | | |
| 16.11 | 17.84 | 15.95 | 16.63 | 12.07 | 15.39 | 15.37 | 14.28 |
| Sugar Percentage | | | | | | | |
| 16.35 | 16.16 | 16.07 | 16.19 | 15.83 | 16.47 | 15.95 | 16.08 |
| Total Sugar: cwt per acre | | | | | | | |
| 52.7 | 57.6 | 51.3 | 53.8 | 38.8 | 50.6 | 49.0 | 46.2 |
| Tops: tons per acre | | | | | | | |
| 8.93 | 9.91 | 9.11 | 9.32 | 12.14 | 14.46 | 16.61 | 14.40 |
| Plant Number: thousands per acre | | | | | | | |
| 30.0 | 28.0 | 28.8 | 28.9 | 29.6 | 31.6 | 31.6 | 30.9 |
| Noxious Nitrogen: mg. per 100 g. | | | | | | | |
| 15.0 | 15.0 | 18.3 | 16.1 | 28.3 | 28.3 | 28.3 | 28.3 |

52/Cj/1.1

CLOVER, RYEGRASS, RED BEET AND CARROTS

Krillium - Rothamsted, Fosters and Barnfield; Woburn, Stackyard and Warren Field.

System of replication: 4 x 4 Latin square.

Area of each plot: 0.00207 acre. Area harvested: Clover and Ryegrass - 0.000275 acre, Red beet and Carrots - 0.000689 acre.

Treatments:

Krillium per acre: None; 3 cwt broadcast and twice rotary cultivated in (K_1); 6 cwt broadcast and twice rotary cultivated in (K_2); 3 cwt broadcast and raked into seed bed (K_3).

Basal manuring: 5 cwt Compound fertilizer (7% N, 7% P_2O_5 , 10.5% K_2O) per acre.

Cultivations, etc.: Rothamsted

Ploughed: Feb 13. K_1 and K_2 applied, all plots rotor tilled: May 14. Rotor tilled 2nd time, applied K_3 , seeds drilled: May 15. Dusted red beet with DDT: June 4. 1st cut ryegrass: Fosters - July 25, Barnfield - Aug 27. Clover cut: Aug 29. 2nd cut ryegrass: Sept 18. Carrots lifted: Nov 13. Beet, Barnfield lifted: Nov 14. The beet on Fosters were damaged by sheep and the yields were not taken. Varieties: Clover - Crimson; Ryegrass - Western Walth; Carrots - James Scot Intermediate; Red Beet - Detroit.

Woburn

Ploughed: Stackyard - Sept 17 1951 and Jan 4 1952. Warren Field - Feb 22. K_1 and K_2 applied, all plots rotor tilled: May 14. Applied K_3 and basal manures, rotor tilled, seeds drilled: May 15. Owing to rabbit damage the clover ryegrass and carrots on Warren Field were not harvested. Clover and ryegrass harvested: Aug 22. Beet lifted: Sept 12. Carrots lifted: Oct 30. Varieties: Clover - Scarlet Isles Trifolium; Ryegrass - Italian; Carrots - Scarlet Intermediate; Red Beet - Detroit.

52/Cj/1.2

Standard errors per plot:

Clover, fresh weight.

| | | |
|------------|----------------------------|----------|
| Fosters: | 9.66 cwt per acre or 14.1% | (6 d.f.) |
| Barnfield: | 3.73 cwt per acre or 12.0% | (6 d.f.) |
| Stackyard: | 19.3 cwt per acre or 31.6% | (6 d.f.) |

Ryegrass, fresh weight.

| | | |
|---------------------|----------------------------|-----------|
| Fosters, 1st cut: | 2.09 cwt per acre or 22.0% | (6 d.f.) |
| 2nd cut: | 10.9 cwt per acre or 17.3% | (6 d.f.) |
| Barnfield, 1st cut: | 5.86 cwt per acre or 9.9% | (5 d.f.)* |
| 2nd cut: | 1.37 cwt per acre or 9.7% | (6 d.f.) |
| Stackyard: | 14.3 cwt per acre or 11.4% | (6 d.f.) |

Red Beet, weight of bulbs.

| | | |
|---------------|------------------------------|----------|
| Barnfield: | 0.960 tons per acre or 18.8% | (6 d.f.) |
| Stackyard: | 3.62 tons per acre or 39.9% | (6 d.f.) |
| Warren Field: | 0.436 tons per acre or 8.2% | (6 d.f.) |

Carrots, roots.

| | | |
|------------|------------------------------|----------|
| Fosters: | 1.02 tons per acre or 7.8% | (6 d.f.) |
| Barnfield: | 0.525 tons per acre or 19.9% | (6 d.f.) |
| Stackyard: | 1.15 tons per acre or 33.5% | (6 d.f.) |

*1 missing value.

Summary of Results

| | Krilium: cwt per acre | | | | Mean |
|------------------------------------|-----------------------|----------------|-----------------------------|------|------|
| | None | Broadcast 3 | Broadcast in 6 seedbed 3 | | |
| Clover, fresh weight: cwt per acre | | | | | |
| | <u>Fosters</u> | | | | |
| Mean (± 4.83) | 67.0 | 66.8 | 68.2 | 72.8 | 68.7 |
| Increase (± 6.83) | | -0.2 | +1.2 | +5.8 | |
| | <u>Barnfield</u> | | | | |
| Mean (± 1.87) | 30.4 | 31.0 | 31.0 | 32.2 | 31.2 |
| Increase (± 2.64) | | +0.6 | +0.6 | +1.8 | |
| | <u>Stackyard</u> | | | | |
| Mean (± 9.6) | 60.7 | 63.2 | 62.4 | 58.3 | 61.1 |
| Increase (± 13.6) | | +2.5 | +1.7 | -2.4 | |

52/Cj/1.3

| | Krilium: cwt per acre | | | | Mean |
|--|-----------------------|----------------|----------------|---------------------------|------|
| | None | Broadcast 3 | Broadcast 6 | Broadcast in seedbed 3 | |

Ryegrass, fresh weight: cwt per acre

| | <u>Fosters, 1st cut</u> | | | | |
|-------------------------|---------------------------|-------|-------|-------|-------|
| Mean (± 1.05) | 9.2 | 9.2 | 9.7 | 9.9 | 9.5 |
| Increase (± 1.48) | | 0.0 | +0.5 | +0.7 | |
| | <u>Fosters, 2nd cut</u> | | | | |
| Mean (± 5.43) | 71.1 | 60.8 | 61.3 | 58.2 | 62.8 |
| Increase (± 7.68) | | -10.3 | -9.8 | -12.9 | |
| | <u>Barnfield, 1st cut</u> | | | | |
| Mean (± 2.93) | 58.7 | 57.4 | 58.3 | 62.1 | 59.1 |
| Increase (± 4.14) | | -1.3 | -0.4 | +3.4 | |
| | <u>Barnfield, 2nd cut</u> | | | | |
| Mean (± 0.68) | 15.5 | 14.2 | 12.4 | 14.5 | 14.1 |
| Increase (± 0.97) | | -1.3 | -3.1 | -1.0 | |
| | <u>Stackyard</u> | | | | |
| Mean (± 7.1) | 132.2 | 123.0 | 124.5 | 123.0 | 125.7 |
| Increase (± 10.1) | | -9.2 | -7.7 | -9.2 | |

Red Beet, weight of bulbs: tons per acre

| | <u>Barnfield</u> | | | | |
|--------------------------|---------------------|-------|-------|-------|------|
| Mean (± 0.480) | 5.56 | 5.49 | 4.57 | 4.83 | 5.11 |
| Increase (± 0.679) | | -0.07 | -0.99 | -0.73 | |
| | <u>Stackyard</u> | | | | |
| Mean (± 1.81) | 9.01 | 10.26 | 9.61 | 7.47 | 9.09 |
| Increase (± 2.56) | | +1.25 | +0.60 | -1.54 | |
| | <u>Warren Field</u> | | | | |
| Mean (± 0.218) | 5.61 | 4.12 | 5.93 | 5.64 | 5.32 |
| Increase (± 0.308) | | -1.49 | +0.32 | +0.03 | |

Carrots, roots: tons per acre

| | <u>Fosters</u> | | | | |
|--------------------------|------------------|-------|-------|-------|-------|
| Mean (± 0.510) | 13.37 | 11.59 | 13.77 | 13.74 | 13.12 |
| Increase (± 0.721) | | -1.78 | +0.40 | +0.37 | |
| | <u>Barnfield</u> | | | | |
| Mean (± 0.263) | 2.50 | 2.88 | 2.31 | 2.88 | 2.65 |
| Increase (± 0.371) | | +0.38 | -0.19 | +0.38 | |
| | <u>Stackyard</u> | | | | |
| Mean (± 0.577) | 3.34 | 3.35 | 3.49 | 3.60 | 3.45 |
| Increase (± 0.816) | | +0.01 | +0.15 | +0.26 | |

52/E/1

CHEMICAL ANALYSES OF MANURES USED IN THE THREE, FOUR AND SIX COURSE
ROTATION EXPERIMENTS 1952

| Manures | % Organic Matter | % N | % P ₂ O ₅ | % K ₂ O |
|-----------------------|------------------|------|---------------------------------|--------------------|
| Three Course Rotation | | | | |
| Wheat Straw | 80.7 | 0.52 | 0.20 | 1.05 |
| Sulphate of Ammonia | | 21.0 | | |
| Superphosphate | | | 18.4 (total) | |
| Muriate of Potash | | | | 56.7 |
| Four Course Rotation | | | | |
| Wheat Straw | 80.7 | 0.52 | 0.20 | 1.05 |
| Adco Compost | 16.8 | 0.38 | 0.27 | 0.12 |
| Dung | 16.5 | 0.39 | 0.17 | 0.82 |
| Sulphate of Ammonia | | 21.0 | | |
| Superphosphate | | | 18.4 (total) | |
| Mineral Phosphate | | | 27.9 | |
| Muriate of Potash | | | | 56.7 |
| Six Course Rotation | | | | |
| Sulphate of Ammonia | | 21.0 | | |
| Superphosphate | | | 18.4 (total) | |
| Muriate of Potash | | | | 56.7 |

METEOROLOGICAL RECORDS ROTHAMSTED 1952
(Departure from long period means in brackets)

| Month | Total Hours of Sunshine | Mean Temperature (°F.) | | | In Ground 4 ft | Ground Frosts (2) | Total Rainfall (in) 1/1000 acre Gauge | Rain Days (3) | Drainage through 20 in soil | Wind (4) m. p. h |
|-------|-------------------------|------------------------|-----------|------|----------------|-------------------|---------------------------------------|---------------|-----------------------------|------------------|
| | | Air (1) | Dew Point | 1 ft | | | | | | |
| Jan. | 88 (+36) | 36.5 (-0.9) | 32.7 | 37.3 | 43.8 | 19 | 1.92 (-0.61) | 18 | 1.17 | 6.7 |
| Feb. | 78 (+9) | 36.7 (-1.7) | 32.1 | 36.1 | 40.6 | 21 | 0.70 (-1.23) | 12 | 0.68 | 4.9 |
| Mar. | 89 (-29) | 43.1 (+1.8) | 39.0 | 42.3 | 42.6 | 11 | 2.84 (+0.93) | 21 | 1.14 | 5.5 |
| Apr. | 165 (+9) | 49.5 (+3.7) | 42.1 | 46.4 | 44.5 | 6 | 2.01 (+0.05) | 15 | 2.20 | 4.0 |
| May | 212 (+16) | 55.7 (+3.8) | 47.7 | 55.7 | 49.4 | 0 | 1.72 (-0.43) | 12 | 0.09 | 3.9 |
| June | 219 (+14) | 58.2 (+0.7) | 49.6 | 59.1 | 53.2 | 0 | 0.81 (-1.36) | 12 | - | 4.0 |
| July | 180 (-16) | 62.4 (+1.7) | 52.8 | 64.3 | 56.8 | 0 | 0.55 (-2.01) | 5 | - | 4.5 |
| Aug. | 178 (-7) | 61.5 (+1.3) | 54.3 | 61.6 | 58.0 | 0 | 5.13 (+2.57) | 16 | 2.34 | 4.0 |
| Sept. | 120 (-26) | 51.8 (-4.3) | 46.3 | 54.2 | 56.6 | 2 | 3.68 (+1.31) | 21 | 1.40 | 4.9 |
| Oct. | 100 (-5) | 47.5 (-1.4) | 43.7 | 47.4 | 52.3 | 4 | 2.94 (-0.05) | 16 | 1.77 | 5.4 |
| Nov. | 65 (+2) | 38.2 (-4.2) | 35.1 | 40.7 | 48.5 | 13 | 4.04 (+1.23) | 18 | 2.51 | 6.1 |
| Dec. | 61 (+16) | 35.4 (-3.1) | 32.2 | 36.0 | 42.8 | 20 | 2.88 (+0.30) | 19 | 3.55 | 4.7 |
| Year* | 1555 (+19) | 48.0 (-0.2) | 42.3 | 48.4 | 49.1 | 96 | 29.22 (+0.70) | 185 | 16.85 | 4.9 |

(1) Mean of maximum and minimum.

(2) Number of nights grass minimum 30°F or less.

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

(4) At 2 metres above ground level.

*Mean or total.

52/E/2.2

METEOROLOGICAL RECORDS WOBURN 1952

| Month | Total hours of Sunshine | Mean Temperature (°F) | | Grass Minimum: °F | Total Rainfall: (in.) 8" gauge | Rain ⁽²⁾ days |
|-------------------|-------------------------|-----------------------|-----------------|-------------------|--------------------------------|--------------------------|
| | | Air ⁽¹⁾ | In Ground 1 ft. | | | |
| January | 87 | 37.0 | 37.1 | 28.7 | 1.51 | 14 |
| February | 87 | 36.8 | 36.3 | 26.9 | 0.67 | 8 |
| March | 90 | 43.4 | 43.3 | 34.6 | 3.56 | 22 |
| April | 162 | 49.5 | 48.0 | 35.8 | 1.93 | 15 |
| May | 216 | 55.9 | 57.9 | 42.7 | 2.46 | 15 |
| June | 207 | 58.2 | 60.7 | 44.6 | 1.19 | 11 |
| July | 222 | 62.6 | 66.7 | 49.1 | 0.39 | 6 |
| August | 183 | 61.2 | 62.9 | 48.9 | 3.18 | 14 |
| September | 119 | 51.7 | 54.0 | 38.7 | 3.06 | 17 |
| October | 99 | 47.2 | 46.8 | 36.9 | 2.96 | 18 |
| November | 65 | 38.2 | 39.9 | 30.0 | 3.24 | 16 |
| December | 68 | 35.9 | 35.8 | 27.7 | 2.06 | 19 |
| Year [#] | 1605 | 48.1 | 49.1 | 37.0 | 26.21 | 175 |

(1) Mean of maximum and minimum.

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

[#] Mean or total.