

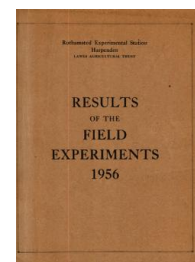
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ROTHAMSTED  
RESEARCH

# Yields of the Field Experiments 1956

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## Default Title

### Rothamsted Research

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Rothamsted Experimental Station  
Harpenden  
LAWES AGRICULTURAL TRUST

RESULTS  
OF THE  
FIELD  
EXPERIMENTS  
1956

Rothamsted Experimental Station

Harpenden

Laws Agricultural Trust

RESULTS

of the

FIELD

EXPERIMENTS

1956

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

Price: 5/-

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\*At Rothamsted unless otherwise stated.

P. T. O.

56/A/1.1

WHEAT - BROADBALK 1956

The 113th year

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

Cultivations, etc.:

Cropped sections. Ground chalk and dung applied: Sept 6, 1955.

Ploughed: Sept 7 - 14. Autumn fertilizers applied: Sept 29.

Seed drilled at  $2\frac{3}{4}$  bushels per acre: Nov 2. Spring fertilizers applied: May 9 - 10, 1956. Second dressing of nitrate of soda applied to plot 16: May 24. Harvested: Sept 1 - 4. Variety: Squareheads Master  $1\frac{3}{4}$ .

Fallow section . (IB) Ploughed: Sept 7 - 14, 1955, May 12 - 15, 1956 and July 17 - 18.

Summary of Results

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

| Section<br>Years<br>after<br>fallow | III  | IV   | VA           | VB         | II   | IA   | Mean |
|-------------------------------------|------|------|--------------|------------|------|------|------|
|                                     | 1    | 2    | Unlimed<br>3 | Limed<br>3 | 4    | 5    |      |
| 2A                                  | 27.3 | 22.3 | 22.7         | 19.5       | 22.6 | 18.1 | 23.0 |
| 2B                                  | 27.4 | 24.4 | 23.3         | 21.5       | 20.2 | 19.7 | 23.4 |
| 3                                   | 17.1 | 8.4  | 8.1          | 6.9        | 8.6  | 11.6 | 10.4 |
| 5                                   | 20.9 | 10.3 | 10.0         | 8.4        | 13.1 | 14.9 | 13.4 |
| 6                                   | 24.0 | 16.7 | 13.2         | 11.8       | 15.8 | 15.3 | 17.1 |
| 7                                   | 22.3 | 22.2 | 18.1         | 14.2       | 18.0 | 19.1 | 19.6 |
| 8                                   | 21.4 | 23.6 | 21.2         | 17.2       | 19.2 | 20.8 | 20.8 |
| 9                                   | 21.1 | 15.0 | 13.1         | 15.2       | 12.2 | 11.7 | 15.4 |
| 10                                  | 14.9 | 14.4 | 9.5          | 9.2        | 8.1  | 13.7 | 11.8 |
| 11                                  | 13.0 | 13.4 | 9.4          | 7.3        | 10.6 | 13.2 | 11.4 |
| 12                                  | 15.4 | 17.4 | 10.1         | 10.6       | 12.1 | 17.5 | 14.0 |
| 13                                  | 22.4 | 20.5 | 17.7         | 11.8       | 16.2 | 17.3 | 18.3 |
| 14                                  | 15.5 | 18.4 | 15.6         | 8.8        | 10.4 | 15.7 | 14.2 |
| 15                                  | 22.2 | 19.0 | 14.2         | 9.9        | 15.6 | 15.5 | 17.1 |
| 16                                  | 21.2 | 18.6 | 14.1         | 12.9       | 15.4 | 14.5 | 17.0 |
| 17                                  | 22.5 | 16.4 | 11.8         | 13.2       | 13.9 | 16.8 | 16.3 |
| 18                                  | 16.1 | 8.9  | 6.6          | 7.2        | 6.0  | 6.3  | 9.3  |
| 19                                  | 19.3 | 15.6 | 12.6         | 10.2       | 13.7 | 15.9 | 15.0 |
| 20                                  | -    | -    | -            | -          | 8.6  | 14.7 | 10.2 |

Mean dry matter % as threshed: 80.7

56/A/1.2

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

| Section<br>Years<br>after<br>fallow | III  | IV   | VA           | VB         | II   | IA   | Mean |
|-------------------------------------|------|------|--------------|------------|------|------|------|
|                                     | 1    | 2    | Unlined<br>3 | Limed<br>3 | 4    | 5    |      |
| 2A                                  | 56.6 | 43.2 | 42.9         | 41.2       | 43.9 | 33.8 | 45.7 |
| 2B                                  | 51.2 | 45.3 | 40.7         | 41.0       | 38.7 | 35.9 | 43.5 |
| 3                                   | 27.5 | 14.1 | 14.6         | 12.6       | 13.0 | 13.3 | 16.8 |
| 5                                   | 30.0 | 19.4 | 21.9         | 19.4       | 20.4 | 20.2 | 22.5 |
| 6                                   | 36.6 | 28.8 | 26.1         | 22.7       | 22.4 | 21.2 | 27.6 |
| 7                                   | 38.7 | 37.9 | 33.6         | 28.9       | 29.5 | 27.0 | 33.9 |
| 8                                   | 34.4 | 42.0 | 38.2         | 32.7       | 29.1 | 33.1 | 35.1 |
| 9                                   | 32.7 | 25.8 | 22.2         | 24.2       | 19.2 | 16.0 | 24.7 |
| 10                                  | 25.0 | 21.9 | 18.8         | 17.1       | 15.6 | 20.2 | 20.1 |
| 11                                  | 25.6 | 23.8 | 23.2         | 20.2       | 18.2 | 21.2 | 22.3 |
| 12                                  | 27.1 | 28.4 | 26.6         | 20.2       | 19.7 | 28.0 | 24.8 |
| 13                                  | 37.1 | 32.5 | 31.0         | 25.3       | 26.5 | 27.4 | 30.8 |
| 14                                  | 26.0 | 29.8 | 23.9         | 21.8       | 16.3 | 25.1 | 23.8 |
| 15                                  | 38.7 | 32.7 | 31.1         | 28.0       | 27.9 | 27.2 | 31.9 |
| 16                                  | 39.1 | 31.4 | 27.1         | 26.0       | 25.5 | 24.4 | 30.2 |
| 17                                  | 36.0 | 27.5 | 25.4         | 25.9       | 21.4 | 22.2 | 27.3 |
| 18                                  | 30.9 | 16.3 | 15.3         | 20.5       | 10.2 | 10.5 | 18.3 |
| 19                                  | 33.4 | 29.0 | 27.5         | 23.2       | 22.6 | 23.7 | 27.4 |
| 20                                  | -    | -    | -            | -          | 16.6 | 19.8 | 17.4 |

Mean dry matter % as threshed: 80.6

56/A/2

BARLEY - HOOSFIELD 1956

The 105th year

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

Cultivations, etc.: Dung applied, all plots ploughed:  
 Oct 16 - 19, 1955. Fertilizers applied: Mar 24 - 26, 1956.  
 Seed drilled at 3 bushels per acre: Apr 3. Sprayed with 3 lb  
 DNOC in 80 gallons per acre: May 28. Harvested: Sept 8.  
 Variety: Plumage Archer.

Summary of Results

| Plot                           | Grain<br>(at 85% dry<br>matter):<br>cwt per acre | Straw<br>(at 85% dry<br>matter):<br>cwt per acre |
|--------------------------------|--|--|
| 1 O                            | 6.0  | 5.3  |
| 2 O                            | 7.8  | 6.7  |
| 3 O                            | 8.0  | 6.8  |
| 4 O                            | 9.9  | 9.1  |
| 5 O                            | 10.2   | 9.6  |
| 1 A                            | 11.6   | 11.1   |
| 2 A                            | 12.5   | 13.1   |
| 3 A                            | 15.5   | 15.0   |
| 4 A                            | 21.6   | 19.7   |
| 5 A                            | 24.7   | 22.9   |
| 1 AA                           | 14.4   | 14.1   |
| 2 AA                           | 17.4   | 18.9   |
| 3 AA                           | 19.4   | 18.9   |
| 4 AA                           | 20.1   | 20.7   |
| 1 AAS                          | 18.2   | 19.8   |
| 2 AAS                          | 18.6   | 19.6   |
| 3 AAS                          | 22.0   | 21.3   |
| 4 AAS                          | 21.8   | 25.2   |
| 1 C                            | 15.4   | 15.6   |
| 2 C                            | 19.0   | 16.1   |
| 3 C                            | 19.1   | 16.9   |
| 4 C                            | 19.3   | 16.6   |
| 7 - 1                          | 12.9   | 11.3   |
| 7 - 2                          | 26.2   | 28.9   |
| 6 - 1                          | 5.8  | 6.4  |
| 6 - 2                          | 8.3  | 7.3  |
| 1 N                            | 14.6   | 15.8   |
| 2 N                            | 16.0   | 12.8   |
| Mean dry matter % as threshed: | 81.5   | 81.1   |

56/A/3

WHEAT AFTER FALLOW - HOOSFIELD 1956

Without manure 1851 and since

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

Cultivations, etc.:

Cropped plots. Ploughed: Sept 28, 1955. Seed drilled at 3 bushels per acre: Nov 2. Harvested: Sept 1, 1956. Variety: Squareheads Master 13/4.

Fallowed plots. Ploughed: Sept 28, 1955, May 15, 1956 and Aug 23.

Summary of Results

Mean yields (at 85% dry matter): cwt per acre

| Plot                   | A2   | A3   | A4   |      |
|------------------------|------|------|------|------|
| No. of years of fallow | 1    | 1    | 3    | Mean |
| Grain                  | 10.2 | 11.3 | 10.7 | 10.7 |
| Straw                  | 15.3 | 17.1 | 16.0 | 16.1 |

Mean dry matter % as threshed, Grain: 80.5  
Straw: 81.9

WINTER BEANS - AGDELL 1956

For history, treatments etc. see "Details of the Classical and Long Term Experiments" 1956. In 1956 a crop of winter sown beans was grown without manure.

Area of plot harvested: 0.0458 acres.

Cultivations, etc.:

Ploughed: Oct 8 - 10, 1955. Seed drilled at 275 lbs per acre: Oct 29. Combine harvested: Oct 4 - 6. Variety: S.Q.Giant.

Summary of Results

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

| Manure to turnips 1948 | Mineral manure  |        |             |        | Complete mineral and nitrogenous manure |        | Mean |
|------------------------|-----------------|--------|-------------|--------|---|--------|------|
|                        | None since 1848 |        | No nitrogen |        |   |        |      |
|                        | 5               | 6      | 3           | 4      | 1                                       | 2      |      |
| Plot rotation          | Fallow          | Clover | Fallow      | Clover | Fallow                                  | Clover |      |
|                        | 8.8             | 5.2    | 26.2        | 20.0   | 18.2                                    | 19.2   | 16.3 |

Mean dry matter % as harvested; 73.7



56/A/4.1

MANGOLDS AND SUGAR BEET - BARNFIELD

The 81st and 11th years

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

A corrective chalk dressing was applied to Series A and AC (excluding plot 9) at 5 tons of  $\text{CaCO}_3$  per acre under the new liming scheme introduced in spring 1956.

The following areas were sprayed with trichloroacetic acid:

First application to S half of plot 1N, S half of series O.  
1st and 2nd applications: to N half of plot 1N, N half of series O.  
3rd application to plot 9.

In June the plant was very irregular and backward on certain plots owing to the spring drought. It was decided to abandon these plots (no yields were recorded) and keep the land free of weeds by surface cultivations.

Cultivations, etc.: Dung applied: Nov 15 - 17, 1955. Ploughed: Nov 29 - Dec 1. Sprayed with TCA, sodium salt, at 20 lb in 90 gallons per acre: Mar 8 and again Mar 24, 1956. Ground chalk applied: Mar 29 and Apr 7. Fertilizers applied: Apr 11 - 17. Sugar beet seed drilled at 16 - 20 lb per acre: Apr 18. Mangolds seed drilled at 8 lb per acre: Apr 19. Singled: June 5 - 19. Abandoned crop on part of field: June 26. Top dressed remaining plots: June 29. 3rd application of TCA, sodium salt, at 20 lb in 80 gallons per acre: July 16. Lifted: Mangolds, Nov 22 - 26. Sugar beet, Nov 26 - 29. Varieties: Mangolds - Yellow Globe, Sugar beet - Klein E.

Cultivations to discarded areas after June 26:-

Thistle bar: June 26 - 28, July 6 - 7, July 13, Aug 9, Aug 22.  
Springtime: Sept 25.

56/A/4.2

Summary of Results

| Strip                                      | Cross Dressing |            |       |       |       |
|--|----------------|------------|-------|-------|-------|
|  | 0              | N          | A     | AC    | C     |
| Mangolds, roots: tons per acre             |                |            |       |       |       |
| 1  | 19.75          | 32.23      | 30.78 | 30.69 | 25.22 |
| 2  | 19.89          | 34.54      | 30.26 | 31.40 | 26.27 |
| 4  |                | (a) 21.39* |       |       |       |
|  |                | (b) 22.28* |       |       |       |
| 5  |                | 19.05      |       |       |       |
| 6  |                | 17.44      |       |       |       |
| 7  |                | 20.18      |       |       |       |
| 8  |                |            |       |       |       |
| 9  |                |            |       |       |       |
| Mangolds, leaves: tons per acre            |                |            |       |       |       |
| 1  | 2.88           | 4.32       | 6.03  | 5.59  | 3.93  |
| 2  | 3.74           | 4.89       | 4.64  | 5.59  | 3.66  |
| 4  |                | (a) 2.76*  |       |       |       |
|  |                | (b) 3.52*  |       |       |       |
| 5  |                | 2.39       |       |       |       |
| 6  |                | 1.98       |       |       |       |
| 7  |                | 2.49       |       |       |       |
| 8  |                |            |       |       |       |
| 9  |                |            |       |       |       |
| Mangolds, plant number: thousands per acre |                |            |       |       |       |
| 1  | 18.0           | 19.8       | 18.2  | 17.4  | 16.4  |
| 2  | 21.4           | 19.8       | 18.9  | 17.6  | 19.2  |
| 4  |                | (a) 20.9*  |       |       |       |
|  |                | (b) 20.9*  |       |       |       |
| 5  |                | 21.2       |       |       |       |
| 6  |                | 20.9       |       |       |       |
| 7  |                | 21.2       |       |       |       |
| 8  |                |            |       |       |       |
| 9  |                |            |       |       |       |

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

56/A/4.3

| Strip  | Cross Dressing |           |       |       |       |
|--|----------------|-----------|-------|-------|-------|
|  | O              | N         | A     | AC    | C     |
| Sugar Beet, roots (washed): tons per acre    |                |           |       |       |       |
| 1  | 9.50           | 12.18     | 12.80 | 12.57 | 12.96 |
| 2  | 10.25          | 13.48     | 13.36 | 14.64 | 13.47 |
| 4  |                | (b) 8.02* |       |       |       |
| 5  |                | 7.58      |       |       |       |
| 6  |                | 5.84      |       |       |       |
| 7  |                | 8.46      |       |       |       |
| 8  |                |           |       |       |       |
| 9  |                |           |       |       |       |
| Sugar Beet, tops: tons per acre              |                |           |       |       |       |
| 1  | 7.43           | 12.11     | 13.14 | 14.80 | 9.09  |
| 2  | 8.60           | 13.92*    | 12.16 | 14.95 | 10.36 |
| 4  |                | (b) 8.16* |       |       |       |
| 5  |                | 7.23      |       |       |       |
| 6  |                | 6.40      |       |       |       |
| 7  |                | 6.79      |       |       |       |
| 8  |                |           |       |       |       |
| 9  |                |           |       |       |       |
| Sugar Beet, plant number: thousands per acre |                |           |       |       |       |
| 1  | 21.1           | 21.6      | 22.3  | 20.7  | 22.1  |
| 2  | 25.8           | 23.2*     | 22.5  | 20.5  | 22.2  |
| 4  |                | (b) 22.5* |       |       |       |
| 5  |                | 24.5      |       |       |       |
| 6  |                | 23.3      |       |       |       |
| 7  |                | 23.1      |       |       |       |
| 8  |                |           |       |       |       |
| 9  |                |           |       |       |       |
| Sugar Beet, sugar percentage                 |                |           |       |       |       |
| 1  | 18.7           | 18.3      | 18.3  | 17.5  | 18.7  |
| 2  | 18.0           | 18.0*     | 17.7  | 16.7  | 18.4  |
| 4  |                | (b) 18.6* |       |       |       |
| 5  |                | 17.9      |       |       |       |
| 6  |                | 18.4      |       |       |       |
| 7  |                | 18.3      |       |       |       |
| 8  |                |           |       |       |       |
| 9  |                |           |       |       |       |

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

56/A/5

HAY - THE PARK GRASS PLOTS 1956

The 101st year

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

Cultivations, etc.: Lime applied: Nov 29, 1955. Mineral fertilizers applied: Dec 16. Supplementary ground chalk applied: Jan 4, 1956. Nitrogenous fertilizers applied: 1st dressing - Mar 22, 2nd dressing - Apr 16. Cut twice: July 12 and Nov 19 - 24.

Note: Because of the low CaO content of the lime used at the normal treatment rates, additional dressings of ground chalk were later applied to make up the deficiencies.

Summary of Results

Yield of Hay: cwt per acre

| Plot | Not limed |          |       | Limed    |          |       |
|------|-----------|----------|-------|----------|----------|-------|
|      | 1st Crop  | 2nd Crop | Total | 1st Crop | 2nd Crop | Total |
| 1    | 1.5       | 4.6      | 6.1   | 7.9      | 5.5      | 13.4  |
| 2    | 7.7       | 6.1      | 13.8  | 7.1      | 4.4      | 11.5  |
| 3    | 7.3       | 6.0      | 13.3  | 7.7      | 3.0      | 10.7  |
| 4-1  | 15.5      | 9.2      | 24.7  | 15.7     | 10.4     | 26.1  |
| 4-2  | 5.7       | 10.4     | 16.1  | 22.3     | 9.6      | 31.9  |
| 5-1  | 7.0       | 4.5      | 11.5  |          |          |       |
| 5-2  | 15.0      | 8.8      | 23.8  |          |          |       |
| 6    | 20.6      | 12.4     | 33.0  |          |          |       |
| 7    | 21.5      | 14.5     | 36.0  | 27.9     | 14.1     | 42.0  |
| 8    | 21.0      | 10.6     | 31.6  | 17.0     | 11.0     | 28.0  |
| 9    | 34.2      | 18.1     | 52.3  | 34.2     | 11.6     | 45.8  |
| 10   | 21.6      | 14.5     | 36.1  | 25.5     | 11.1     | 36.6  |
| 11-1 | 37.8      | 31.5     | 69.3  | 36.5     | 21.1     | 57.6  |
| 11-2 | 45.0      | 28.0     | 73.0  | 47.1     | 26.5     | 73.6  |
| 12   | 12.6      | 6.0      | 18.6  |          |          |       |
| 13   | 23.2      | 13.2     | 36.4  | 18.7     | 12.0     | 30.7  |
| 14   | 41.7      | 22.9     | 64.6  | 34.5     | 17.5     | 52.0  |
| 15   | 15.2      | 10.2     | 25.4  | 27.0     | 19.6     | 46.6  |
| 16   | 24.7      | 16.9     | 41.6  | 28.7     | 19.1     | 47.8  |
| 17   | 23.2      | 16.0     | 39.2  | 19.6     | 13.6     | 33.2  |
| 18   | 0.8       | 9.4      | 10.2  | 15.7*    | 4.4*     | 20.1* |
|      |           |          |       | 17.4+    | 7.5+     | 24.9+ |
| 19   | 19.7      | 17.0     | 36.7  | 20.6*    | 14.0*    | 34.6* |
|      |           |          |       | 23.3+    | 16.6+    | 39.9+ |
| 20   | 27.0      | 17.2     | 44.2  | 24.4*    | 12.4*    | 36.8* |
|      |           |          |       | 27.9+    | 17.0+    | 44.9+ |

\* Heavy liming

+ Light liming

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

56/A/6

BARLEY - EXHAUSTION LAND HOOSFIELD 1956

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

Cultivations, etc.: Ploughed: Sept 12 - 23, 1955 and again Nov 21. 'Nitro-Chalk' applied at  $3\frac{1}{2}$  cwt per acre: Mar 26, 1956. Seed drilled at 3 bushels per acre: Apr 3. Sprayed with MCPA, at 3 pints in 40 gallons per acre: May 17. Harvested: Aug 30. Variety: Plumage Archer.

Note. The NE halves of plots 1 and 2 (by the side land) were fallowed to reduce the weed infestation. (Ploughed: Sept 23, 1955, Nov 22, May 15, 1956, Aug 23.)

Summary of Results

| Manuring to potatoes 1876 - 1901*       | Yields (at 85% dry matter):<br>cwt per acre |       |
|---|---|-------|
|   | Grain                                       | Straw |
| 1 Unmanured                             | 8.7   | 11.1  |
| 2 Unmanured after dung 1876 - 81        | 11.5  | 12.8  |
| 3 Dung                                  | 20.7  | 21.3  |
| 4 Dung                                  | 20.8  | 20.7  |
| 5 Ammonium salts                        | 9.4   | 11.8  |
| 6 Nitrate of soda                       | 9.8   | 12.4  |
| 7 Ammonium salts and complete minerals  | 22.1  | 22.1  |
| 8 Nitrate of soda and complete minerals | 21.1  | 19.3  |
| 9 Superphosphate                        | 22.4  | 22.4  |
| 10 Complete minerals                    | 23.9  | 25.7  |
| Mean dry matter % as threshed:          | 80.4  | 79.2  |

\*For certain changes see history.

56/A/7

CLOVER - ROTHAMSTED GARDEN 1956

The 103rd year

For history, etc. see "Details of the Classical and Long Term Experiments" 1956. Starting in 1956, muriate of potash at 2 cwt per acre was applied to one half of the plot.

Cultivations, etc.:

Resowed all blank patches: Sept 7, 1955 and again Apr 21, 1956.  
Muriate of potash applied: May 24. Cut twice: July 19 (only a few old plants surviving) and Sept 27 (almost all new plants).

Summary of Results

Dry matter: cwt per acre

| Muriate of potash:<br>cwt per acre | Cuts |     | Total |
|------------------------------------|------|-----|-------|
|                                    | 1st  | 2nd |       |
| None                               | 0.4  | 0.8 | 1.2   |
| 2                                  | 0.4  | 3.8 | 4.2   |

56/A/8

WHEAT AND BARLEY - WOBURN STACKYARD 1956

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

The land was bare fallowed in 1956 and sprayed with TCA (trichloroacetic acid) to control grasses (Holcus mollis & Agrostis gigantea). The two halves of each plot were sprayed separately at different times. Ground chalk was applied to certain areas at 7.5 and 15 cwt  $\text{CaCO}_3$  per acre.

A soil survey of the experimental area was made.

Cultivations etc.:

Wheat

Ploughed: Sept 26, 1955. Half of each plot sprayed with TCA, 20 lb in 40 gallons per acre: Nov 30, 1955 and again Mar 28, 1956. Ploughed across plots: June 18 - 20. Remaining half plots sprayed with TCA at 20 lb in 40 gallons per acre: July 26 and again Sept 26. Ground chalk applied: Aug 15.

Barley

Ploughed: Sept 7 - 25, 1955. Half of each plot sprayed with TCA, 20 lb in 40 gallons per acre: Dec 1, 1955 and again on Mar 28, 1956. Ploughed across plots: June 18 - 20. Remaining half plots sprayed with TCA at 20 lb in 40 gallons per acre: July 25 and again Sept 26. Ground chalk applied: Aug 15.

56/Ba/1.1

### THREE COURSE ROTATION EXPERIMENT

5th year of revised scheme

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

Area of each plot (acres): Potatoes (sub plot), 0.0092; barley, 0.0200; sugar beet, 0.0205.

Cultivations, etc.:

Potatoes.

Straw applied, all plots ploughed: Dec 2, 1955. Fertilizers applied: Apr 7, 1956. Potatoes machine planted: Apr 12. Earthed up: June 23. Sprayed with copper fungicide, 3 lb in 80 gallons per acre: July 25. Sprayed with sulphuric acid, 20% BOV at 80 gallons per acre: Sept 13. Lifted: Oct 11. Variety: Majestic.

Barley.

Straw applied, all plots ploughed: Dec 2, 1955. Ground chalk applied at 20 cwt per acre: Dec 7. Fertilizers applied, seed drilled at 3 bushels per acre: Mar 15, 1956. Sprayed with MCPA, 3 pints in 40 gallons per acre: May 15. Harvested: Aug 24. Variety: Plumage Archer.

Sugar beet.

Straw applied, all plots ploughed: Dec 2, 1955. Seed drilled at 18 lb per acre: Mar 29, 1956. Fertilizers applied: Mar 30. Singled: June 1 - 5. Lifted: Dec 6. Variety: Klein E.



56/Ba/1.2

Summary of Results

Potatoes

| Treatments applied: | 1953 and 1955 |                        | 0     | 0.4N  | St +<br>0.2N | St +<br>0.6N | K <sub>s</sub> | K <sub>s</sub> +<br>0.4N |
|---------------------|---------------|------------------------|-------|-------|--------------|--------------|----------------|--------------------------|
|                     | 1956          | 1952<br>1954 &<br>1956 |       |       |              |              |                |                          |
| 1950                | 1951          |                        |       |       |              |              |                |                          |
| Ar                  | Ar            | 0                      | 11.98 | 9.94  | 9.85         |              |                |                          |
|                     |               | 0.4N                   | 10.72 | 8.63  | 9.51         |              |                |                          |
| Ar                  |               | 0                      | 10.79 | 9.65  | 10.38        |              |                |                          |
|                     |               | 0.4N                   | 11.40 | 11.54 | 13.39        | 11.59        | 12.17          | 10.04                    |
| St1 St2             | St1 St2       | 0                      | 12.37 | 9.21  | 10.62        |              |                | 10.09                    |
|                     |               | 0.4N                   | 10.72 | 9.65  | 11.11        |              |                | 11.88                    |
| St1 St2             |               | St+ 0.2N               | 11.30 | 8.83  | 10.28        |              |                |                          |
|                     |               | St+ 0.6N               | 12.08 | 9.75  | 8.83         |              |                |                          |
|                     |               | K <sub>s</sub>         | 12.90 | 9.75  | 8.83         |              |                |                          |
|                     |               | K <sub>s</sub> + 0.4N  | 13.43 | 10.09 | 9.12         |              |                | 12.12                    |
| Ad                  | Ad            | 0                      | 10.91 | 10.72 | 11.06        |              |                |                          |
|                     |               | 0.4N                   | 10.14 | 11.01 |              |              |                |                          |
| Ad                  |               | St+ 0.6N               | 12.90 | 13.63 |              |              |                |                          |
|                     |               | K <sub>s</sub> + 0.4N  |       |       |              |              |                |                          |

Total tubers: tons per acre

| Treatments applied: | 1953 and 1955 |      | 1954 & 1956 |      | Potatoes |      |           |           |                |                       |      |      |
|---------------------|---------------|------|-------------|------|----------|------|-----------|-----------|----------------|-----------------------|------|------|
|                     | 1953          | 1955 | 1954        | 1956 | 0        | 0.4N | St + 0.2N | St + 0.6N | K <sub>s</sub> | K <sub>s</sub> + 0.4N |      |      |
| 1950                |               |      |             |      |          |      |           |           |                |                       |      |      |
| Ar                  | Ar            |      |             |      | 86.4     | 88.1 | 85.9      | 84.2      |                |                       |      |      |
| St1 St2             | St1 St2       |      |             |      | 87.6     | 87.6 | 87.8      | 87.1      |                |                       |      |      |
|                     |               |      |             |      | 85.3     | 82.1 | 85.8      | 87.1      | 88.0           | 88.6                  | 87.2 | 89.2 |
|                     |               |      |             |      | 86.7     | 87.0 | 85.8      | 88.0      | 88.8           | 87.4                  |      |      |
|                     |               |      |             |      | 85.9     | 89.1 | 87.1      | 85.3      |                |                       |      |      |
|                     |               |      |             |      | 86.9     | 85.4 | 85.5      | 82.0      |                |                       |      |      |
| Ad                  | Ad            |      |             |      | 82.9     | 88.4 | 85.9      | 87.8      |                |                       | 88.8 | 88.3 |
|                     |               |      |             |      | 85.8     | 88.1 |           |           |                |                       |      |      |
|                     |               |      |             |      | 86.5     | 83.6 |           |           |                |                       |      |      |
|                     |               |      |             |      | 89.9     | 91.7 |           |           |                |                       |      |      |

Percentage Ware (1½" riddle)

33

| Treatments applied:                     | 1953 and 1955 |                        | Barley |      |              |              |                |                          |
|---|---------------|------------------------|--------|------|--------------|--------------|----------------|--------------------------|
|   | 1951          | 1952<br>1954 &<br>1956 | 0      | 0.4N | St +<br>0.2N | St +<br>0.6N | K <sub>s</sub> | K <sub>s</sub> +<br>0.4N |
| 56/Ba/1.4                               |               |                        |        |      |              |              |                |                          |
| 1950                                    | 1951          | 1952<br>1954 &<br>1956 |        |      |              |              |                |                          |
| Grain (at 85% dry matter): cwt per acre |               |                        |        |      |              |              |                |                          |
|   | Ar            | 0                      | 28.1   |      |              |              |                |                          |
|   |               | 0.4N                   | 28.9   |      |              |              |                |                          |
| Ar                                      |               | 0                      | 26.3   |      |              |              |                |                          |
|   |               | 0.4N                   | 29.5   |      |              |              |                |                          |
|   | St1 St2       | 0                      | 28.8   |      | 29.6         |              | 28.5           |                          |
|   |               | 0.4N                   | 30.9   | 30.9 |              | 29.8         |                |                          |
| St1 St2                                 |               | 0                      | 27.5   |      |              |              |                |                          |
|   |               | 0.4N                   | 30.5   |      |              |              |                |                          |
|   |               | St+ 0.2N               | 30.2   |      |              |              |                |                          |
|   |               | St+ 0.6N               | 30.5   |      |              |              |                |                          |
|   |               | K <sub>s</sub>         | 28.3   |      |              |              |                |                          |
|   |               | K <sub>s</sub> + 0.4N  | 30.4   |      |              |              |                |                          |
|   | Ad            | 0                      | 26.3   |      | 30.2         |              | 27.7           |                          |
| Ad                                      |               | 0.4N                   | 29.5   |      |              |              |                |                          |
|   |               | St+ 0.6N               | 29.3   |      |              |              |                |                          |
|   |               | K <sub>s</sub> + 0.4N  | 27.5   |      |              |              |                |                          |
| Straw (at 85% dry matter): cwt per acre |               |                        |        |      |              |              |                |                          |
|   | Ar            | 0                      | 30.5   |      |              |              |                |                          |
|   |               | 0.4N                   | 28.5   |      |              |              |                |                          |
| Ar                                      |               | 0                      | 27.5   |      |              |              |                |                          |
|   |               | 0.4N                   | 30.1   |      |              |              |                |                          |
|   | St1 St2       | 0                      | 29.3   |      | 31.6         |              | 33.6           |                          |
|   |               | 0.4N                   | 30.5   | 31.9 |              | 31.7         |                |                          |
| St1 St2                                 |               | 0                      | 26.6   |      |              |              |                |                          |
|   |               | 0.4N                   | 34.5   |      |              |              |                |                          |
|   |               | St+ 0.2N               | 29.9   |      |              |              |                |                          |
|   |               | St+ 0.6N               | 36.2   |      |              |              |                |                          |
|   |               | K <sub>s</sub>         | 28.9   |      |              |              |                |                          |
|   |               | K <sub>s</sub> + 0.4N  | 31.9   |      |              |              |                |                          |
|   | Ad            | 0                      | 25.4   |      | 32.5         |              | 27.0           |                          |
| Ad                                      |               | 0.4N                   | 27.0   |      |              |              |                |                          |
|   |               | St+ 0.6N               | 32.5   |      |              |              |                |                          |
|   |               | K <sub>s</sub> + 0.4N  | 26.4   |      |              |              |                |                          |

Mean dry matter % as harvested Grain: 79.0  
Straw: 76.7

56/Ba/1.5

| Treatments applied:           |         | Sugar Beet             |       |           |           |                |                       |
|-------------------------------|---------|------------------------|-------|-----------|-----------|----------------|-----------------------|
| 1953 and 1955                 |         | 0                      | 0.4N  | St + 0.2N | St + 0.6N | K <sub>s</sub> | K <sub>s</sub> + 0.4N |
| 1950                          | 1951    | 1952<br>1954 &<br>1956 |       |           |           |                |                       |
| Rocks (washed): tons per acre |         |                        |       |           |           |                |                       |
|                               | Ar      | 0                      | 8.88  |           |           |                |                       |
|                               |         | 0.4N                   | 11.85 |           |           |                |                       |
| Ar                            |         | 0                      | 9.10  |           |           |                |                       |
|                               |         | 0.4N                   | 12.08 |           |           |                |                       |
|                               | St1 St2 | 0                      | 10.54 | 10.48     |           |                | 9.38                  |
|                               |         | 0.4N                   | 11.57 | 14.21     |           | 11.55          |                       |
| St1 St2                       |         | 0                      | 9.21  |           |           |                |                       |
|                               |         | 0.4N                   | 11.81 |           |           |                |                       |
|                               |         | St+ 0.2N               | 9.58  |           |           |                |                       |
|                               |         | St+ 0.6N               | 12.13 |           |           |                |                       |
|                               |         | K <sub>s</sub>         | 9.60  |           |           |                |                       |
|                               |         | K <sub>s</sub> + 0.4N  | 11.87 |           |           |                |                       |
|                               | Ad      | 0                      | 9.80  |           | 8.84      |                | 9.91                  |
|                               |         | 0.4N                   | 12.31 |           |           |                |                       |
| Ad                            |         | St+ 0.6N               | 13.05 |           |           |                |                       |
|                               |         | K <sub>s</sub> + 0.4N  | 11.00 |           |           |                |                       |
| Sugar Percentage              |         |                        |       |           |           |                |                       |
|                               | Ar      | 0                      | 18.1  |           |           |                |                       |
|                               |         | 0.4N                   | 18.4  |           |           |                |                       |
| Ar                            |         | 0                      | 18.0  |           |           |                |                       |
|                               |         | 0.4N                   | 18.1  |           |           |                |                       |
|                               | St1 St2 | 0                      | 18.2  | 17.8      | 17.8      |                | 18.7                  |
|                               |         | 0.4N                   | 18.6  |           |           | 18.1           |                       |
| St1 St2                       |         | 0                      | 18.1  |           |           |                |                       |
|                               |         | 0.4N                   | 18.2  |           |           |                |                       |
|                               |         | St+ 0.2N               | 18.5  |           |           |                |                       |
|                               |         | St+ 0.6N               | 18.3  |           |           |                |                       |
|                               |         | K <sub>s</sub>         | 18.0  |           |           |                |                       |
|                               |         | K <sub>s</sub> + 0.4N  | 18.6  |           |           |                |                       |
|                               | Ad      | 0                      | 18.1  |           | 18.4      |                | 18.1                  |
|                               |         | 0.4N                   | 18.2  |           |           |                |                       |
| Ad                            |         | St+ 0.6N               | 18.1  |           |           |                |                       |
|                               |         | K <sub>s</sub> + 0.4N  | 17.8  |           |           |                |                       |

56/Ba/1.6

|                           |               | Sugar Beet             |       |      |           |           |                |                       |
|---------------------------|---------------|------------------------|-------|------|-----------|-----------|----------------|-----------------------|
| Treatments applied:       | 1953 and 1955 | 1952                   | 0     | 0.4N | St + 0.2N | St + 0.6N | K <sub>s</sub> | K <sub>s</sub> + 0.4N |
| 1950                      | 1951          | 1952<br>1954 &<br>1956 |       |      |           |           |                |                       |
| Total sugar: cwt per acre |               |                        |       |      |           |           |                |                       |
|                           | Ar            | 0                      |       | 32.2 |           |           |                |                       |
|                           |               | 0.4N                   | 43.6  |      |           |           |                |                       |
| Ar                        |               | 0                      |       | 32.7 |           |           |                |                       |
|                           |               | 0.4N                   | 43.8  |      |           |           |                |                       |
|                           | St1 St2       | 0                      |       | 38.4 |           | 37.2      |                | 35.1                  |
|                           |               | 0.4N                   | 43.0  |      | 50.6      |           | 41.9           |                       |
| St1 St2                   |               | 0                      |       | 33.3 |           |           |                |                       |
|                           |               | 0.4N                   | 42.9  |      |           |           |                |                       |
|                           |               | St+ 0.2N               |       | 35.5 |           |           |                |                       |
|                           |               | St+ 0.6N               | 44.4  |      |           |           |                |                       |
|                           |               | K <sub>s</sub>         |       | 34.6 |           |           |                |                       |
|                           |               | K <sub>s</sub> + 0.4N  | 44.3  |      |           |           |                |                       |
|                           | Ad            | 0                      |       | 35.5 |           | 32.5      |                | 35.9                  |
| Ad                        |               | 0.4N                   | 44.8  |      |           |           |                |                       |
|                           |               | St+ 0.6N               | 47.1  |      |           |           |                |                       |
|                           |               | K <sub>s</sub> + 0.4N  | 39.1  |      |           |           |                |                       |
| Tops: tons per acre       |               |                        |       |      |           |           |                |                       |
|                           | Ar            | 0                      |       | 7.08 |           |           |                |                       |
|                           |               | 0.4N                   | 9.47  |      |           |           |                |                       |
| Ar                        |               | 0                      |       | 6.48 |           |           |                |                       |
|                           |               | 0.4N                   | 9.22  |      |           |           |                |                       |
|                           | St1 St2       | 0                      |       | 7.75 |           | 7.97      |                | 5.81                  |
|                           |               | 0.4N                   | 8.34  |      | 9.71      |           | 10.96          |                       |
| St1 St2                   |               | 0                      |       | 7.20 |           |           |                |                       |
|                           |               | 0.4N                   | 9.76  |      |           |           |                |                       |
|                           |               | St+ 0.2N               |       | 7.79 |           |           |                |                       |
|                           |               | St+ 0.6N               | 10.00 |      |           |           |                |                       |
|                           |               | K <sub>s</sub>         |       | 7.44 |           |           |                |                       |
|                           |               | K <sub>s</sub> + 0.4N  | 9.41  |      |           |           |                |                       |
|                           | Ad            | 0                      |       | 7.31 |           | 6.09      |                | 7.73                  |
| Ad                        |               | 0.4N                   | 9.95  |      |           |           |                |                       |
|                           |               | St+ 0.6N               | 11.70 |      |           |           |                |                       |
|                           |               | K <sub>s</sub> + 0.4N  | 10.19 |      |           |           |                |                       |

56/Ba/1.7

| Treatments applied:              |         | Sugar Beet             |      |      |           |           |                |                       |
|----------------------------------|---------|------------------------|------|------|-----------|-----------|----------------|-----------------------|
|                                  |         | 1953 and 1955          | 0    | 0.4N | St + 0.2N | St + 0.6N | K <sub>s</sub> | K <sub>s</sub> + 0.4N |
| 1950                             | 1951    | 1952<br>1954 &<br>1956 |      |      |           |           |                |                       |
| Plant number: thousands per acre |         |                        |      |      |           |           |                |                       |
|                                  | Ar      | 0                      |      | 31.0 |           |           |                |                       |
|                                  |         | 0.4N                   | 29.6 |      |           |           |                |                       |
| Ar                               |         | 0                      |      | 30.1 |           |           |                |                       |
|                                  |         | 0.4N                   | 30.4 |      |           |           |                |                       |
|                                  | St1 St2 | 0                      |      | 31.1 |           | 30.0      | 30.9           |                       |
|                                  |         | 0.4N                   | 31.3 |      | 30.3      |           | 29.8           |                       |
| St1 St2                          |         | 0                      |      | 31.1 |           |           |                |                       |
|                                  |         | 0.4N                   | 30.3 |      |           |           |                |                       |
|                                  |         | St+ 0.2N               |      | 30.1 |           |           |                |                       |
|                                  |         | St+ 0.6N               | 30.3 |      |           |           |                |                       |
|                                  |         | K <sub>s</sub>         |      | 31.4 |           |           |                |                       |
|                                  |         | K <sub>s</sub> +0.4N   | 30.7 |      |           |           |                |                       |
|                                  | Ad      | 0                      |      | 30.4 |           | 30.8      | 30.6           |                       |
| Ad                               |         | 0.4N                   | 30.4 |      |           |           |                |                       |
|                                  |         | St+ 0.6N               | 31.2 |      |           |           |                |                       |
|                                  |         | K <sub>s</sub> + 0.4N  | 30.2 |      |           |           |                |                       |

56/Ba/2.1

#### FOUR COURSE ROTATION EXPERIMENT

2nd year of revised scheme

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

Area of each sub plot (acres): Potatoes, 0.0120; barley, 0.0129; beans (whole plot), 0.0244; wheat, 0.0129.

Area harvested (acres): Potatoes, 0.0093; barley, 0.0057; beans, 0.0097; wheat, 0.0056.

Note: The winter sown beans were badly thinned by frost and the crop was resown in spring.

#### Cultivations, etc.:

Potatoes. Ploughed: Sept 9, 1955 and Nov 17. Fertilizers applied broadcast on flat: Apr 7, 1956. Machine planted: Apr 11. Earthed up: June 26. Sprayed with copper fungicide, 3 lb in 80 gallons per acre: July 25. Sprayed with sulphuric acid 20% BOV: Sept 13. Lifted: Oct 10. Variety: Majestic.

Barley. Ploughed: Oct 11, 1955. Fertilizers applied, seed drilled at 3 bushels per acre: Mar 15, 1956. Sprayed with MCPA at 3 pints in 40 gallons per acre: May 15. Combine harvested: Sept 8. Variety: Plumage Archer.

Beans. Ploughed: Sept 23, 1955. Fertilizers applied: Oct 14. Seed drilled at 300 lb per acre: Oct 17. Whole block ploughed: Apr 11, 1956. Seed drilled at 200 lb per acre: Apr 12. Combine harvested: Oct 10. Variety: Spring Tick.

Wheat. Ploughed: Sept 24 - 26, 1955. Seed drilled at  $2\frac{3}{4}$  bushels per acre: Oct 18. Potash and phosphate fertilizers applied: Oct 26. Nitrogen treatments applied: Apr 24, 1956. Sprayed with MCPA at 3 pints in 40 gallons per acre: May 22. Combine harvested: Sept 8. Variety: Yeoman.

56/Ba/2.2

Summary of Results

| Previous Manure                | Treatment Year applied | P <sub>2</sub> O <sub>5</sub> : cwt per acre | Total tubers:   |       |       | Potatoes        |      |       | Percentage Ware (1 1/2" riddle) |      |       | Barley (at 85% dry matter): cwt per acre |       |       |
|--------------------------------|------------------------|--|-----------------|-------|-------|-----------------|------|-------|---------------------------------|------|-------|--|-------|-------|
|                                |                        |  | N: cwt per acre | Mean  | Diff. | N: cwt per acre | Mean | Diff. | N: cwt per acre                 | Mean | Diff. | N: cwt per acre                          | Mean  | Diff. |
|                                | 1954                   |  | 9.69            | 12.97 | +3.28 | 84.4            | 79.7 | 82.1  | -4.7                            | 19.5 | 27.5  | 23.5                                     | +8.0  |       |
|                                | 1953                   |  | 8.19            | 9.68  | +1.49 | 83.6            | 87.0 | 85.3  | +3.4                            | 15.9 | 26.8  | 21.4                                     | +10.9 |       |
| Dung                           | 1952                   | 0.24   | 9.18            | 13.20 | +4.02 | 87.8            | 78.4 | 83.1  | -9.4                            | 22.8 | 28.3  | 25.6                                     | +5.5  |       |
|                                | 1951                   |  | 8.22            | 11.01 | +2.79 | 85.1            | 84.5 | 84.8  | -0.6                            | 20.1 | 26.3  | 23.2                                     | +6.2  |       |
|                                | 1950                   |  | 9.25            | 11.79 | +2.54 | 87.8            | 82.2 | 85.0  | -5.6                            | 16.7 | 26.6  | 21.6                                     | +9.9  |       |
|                                | 1954                   |  | 9.11            | 10.11 | +1.00 | 90.3            | 86.4 | 88.4  | -3.9                            | 22.0 | 29.1  | 25.6                                     | +7.1  |       |
| Adco (straw compost)           | 1953                   |  | 8.42            | 9.99  | +1.57 | 87.2            | 82.7 | 85.0  | -4.5                            | 26.9 | 18.9  | 22.9                                     | -8.0  |       |
|                                | 1952                   | 0.12   | 8.19            | 10.10 | +1.91 | 83.7            | 87.0 | 85.4  | +3.3                            | 19.8 | 25.5  | 22.6                                     | +5.7  |       |
|                                | 1951                   |  | 7.68            | 9.37  | +1.69 | 87.1            | 81.5 | 84.3  | -5.6                            | 16.5 | 24.6  | 20.6                                     | +8.1  |       |
|                                | 1950                   |  | 8.48            | 10.91 | +2.43 | 90.9            | 81.1 | 86.0  | -9.8                            | 17.3 | 29.6  | 23.4                                     | +12.3 |       |
|                                | 1954                   |  | 10.69           | 14.25 | +3.56 | 85.2            | 84.4 | 84.8  | -0.8                            | 20.3 | 29.7  | 25.0                                     | +9.4  |       |
| Straw                          | 1953                   |  | 8.40            | 11.39 | +2.99 | 82.9            | 83.3 | 83.1  | +0.4                            | 20.1 | 30.8  | 25.4                                     | +10.7 |       |
|                                | 1952                   | 0.24   | 9.09            | 9.90  | +0.81 | 86.5            | 85.0 | 85.8  | -1.5                            | 19.5 | 33.2  | 26.4                                     | +13.7 |       |
|                                | 1951                   |  | 8.59            | 11.09 | +2.50 | 83.2            | 71.9 | 77.6  | -11.3                           | 11.8 | 30.7  | 21.2                                     | +18.9 |       |
|                                | 1950                   |  | 9.88            | 11.86 | +1.98 | 83.6            | 86.2 | 84.9  | +2.6                            | 17.6 | 27.9  | 22.8                                     | +10.3 |       |
|                                | 1954                   |  | 7.76            | 11.25 | +3.49 | 86.1            | 82.9 | 84.5  | -33.2                           | 18.4 | 26.9  | 22.6                                     | +8.5  |       |
| Super-phosphate                | 1953                   |  | 9.32            | 11.01 | +1.69 | 83.0            | 87.6 | 85.3  | +4.6                            | 20.9 | 26.3  | 23.6                                     | +5.4  |       |
|                                | 1952                   | 0.24   | 7.96            | 10.60 | +2.64 | 84.3            | 87.8 | 86.1  | +3.5                            | 18.1 | 27.1  | 22.6                                     | +9.0  |       |
|                                | 1951                   |  | 8.63            | 10.79 | +2.16 | 84.3            | 86.6 | 85.5  | +2.3                            | 12.7 | 26.0  | 19.4                                     | +13.3 |       |
|                                | 1950                   |  | 6.65            | 9.44  | +2.79 | 86.6            | 85.4 | 86.0  | -1.2                            | 16.5 | 28.3  | 22.4                                     | +11.8 |       |
|                                | 1954                   |  | 6.39            | 8.31  | +1.92 | 83.1            | 87.1 | 85.1  | +4.0                            | 20.3 | 24.4  | 22.4                                     | +4.1  |       |
| Rock phosphate                 | 1953                   |  | 7.58            | 9.32  | +1.74 | 92.7            | 82.4 | 87.6  | -10.3                           | 14.8 | 26.0  | 20.4                                     | +11.2 |       |
|                                | 1952                   | None   | 5.94            | 7.78  | +1.84 | 85.5            | 85.6 | 85.6  | +0.1                            | 9.1  | 21.7  | 15.4                                     | +12.6 |       |
|                                | 1951                   |  | 6.32            | 8.53  | +2.21 | 87.0            | 91.0 | 89.0  | +4.0                            | 15.9 | 26.9  | 21.4                                     | +11.0 |       |
|                                | 1950                   |  | 6.00            | 5.84  | -0.16 | 85.1            | 72.6 | 78.9  | -12.5                           | 14.3 | 25.0  | 19.6                                     | +10.7 |       |
| Mean dry matter % as harvested |                        |  |                 |       |       |                 |      |       |                                 |      |       |  | 73.2  |       |



56/Ba/2.3

| Previous Treatment              | Year applied | P <sub>2</sub> O <sub>5</sub> : cwt per acre | Wheat                                   |      |      |       | Beans |
|---------------------------------|--------------|--|---|------|------|-------|-------|
|                                 |              |  | Grain (at 85% dry matter): cwt per acre |      | Mean | Diff. |       |
| Manure                          |              |  | N: cwt per acre                         | 0.4  |      |       |       |
| Dung                            | 1954         | 0.24   | 15.3                                    | 20.3 | 17.8 | + 5.0 | 23.4  |
|                                 | 1953         |  | 9.4                                     | 15.7 | 12.6 | + 6.3 | 23.4  |
|                                 | 1952         |  | 6.5                                     | 13.0 | 9.8  | + 6.5 | 22.5  |
|                                 | 1951         |  | 9.4                                     | 15.4 | 12.4 | + 6.0 | 22.9  |
|                                 | 1950         |  | 6.2                                     | 13.5 | 9.8  | + 7.3 | 25.6  |
| Adco (straw compost)            | 1954         | 0.12   | 8.1                                     | 12.2 | 10.2 | + 4.1 | 25.4  |
|                                 | 1953         |  | 13.5                                    | 17.8 | 15.6 | + 4.3 | 26.3  |
|                                 | 1952         |  | 13.7                                    | 18.3 | 16.0 | + 4.6 | 24.8  |
|                                 | 1951         |  | 8.6                                     | 13.7 | 11.2 | + 5.1 | 25.7  |
|                                 | 1950         |  | 14.5                                    | 12.6 | 13.6 | - 1.9 | 24.8  |
| Straw                           | 1954         | 0.24   | 12.9                                    | 20.7 | 16.8 | + 7.8 | 21.8  |
|                                 | 1953         |  | 11.4                                    | 15.6 | 13.5 | + 4.2 | 25.0  |
|                                 | 1952         |  | 16.5                                    | 21.6 | 19.0 | + 5.1 | 24.4  |
|                                 | 1951         |  | 9.4                                     | 17.3 | 13.4 | + 7.9 | 24.6  |
|                                 | 1950         |  | 9.1                                     | 18.1 | 13.6 | + 9.0 | 23.9  |
| Super-phosphate                 | 1954         | 0.24   | 3.2                                     | 7.6  | 5.4  | + 4.4 | 22.4  |
|                                 | 1953         |  | 2.5                                     | 12.9 | 7.7  | +10.4 | 24.8  |
|                                 | 1952         |  | 7.0                                     | 18.1 | 12.6 | +11.1 | 22.2  |
|                                 | 1951         |  | 3.5                                     | 10.3 | 6.9  | + 6.8 | 24.0  |
|                                 | 1950         |  | 6.2                                     | 7.9  | 7.0  | + 1.7 | 23.7  |
| Rock phosphate                  | 1954         | None   | 3.2                                     | 14.5 | 8.8  | +11.3 | 20.3  |
|                                 | 1953         |  | 5.6                                     | 18.6 | 12.1 | +13.0 | 15.2  |
|                                 | 1952         |  | 7.3                                     | 11.0 | 9.2  | + 3.7 | 18.7  |
|                                 | 1951         |  | 3.2                                     | 7.9  | 5.6  | + 4.7 | 21.0  |
|                                 | 1950         |  | 8.7                                     | 9.4  | 9.0  | + 0.7 | 15.2  |
| Mean dry matter % as harvested: |              |  |   |      | 74.1 |       | 54.4  |

56/Ba/3.1

SIX COURSE ROTATION EXPERIMENT

The 27th year

Seasonal effects of fertilizers - Rothamsted Long Hoos IV and Woburn Stackyard 1956.

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

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

Cultivations, etc.:

Rothamsted

Sugar beet.

Ploughed: Sept 6, 1955 and Nov 24. Fertilizers applied, seed drilled at 18 lb per acre: Mar 29, 1956. Singled: May 24 - 30. Lifted: Dec 5. Variety: Klein E.

Barley.

Sugar beet tops spread: Nov 22, 1955. Ploughed: Nov 24. Ground chalk applied at 20 cwt per acre: Dec 2. Seed drilled at 3 bushels per acre: Mar 14, 1956. Fertilizers applied: Mar 15. Clover seed undersown: Apr 23. Harvested: Sept 12. Variety: Plumage Archer.

Clover.

Seed undersown in barley at 40 lb per acre: Apr 26, 1955. Autumn fertilizers applied: Oct 27. Sulphate of ammonia applied: Apr 9, 1956. Cut: July 13. Variety: Late flowering Montgomery Red.

Wheat.

Ploughed: July 28, 1955 and Oct 12. Autumn fertilizers applied: Oct 17. Seed drilled at  $2\frac{1}{4}$  bushels per acre: Oct 18. Sulphate of ammonia applied: Apr 24, 1956. Harvested: Aug 22. Variety: Yeoman.

Potatoes.

Ploughed: Sept 6, 1955 and Oct 17. Ridged: Mar 26, 1956. Fertilizers applied, potatoes planted: Mar 27. Earthed up: June 23. Sprayed with copper fungicide at 3 lb in 80 gallons per acre: July 25. Sprayed with sulphuric acid, 20% BOV, 80 gallons per acre: Sept 13. Lifted: Oct 8. Variety: Majestic.

Rye.

Ploughed: Oct 3, 1955. Ground chalk applied at 20 cwt per acre: Oct 4. Autumn fertilizers applied: Oct 15. Seed drilled at 3 bushels per acre: Oct 17. Sulphate of ammonia applied: Apr 24, 1956. Harvested: Aug 21. Variety: King II.

56/Ba/3.2

Woburn

Sugar beet.

Ploughed: Sept 1, 1955 and Dec 12. Fertilizers applied: Apr 6, 1956.  
Seed drilled at 12 lb per acre: Apr 9. Re-drilled thin places:  
May 12. Dusted with 5% DDT: May 19. Sprayed with parathion,  
 $\frac{1}{2}$  pint in 40 gallons per acre: May 25. Singled: June 6 - 7.  
Lifted: Oct 23. Variety: Klein E.  
Note: The DDT and parathion were applied to control leaf miner  
(Pegomyia beta).

Barley.

Beet tops spread, ploughed: Oct 31, 1955. Fertilizers applied:  
Mar 13. Seed drilled at  $2\frac{1}{2}$  bushels per acre: Mar 15. Sprayed  
with MCPA, 2 pints in 20 gallons per acre: May 7. Harvested:  
Aug 14. Variety: Herta.

Clover.

Autumn fertilizers applied: Oct 13, 1955. Undersown crop failed  
during winter. Whole block ploughed: Mar 9, 1956. Sulphate of  
ammonia applied: Mar 27. Seed drilled at 40 lb per acre: Mar 28.  
Cut: July 6. Variety: Crimson Clover.

Wheat.

Ploughed: July 19, 1955. Autumn fertilizers applied: Oct 12, 1955.  
Seed drilled at 3 bushels per acre: Oct 15. Sulphate of ammonia  
applied: Apr 26, 1956. Sprayed with DNOC, 6 lb in 80 gallons  
per acre: May 1. Harvested: Aug 23. Variety: Yeoman.

Potatoes.

Ploughed: Sept 1, 1955 and Dec 12. Ridged, fertilizers applied,  
potatoes planted: Apr 4, 1956. Earthed up: June 18. Sprayed with  
copper fungicide, 5 lb in 40 gallons per acre: July 23. Sprayed with  
arsenious compound, 1 gallon in 40 gallons per acre: Sept 4.  
Lifted: Oct 4. Variety: Majestic.

Rye.

Ploughed: Oct 6, 1955. Ground chalk applied at 20 cwt per acre:  
Oct 13. Seed drilled at  $2\frac{1}{2}$  bushels per acre: Oct 15. Seed  
re-drilled at  $2\frac{1}{2}$  bushels per acre: Nov 16. Sulphate of ammonia  
applied: Apr 24, 1956. Harvested: Aug 23. Variety: King II.  
Note: A poor plant was obtained from the first sowing because of  
a defective drill.

Note: In 1956 at Woburn the nitrogen levels were doubled on all crops  
except clover.

56/Ba/3.3

Summary of Results

Mean yields per acre and responses in yield per cwt of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O

|   | Rothamsted | Woburn | Rothamsted                               | Woburn |
|---|------------|--------|--|--------|
| Sugar Beet, roots (washed):<br>tons per acre    |            |        | Barley, grain:<br>cwt per acre           |        |
| Mean  | 11.59      | 10.76  | *  |        |
| Response to: N                                  | +5.27      | +8.97  | 25.3                                     | 34.0   |
| P   | -2.55      | +2.21  | +16.9                                    | +23.6  |
| K   | +0.07      | +0.64  | -0.3                                     | -1.0   |
| Mean dry matter % as harvested:                 |            |        | -3.7                                     | -2.7   |
|   |            |        | 80.9                                     |        |
| Sugar Beet,<br>sugar percentage                 |            |        | Barley, straw:<br>cwt per acre           |        |
| Mean  | 18.4       | 18.1   | *  |        |
| Response to: N                                  | -0.4       | 0.0    | 26.9                                     | 29.2   |
| P   | 0.0        | -0.1   | +26.3                                    | +25.1  |
| K   | +0.1       | +0.2   | +0.5                                     | -1.2   |
| Mean dry matter % as harvested:                 |            |        | -6.4                                     | -2.3   |
|   |            |        | 81.4                                     |        |
| Sugar Beet, total sugar:<br>cwt per acre        |            |        | Clover, hay, dry matter:<br>cwt per acre |        |
| Mean  | 42.6       | 38.9   | 21.3                                     | 19.1   |
| Response to: N                                  | +18.5      | +32.1  | +5.3                                     | -5.5   |
| P   | -9.1       | +7.7   | -11.7                                    | +12.4  |
| K   | +0.6       | +2.6   | -2.5                                     | +12.9  |
| Mean dry matter % as harvested:                 |            |        | 79.7                                     |        |
| Sugar Beet, tops:<br>tons per acre              |            |        | Wheat, grain:<br>cwt per acre            |        |
| Mean  | 9.22       | 6.41   | *  |        |
| Response to: N                                  | +6.32      | +8.08  | 27.7                                     | 19.1   |
| P   | -4.37      | +2.65  | +6.1                                     | +11.3  |
| K   | -0.31      | +0.46  | +5.7                                     | -1.0   |
| Mean dry matter % as harvested:                 |            |        | +1.6                                     | -0.2   |
|   |            |        | 78.1                                     |        |
| Sugar Beet, plant number:<br>thousands per acre |            |        | Wheat, straw:<br>cwt per acre            |        |
| Mean  | 28.1       | **     | *  |        |
| Response to: N                                  | -2.1       |        | 37.6                                     | 23.2   |
| P   | -3.7       |        | +14.5                                    | +10.9  |
| K   | +1.1       |        | +10.5                                    | -2.5   |
| Mean dry matter % as harvested:                 |            |        | -0.6                                     | -1.2   |
|   |            |        | 79.9                                     |        |

\*(at 85% dry matter)

\*\* not recorded.

56/Ba/3.4

Mean yields per acre and responses in yield per cwt of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O

|                                 | Rothamsted                               | Woburn | Rothamsted                  | Woburn |
|---------------------------------|--|--------|-----------------------------|--------|
|                                 | Potatoes, total tubers:<br>tons per acre |        | Rye, grain:<br>cwt per acre |        |
|                                 |  |        | *                           |        |
| Mean                            | 9.03                                     | 10.87  | 28.8                        | 30.7   |
| Response to: N                  | +6.19                                    | +5.33  | +19.1                       | +15.5  |
| P                               | +1.83                                    | +2.61  | +2.0                        | +1.9   |
| K                               | +0.42                                    | -0.04  | -4.7                        | -5.7   |
| Mean dry matter % as harvested: |  |        | 76.6                        |        |
|                                 | Potatoes, percentage<br>ware             |        | Rye, straw:<br>cwt per acre |        |
|                                 | (1)                                      | (2)    | *                           |        |
| Mean                            | 91.0                                     | 83.3   | 36.4                        | 35.1   |
| Response to: N                  | +7.3                                     | +6.2   | +23.1                       | +17.6  |
| P                               | -17.1                                    | -13.8  | +2.3                        | +0.6   |
| K                               | +0.2                                     | -9.8   | -6.9                        | -6.4   |
| Mean dry matter % as harvested: |  |        | 80.7                        |        |

\*(at 85% dry matter)

Riddle: (1) 1½"; (2) 1⅝".

56/Bb/1.1

DEEP CULTIVATION ROTATION EXPERIMENT

The 13th year

Deep ploughing, fertilizers and dung - Long Hoos I and II 1956.

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

Area of each plot: 0.0312 acres. Area harvested:  
Barley, spring oats, 0.0265 acres; ley, 0.0275 acres;  
wheat, 0.0188 acres.

Termination of Experiment. Series 1 and 2, due to carry sugar beet and potatoes in 1956, were terminated. They completed the two cycles of the 6 course rotation in 1955 and were sown with barley this year.

Cultivations, etc.:

Barley

Ploughed: Dec 22, 1955. Ground chalk at 20 cwt per acre applied: Jan 3, 1956. Basic slag and sulphate of ammonia applied: Mar 10. Seed drilled at 3 bushels per acre: Mar 14. Seeds for 1 year ley undersown: Apr 24. Harvested: Aug 29. Variety: Plumage Archer.

Ley

Seeds undersown: Apr 26, 1955. Cut: June 21, 1956. Seeds mixture 18 lb S24 perennial ryegrass, 8 lb Montgomery red clover, 2 lb American Alsike clover.

Wheat

"Deep" plots ploughed: Oct 5, 1955. "Shallow" plots ploughed: Oct 6. Seed drilled at  $2\frac{3}{4}$  bushels per acre: Oct 25. Sulphate of ammonia applied: Apr 30, 1956. Sprayed with MCPA, 3 pints in 40 gallons per acre: May 15. Combine harvested: Aug 29. Variety: Yeoman.

Oats

Ploughed: Nov 1, 1955. Ground chalk at 20 cwt per acre applied: Dec 2. Sulphate of ammonia applied: Mar 10, 1956. Seed drilled at 4 bushels per acre: Mar 13. Sprayed with MCPA, 3 pints in 40 gallons per acre: May 15. Harvested: Aug 30. Variety: Star.

Standard errors per plot:

|                                   |                                     |
|-----------------------------------|-------------------------------------|
| Barley, Grain (at 85% D.M.):      | 1.81 cwt per acre or 6.4% (4 d.f.)  |
| Ley, Hay:                         | 3.38 cwt per acre or 15.1% (4 d.f.) |
| Wheat, Grain (at 85% D.M.):       | 1.08 cwt per acre or 3.9% (4 d.f.)  |
| Spring Oats, Grain (at 85% D.M.): | 0.945 cwt per acre or 3.9% (4 d.f.) |

56/Bb/1.2

Summary of Results

Responses to treatments to previous sugar beet

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

Barley

Grain (at 85% dry matter): Mean yield 28.2 cwt per acre.

|                        | (±0.90) | (±1.28) |      |      |      |      |      |      |      |
|------------------------|---------|---------|------|------|------|------|------|------|------|
| Ploughing deep-shallow | 0.0     | -       | -    | +0.3 | -0.3 | +0.9 | -0.9 | +0.1 | -0.1 |
| Dung                   | +1.8    | +2.1    | +1.5 | -    | -    | +1.1 | +2.5 | +2.4 | +1.2 |
| Phosphate              | -0.2    | +0.7    | -1.1 | -0.9 | +0.5 | -    | -    | -0.7 | +0.3 |
| Potash                 | +0.3    | +0.4    | +0.2 | +0.9 | -0.3 | -0.2 | +0.8 | -    | -    |

Straw (at 85% dry matter): Mean yield 34.9 cwt per acre

|                        |      |      |      |      |      |      |      |      |      |
|------------------------|------|------|------|------|------|------|------|------|------|
| Ploughing deep-shallow | +3.1 | -    | -    | +3.2 | +3.0 | +2.3 | +3.9 | +1.8 | +4.4 |
| Dung                   | +6.6 | +6.7 | +6.5 | -    | -    | +6.1 | +7.1 | +9.5 | +3.7 |
| Phosphate              | +0.3 | -0.5 | +1.1 | -0.2 | +0.8 | -    | -    | +1.3 | -0.7 |
| Potash                 | +1.3 | 0.0  | +2.6 | +4.2 | -1.6 | +2.3 | +0.3 | -    | -    |

Ley

Hay: Mean yield 22.3 cwt per acre

|                        | (±1.69) | (±2.39) |      |      |      |      |      |      |      |
|------------------------|---------|---------|------|------|------|------|------|------|------|
| Ploughing deep-shallow | +1.4    | -       | -    | +1.4 | +1.4 | 0.0  | +2.8 | -0.4 | +3.2 |
| Dung                   | +3.9    | +3.9    | +3.9 | -    | -    | +3.3 | +4.5 | +3.4 | +4.4 |
| Phosphate              | -0.8    | -2.2    | +0.6 | -1.4 | -0.2 | -    | -    | -1.2 | -0.4 |
| Potash                 | +1.3    | -0.5    | +3.1 | +0.8 | +1.8 | +0.9 | +1.7 | -    | -    |

Wheat\*

Grain (at 85% dry matter): Mean yield 27.7 cwt per acre

|                        | (±0.54) | (±0.76) |      |      |      |      |      |      |      |
|------------------------|---------|---------|------|------|------|------|------|------|------|
| Ploughing deep-shallow | +3.6    | -       | -    | +5.2 | +2.0 | +3.5 | +3.7 | +3.0 | +4.2 |
| Dung                   | +2.5    | +4.1    | +0.9 | -    | -    | +1.4 | +3.6 | +4.2 | +0.8 |
| Phosphate              | +0.7    | +0.6    | +0.8 | -0.4 | +1.8 | -    | -    | +0.4 | +1.0 |
| Potash                 | +1.3    | +0.7    | +1.9 | +3.0 | -0.4 | +1.0 | +1.6 | -    | -    |

\*Cultivation treatments direct to wheat, manures to previous sugar beet.

Mean dry matter % as harvested:

Barley, grain: 76.8

straw: 73.7

Wheat, grain: 73.3

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Responses to treatments to previous potatoes

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

Spring Oats

Grain (at 85% dry matter): Mean yield 24.2 cwt per acre

|                        | ( $\pm 0.47$ ) |      |      |      | ( $\pm 0.67$ ) |      |      |      |      |
|------------------------|----------------|------|------|------|----------------|------|------|------|------|
| Ploughing deep-shallow | -1.8           | -    | -    | -1.9 | -1.7           | -0.8 | -2.8 | -2.1 | -1.5 |
| Dung                   | +1.3           | +1.2 | +1.4 | -    | -              | +2.3 | +0.3 | +2.0 | +0.6 |
| Phosphate              | +2.0           | +3.0 | +1.0 | +3.0 | +1.0           | -    | -    | +1.6 | +2.4 |
| Potash                 | +2.7           | +2.4 | +3.0 | +3.4 | +2.0           | +2.3 | +3.1 | -    | -    |

Straw: Mean yield 41.3 cwt per acre

|                        |      |      |      |      |      |      |      |      |      |
|------------------------|------|------|------|------|------|------|------|------|------|
| Ploughing deep-shallow | +1.3 | -    | -    | +2.8 | -0.2 | +3.5 | -0.9 | +1.2 | +1.4 |
| Dung                   | +2.8 | +4.3 | +1.3 | -    | -    | +1.5 | +4.1 | +3.2 | +2.4 |
| Phosphate              | +1.2 | +3.4 | -1.0 | -0.1 | +2.5 | -    | -    | +0.5 | +1.9 |
| Potash                 | +2.9 | +2.8 | +3.0 | +3.3 | +2.5 | +2.2 | +3.6 | -    | -    |

Mean dry matter % as harvested:

Spring oats, grain: 79.2



56/Bc/1.1

LEY AND ARABLE ROTATIONS

Highfield and Fosters Field 1956 - the 8th year.

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

Rates of application of supplementary (corrective) potash  
(K<sub>2</sub>O: cwt per acre)

| Crop                             | Year of cycle   | Rate |                               |
|----------------------------------|-----------------|------|-------------------------------|
| Cut grass                        | "1st treatment" | 3.0  | (3 years previous cutting)    |
|                                  | "2nd treatment" | 1.5  | (received supplement in 1955) |
|                                  | "3rd treatment" | 1.5  | (received supplement in 1955) |
| Lucerne                          | "1st treatment" | 3.0  | (3 years previous lucerne)    |
|                                  | "2nd treatment" | 1.0  | (received supplement in 1955) |
|                                  | "3rd treatment" | 1.0  | (received supplement in 1955) |
| Permanent and Reseeded Remainder | "1st treatment" | 1.2  | (1 previous hay crop taken)   |
|                                  |                 | None |                               |

Cultivations, etc.:

HIGHFIELD

1st year Treatment Crops

Cut grass. Ploughed twice: Sept 8, 1955 and Nov 29. 1st dressing of supplementary K applied: Mar 9, 1956. Basal PK and 'Nitro-Chalk' applied: Apr 17. Seed sown at 33 lb per acre: Apr 19. 2nd dressing of supplementary K applied: July 11. Cut 4 times: July 10, Aug 9, Sept 6, Nov 12. 'Nitro-Chalk' applied after each cut except the last.

Grazed ley. Ploughed twice: Sept 8, 1955 and Nov 29. Basal PK applied: Apr 17, 1956. 'Nitro-Chalk' applied: Apr 18. Seed sown at 44 lb per acre: Apr 19. 'Nitro-Chalk' applied: Aug 23. Grazed: 7 - 8 circuits, July 5 - Nov 1.

Lucerne. Ploughed twice: Sept 8, 1955 and Nov 29. 1st dressing of supplementary K applied: Mar 9, 1956. Basal PK applied: Apr 17. Seed drilled at 28 lb per acre: Apr 19. 2nd dressing of supplementary K applied: Aug 3. Cut twice: Aug 3, Nov 9. Variety: Du Puits.

Hay. Seeds undersown in barley at 28 lb per acre: Apr 25, 1955. Basal PK applied: Dec 5. 'Nitro-Chalk' applied: Mar 20, 1956. Cut: June 27.

2nd year Treatment Crops

Cut grass. Basal PK applied: Dec 6, 1955. Supplementary K applied: Mar 9, 1956. 'Nitro-Chalk' applied: Mar 15 and after each cut except the last. Cut 6 times: May 16, June 20, July 10, Aug 9, Sept 6, Nov 12.

Grazed ley. Basal PK applied: Dec 6, 1955. 'Nitro-Chalk' applied: May 7, 1956 and Aug 23. Grazed: 9 circuits, Apr 24 - Oct 28.

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Lucerne. Basal PK applied: Dec 6, 1955. Supplementary K applied: Mar 9, 1956. Cut 3 times: June 21, Aug 2, Nov 9.  
Potatoes. Ploughed twice: June 11, 1955 and Oct 14. Ridged: Mar 26, 1956. Basal PK applied: Mar 27. Sulphate of ammonia and dung applied, potatoes planted: Mar 29. For later cultivations see Potato Test Crop.

### 3rd year Treatment Crops

Cut grass. Basal PK applied: Dec 6, 1955. Supplementary K applied: Mar 9, 1956. 'Nitro-Chalk' applied: Mar 15 and after each cut except the last. Cut 6 times: May 16, June 20, July 10, Aug 9, Sept 6, Oct 18.  
Grazed ley. Basal PK applied: Dec 6, 1955. 'Nitro-Chalk' applied: May 7, 1956 and Aug 23. Grazed: 8 circuits, Apr 28 - Oct 5.  
Lucerne. Basal PK applied: Dec 6, 1955. Sprayed with TCA (Sodium trichloroacetate), 20 lb in 90 gallons per acre: Mar 8, 1956. Supplementary K applied: Mar 9. Cut 3 times: June 21, Aug 3, Oct 18.  
Oats. Ploughed: Oct 14, 1955. 'Nitro-Chalk' applied, seed drilled at  $3\frac{1}{2}$  bushels per acre with basal PK: Mar 13, 1956. Combine harvested: Sept 15. Variety: Sun II.

### 1st Test Crop, Wheat

Ploughed after oats: Sept 8, 1955. Ploughed leys: Oct 25 - 27. Seed drilled at  $2\frac{3}{4}$  bushels per acre with basal PK: Nov 1. 'Nitro-Chalk' applied: Apr 25, 1956. Sprayed with MCPA, 3 pints in 40 gallons per acre: May 22. Combine harvested: Sept 17. Variety: Yeoman.

### 2nd Test Crop, Potatoes

Ploughed twice: Sept 8, 1955 and Nov 29. Ridged: Mar 26, 1956. Basal PK applied: Mar 27. Dung, sulphate of ammonia and additional P and K applied, potatoes planted: Mar 29. Earthed up: June 22. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 25. Sprayed with sulphuric acid, 20% BOV at 80 gallons per acre: Sept 13. Lifted: Oct 12. Variety: Majestic.

### 3rd Test Crop, Barley

Ploughed: Oct 14, 1955. Ground chalk applied to blocks 9 and 12: Dec 5. 'Nitro-Chalk' applied: Mar 13, 1956. Seed drilled at 2 bushels per acre with basal PK: Mar 14. Combine harvested: Sept 15 - 17. Variety: Proctor.

Permanent grasses. Basal PK applied to all plots: Dec 6, 1955.  
6th year reseeded, 6th experimental year of permanent grass, Blocks 9-12.  
Blocks 9 and 12. Ground chalk applied: Dec 5, 1955. 'Nitro-Chalk' applied to reseeded grass: May 30, 1956 and Sept 7. 'Nitro-Chalk' applied to permanent grass: June 4 and Aug 27. Grazed: 8 circuits, May 6 - Nov 3.  
Blocks 10 and 11. 'Nitro-Chalk' to reseeded grass: May 28, 1956 and Sept 3. 'Nitro-Chalk' to permanent grass: May 30 and Aug 27. Grazed: 8 circuits, May 6 - Oct 30.

56/Bc/1.3

7th year reseeded, 7th experimental year of permanent grass, Blocks 5-8.  
Blocks 5 and 8. Supplementary K applied: Mar 9, 1956. 'Nitro-Chalk' applied: Mar 20. Cut for hay, 'Nitro-Chalk' applied: June 27. Grazed aftermath: 4 circuits, July 21 - Oct 22.  
Blocks 6 and 7. 'Nitro-Chalk' applied: May 24 - 26, 1956 and Aug 23. Grazed: 8 circuits, May 2 - Oct 30.

8th year reseeded, 8th experimental year of permanent grass, Blocks 1-4.  
'Nitro-Chalk' applied: Mar 18, 1956 and Aug 27 - Sept 3. Grazed: 8-9 circuits, Apr 24 - Nov 7.

#### FOSTERS

##### 1st year Treatment Crops

Cut grass. Ploughed twice: Sept 7, 1955 and Nov 28. 1st dressing of supplementary K applied: Mar 8, 1956. Basal PK applied: Mar 17. 'Nitro-Chalk' applied: Mar 18. Seed sown at 33 lb per acre: Mar 19. 2nd dressing of supplementary K applied: July 12. Cut 4 times: July 11, Aug 8, Sept 8, Nov 12. 'Nitro-Chalk' applied after each cut except the last.

Grazed ley. Ploughed twice: Sept 8, 1955 and Nov 29. Basal PK applied: Apr 17, 1956. 'Nitro-Chalk' applied: Apr 18. Seed sown at 44 lb per acre: Apr 19. 'Nitro-Chalk' applied: Aug 24. Grazed: 5 circuits, July 6 - Oct 19.

Lucerne. Ploughed twice: Sept 7, 1955 and Nov 28. 1st dressing of supplementary K applied: Mar 8, 1956. Basal PK applied: Apr 17. Seed drilled at 28 lb per acre: Apr 19. 2nd dressing of supplementary K applied: Aug 2. Cut twice: Aug 1 and Nov 9. Variety: Du Puits.

Hay. Seeds undersown in barley at 28 lb per acre: Apr 25, 1955. Basal PK applied: Dec 5. 'Nitro-Chalk' applied: Mar 20, 1956. Cut: June 25.

##### 2nd year Treatment Crops

Cut grass. Basal PK applied: Dec 5, 1955. Supplementary K applied: Mar 8, 1956. 'Nitro-Chalk' applied: Mar 14 and after each cut except the last. Cut 6 times: May 16, June 20, July 11, Aug 8, Sept 8, Nov 12.

Grazed ley. Basal PK applied: Dec 5, 1955. 'Nitro-Chalk' applied: May 7, 1956 and Aug 25. Grazed: 7-8 circuits, Apr 25 - Oct 23.

Lucerne. Basal PK applied: Dec 6, 1955. Supplementary K applied: Mar 8, 1956. Cut 3 times: June 22, July 31, Nov 9.

Potatoes. Ploughed twice: June 11, 1955 and Oct 14. Ridged: Mar 26, 1956. Basal PK applied: Mar 27. Sulphate of ammonia and dung applied, potatoes planted: Mar 28. For later cultivations see Potato Test Crop.

56/Bc/1.4

### 3rd year Treatment Crops

Cut grass. Basal PK applied: Dec 5, 1955. Supplementary K applied: Mar 8, 1956. 'Nitro-Chalk' applied: Mar 14 and after each cut except the last. Cut 6 times: May 16, June 20, July 11, Aug 8, Sept 8, Oct 19.

Grazed ley. Basal PK applied: Dec 5, 1955. 'Nitro-Chalk' applied: May 7, 1956 and Aug 24. Grazed: 7 circuits, Apr 29 - Oct 15.

Lucerne. Basal PK applied: Dec 5, 1955. Supplementary K applied: Mar 8, 1956. Cut 3 times: June 22, July 31, Oct 19.

Oats. Ploughed: Oct 13, 1955. 'Nitro-Chalk' applied, seed drilled at  $3\frac{1}{2}$  bushels per acre with basal PK: Mar 13, 1956. Combine harvested: Sept 14. Variety: Sun II.

### 1st Test Crop, Wheat

Ploughed after oats: Sept 7, 1955. Ploughed leys: Oct 27. Seed drilled at  $2\frac{3}{4}$  bushels per acre with basal PK: Nov 1. 'Nitro-Chalk' applied: Apr 25, 1956. Sprayed with MCPA, 3 pints in 40 gallons per acre: May 17. Combined harvested: Sept 4. Variety: Yeoman.

### 2nd Test Crop, Potatoes

Ploughed twice: Sept 7, 1955 and Nov 28. Ridged: Mar 26, 1956. Basal PK applied: Mar 27. Dung, sulphate of ammonia and additional P and K applied, potatoes planted: Mar 27 - 28. Earthed up: June 22. Sprayed with copper sulphate, 5 lb in 40 gallons per acre: July 24. Sprayed with sulphuric acid, 20% BOV at 80 gallons per acre: Sept 13. Lifted: Oct 9. Variety: Majestic.

### 3rd Test Crop, Barley

Ploughed: Oct 13, 1955. 'Nitro-Chalk' applied: Mar 13, 1956. Seed drilled at 2 bushels per acre with basal PK: Mar 14. Combine harvested: Sept 14. Variety: Proctor.

Note: One block received a basal dressing of sulphate of ammonia in error.

Permanent grasses. Basal PK applied to all plots: Dec 5, 1955.

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

'Nitro-Chalk' applied: May 14, 1956 and Aug 25. Grazed: 7 circuits, May 3 - Oct 27.

7th year reseeded grass, Blocks 5, 7, 8, 9.

Blocks 5 and 7. Supplementary K applied: Mar 8, 1956. 'Nitro-Chalk' applied: Mar 20. Cut for hay, 'Nitro-Chalk' applied: June 25. Grazed aftermath: 4 circuits, July 28 - Oct 7.

Blocks 8 and 9. 'Nitro-Chalk' applied: May 14, 1956 and Aug 24. Grazed: 7 circuits, May 3 - Oct 19.

8th year reseeded grass, Blocks 1, 2, 3, 4.

'Nitro-Chalk' applied: May 14, 1956 and Aug 29 - Sept 3. Grazed: 8-9 circuits, Apr 25 - Oct 31.

56/Bc/1.5

Standard errors per  $\frac{1}{4}$  plot. Test Crops.

Wheat, grain Highfield: 1.78 cwt per acre or 5.5% (13 d.f.)  
(at 85% dry matter). Fosters: 1.36 cwt per acre or 3.8% (13 d.f.)

Potatoes, Highfield  $\frac{1}{4}$  plot: 1.507 tons per acre or 9.4% (14 d.f.)  
total tubers.  $\frac{1}{8}$  plot: 1.134 tons per acre or 7.1% (20 d.f.)  
Fosters  $\frac{1}{4}$  plot: 0.531 tons per acre or 3.7% (14 d.f.)  
 $\frac{1}{8}$  plot: 1.011 tons per acre or 7.1% (20 d.f.)

Barley, grain Highfield: 2.73 cwt per acre or 8.0% (15 d.f.)  
(at 85% dry matter). Fosters: 1.64 cwt per acre or 4.2% (15 d.f.)

Summary of Results

Wheat 1st test crop

| N: cwt per acre                         | Treatment crops 1953-1955 |      |           |                 | Mean                   |
|---|---------------------------|------|-----------|-----------------|------------------------|
|   | Lucerne                   | Ley  | Cut Grass | Arable with hay |                        |
| Grain (at 85% dry matter): cwt per acre |                           |      |           |                 |                        |
| <u>Highfield</u>                        |                           |      |           |                 |                        |
| Mean                                    | 34.2                      | 36.2 | 20.4      | 39.7            | 32.6                   |
| To test crop                            |                           |      |           |                 |                        |
| 0.3                                     | 34.8                      | 36.9 | 21.4      | 38.2            | 32.8                   |
| 0.6                                     | 33.7                      | 35.4 | 19.5      | 41.1            | 32.4                   |
| Difference ( $\pm 1.26$ )               | -1.1                      | -1.5 | -1.9      | +2.9            | -0.4<br>( $\pm 0.63$ ) |
| To treatment crops                      |                           |      |           |                 |                        |
| Single rate                             |                           | 36.3 | 22.2      | 39.2            | 32.6                   |
| Double rate                             |                           | 36.1 | 18.7      | 40.1            | 31.6                   |
| Difference ( $\pm 1.26$ )               |                           | -0.2 | -3.5      | +0.9            | -1.0<br>( $\pm 0.73$ ) |
| <u>Fosters</u>                          |                           |      |           |                 |                        |
| Mean                                    | 41.7                      | 36.1 | 33.8      | 30.5            | 35.5                   |
| To test crop                            |                           |      |           |                 |                        |
| 0.3                                     | 40.4                      | 34.6 | 32.0      | 27.1            | 33.5                   |
| 0.6                                     | 43.0                      | 37.6 | 35.7      | 34.0            | 37.6                   |
| Difference ( $\pm 0.96$ )               | +2.6                      | +3.0 | +3.7      | +6.9            | +4.1<br>( $\pm 0.48$ ) |
| To treatment crops                      |                           |      |           |                 |                        |
| Single rate                             |                           | 35.2 | 33.4      | 28.8            | 32.5                   |
| Double rate                             |                           | 37.0 | 34.3      | 32.3            | 34.5                   |
| Difference ( $\pm 0.96$ )               |                           | +1.8 | +0.9      | +3.5            | +2.0<br>( $\pm 0.56$ ) |

56/Bc/1.6

Wheat 1st test crop

| N: cwt per acre | Excluding Lucerne<br>N to previous<br>treatment crop |                |      | Arable with hay only<br>Dung to potatoes<br>1954: tons<br>per acre |    |      |
|-----------------|--|----------------|------|--|----|------|
|                 | Single<br>rate                                       | Double<br>rate | Mean | None   | 12 | Mean |

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

Highfield

|                                |                |      |                |                |      |                |
|--------------------------------|----------------|------|----------------|----------------|------|----------------|
| To test crop                   | ( $\pm 0.73$ ) |      | ( $\pm 0.51$ ) | ( $\pm 1.26$ ) |      | ( $\pm 0.89$ ) |
| 0.3                            | 32.0           | 32.4 | 32.2           | 37.0           | 39.3 | 38.2           |
| 0.6                            | 33.2           | 30.9 | 32.0           | 39.3           | 42.9 | 41.1           |
| Mean                           | 32.6           | 31.6 | 32.1           | 38.2           | 41.1 | 39.7           |
|                                | ( $\pm 0.51$ ) |      |                | ( $\pm 0.89$ ) |      |                |
| To previous<br>treatment crops |                |      |                | ( $\pm 1.26$ ) |      | ( $\pm 0.89$ ) |
| Single rate                    |                |      |                | 37.9           | 40.4 | 39.2           |
| Double rate                    |                |      |                | 38.5           | 41.8 | 40.1           |
| Mean                           |                |      |                | 38.2           | 41.1 | 39.7           |
|                                |                |      |                | ( $\pm 0.89$ ) |      |                |

Mean dry matter % as harvested: 81.6

Fosters

|                                |                |      |                |                |      |                |
|--------------------------------|----------------|------|----------------|----------------|------|----------------|
| To test crop                   | ( $\pm 0.56$ ) |      | ( $\pm 0.39$ ) | ( $\pm 0.96$ ) |      | ( $\pm 0.68$ ) |
| 0.3                            | 30.2           | 32.3 | 31.2           | 26.7           | 27.6 | 27.1           |
| 0.6                            | 34.8           | 36.8 | 35.8           | 32.6           | 35.3 | 34.0           |
| Mean                           | 32.5           | 34.5 | 33.5           | 29.6           | 31.5 | 30.5           |
|                                | ( $\pm 0.39$ ) |      |                | ( $\pm 0.68$ ) |      |                |
| To previous<br>treatment crops |                |      |                | ( $\pm 0.96$ ) |      | ( $\pm 0.68$ ) |
| Single rate                    |                |      |                | 28.2           | 29.3 | 28.8           |
| Double rate                    |                |      |                | 31.0           | 33.6 | 32.3           |
| Mean                           |                |      |                | 29.6           | 31.5 | 30.5           |
|                                |                |      |                | ( $\pm 0.68$ ) |      |                |

Mean dry matter % as harvested: 71.4

56/Bc/1.7

Wheat 1st test crop

| N: cwt per acre | Treatment crops 1953-1955 |     |           |                 | Mean |
|-----------------|---------------------------|-----|-----------|-----------------|------|
|                 | Lucerne                   | Ley | Cut Grass | Arable with hay |      |

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

Highfield

|                    |      |      |      |      |      |
|--------------------|------|------|------|------|------|
| Mean               | 24.2 | 37.1 | 15.3 | 26.7 | 25.8 |
| To test crop       |      |      |      |      |      |
| 0.3                | 24.8 | 37.3 | 15.0 | 28.9 | 26.5 |
| 0.6                | 23.6 | 37.0 | 15.6 | 24.5 | 25.2 |
| Difference         | -1.2 | -0.3 | +0.6 | -4.4 | -1.3 |
| To treatment crops |      |      |      |      |      |
| Single rate        |      | 36.3 | 17.2 | 25.8 | 26.4 |
| Double rate        |      | 38.0 | 13.4 | 27.6 | 26.3 |
| Difference         |      | +1.7 | -3.8 | +1.8 | -0.1 |

Fosters

|                    |      |      |      |      |      |
|--------------------|------|------|------|------|------|
| Mean               | 26.2 | 27.5 | 22.0 | 21.2 | 24.2 |
| To test crop       |      |      |      |      |      |
| 0.3                | 27.1 | 26.7 | 20.4 | 18.9 | 23.3 |
| 0.6                | 25.3 | 28.3 | 23.6 | 23.4 | 25.2 |
| Difference         | -1.8 | +1.6 | +3.2 | +4.5 | +1.9 |
| To treatment crops |      |      |      |      |      |
| Single rate        |      | 27.0 | 22.9 | 18.6 | 22.8 |
| Double rate        |      | 27.9 | 21.2 | 23.7 | 24.3 |
| Difference         |      | +0.9 | -1.7 | +5.1 | +1.5 |

56/Bc/1.8

Wheat 1st test crop

| N: cwt per acre | Excluding Lucerne |             |      | Arable with hay only                 |    |      |
|-----------------|-------------------|-------------|------|--------------------------------------|----|------|
|                 | Single rate       | Double rate | Mean | Dung to potatoes 1954: tons per acre |    | Mean |
|                 |                   |             |      | None                                 | 12 |      |

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

Highfield

|                             |      |      |      |      |      |      |
|-----------------------------|------|------|------|------|------|------|
| To test crop                |      |      |      |      |      |      |
| 0.3                         | 26.4 | 27.8 | 27.1 | 26.7 | 31.2 | 28.9 |
| 0.6                         | 26.5 | 24.9 | 25.7 | 24.8 | 24.2 | 24.5 |
| Mean                        | 26.4 | 26.3 | 26.4 | 25.8 | 27.7 | 26.7 |
| To previous treatment crops |      |      |      |      |      |      |
| Single rate                 |      |      |      | 26.1 | 25.6 | 25.8 |
| Double rate                 |      |      |      | 25.4 | 29.8 | 27.6 |
| Mean                        |      |      |      | 25.8 | 27.7 | 26.7 |

Mean dry matter % as harvested: 84.6

Fosters

|                             |      |      |      |      |      |      |
|-----------------------------|------|------|------|------|------|------|
| To test crop                |      |      |      |      |      |      |
| 0.3                         | 21.0 | 23.0 | 22.0 | 17.1 | 20.8 | 18.9 |
| 0.6                         | 24.6 | 25.6 | 25.1 | 24.8 | 21.9 | 23.4 |
| Mean                        | 22.8 | 24.3 | 23.6 | 21.0 | 21.4 | 21.2 |
| To previous treatment crops |      |      |      |      |      |      |
| Single rate                 |      |      |      | 18.8 | 18.5 | 18.6 |
| Double rate                 |      |      |      | 23.2 | 24.2 | 23.7 |
| Mean                        |      |      |      | 21.0 | 21.4 | 21.2 |

Mean dry matter % as harvested: 83.4



56/Bc/1.9

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

|   | Treatment crops 1952-1954 |       |           |                 | Mean                     |
|---|---------------------------|-------|-----------|-----------------|--------------------------|
|   | Lucerne                   | Ley   | Cut Grass | Arable with hay |                          |
|   | <u>Highfield</u>          |       |           |                 |                          |
| Mean  | 15.64                     | 17.86 | 14.81     | 15.54           | 15.96                    |
| N: cwt per acre                               |                           |       |           |                 |                          |
| 0.5   | 16.13                     | 17.89 | 14.74     | 15.18           | 15.98                    |
| 1.0   | 15.15                     | 17.82 | 14.87     | 15.90           | 15.94                    |
| Difference ( $\pm 1.066$ )                    | -0.98                     | -0.07 | +0.13     | +0.72           | -0.04<br>( $\pm 0.533$ ) |
| Dung: tons per acre                           |                           |       |           |                 |                          |
| None  | 13.10                     | 16.62 | 13.38     | 13.92           | 14.25                    |
| 12  | 18.19                     | 19.10 | 16.23     | 17.16           | 17.67                    |
| Difference ( $\pm 1.066$ )                    | +5.09                     | +2.48 | +2.85     | +3.24           | +3.42<br>( $\pm 0.533$ ) |
| P <sub>2</sub> O <sub>5</sub> : cwt per acre* |                           |       |           |                 |                          |
| 0.9   | 15.75                     | 17.99 | 14.47     | 15.12           | 15.83                    |
| 1.8   | 15.54                     | 17.72 | 15.14     | 15.96           | 16.09                    |
| Difference ( $\pm 0.567$ )                    | -0.21                     | -0.27 | +0.67     | +0.84           | +0.26<br>( $\pm 0.284$ ) |
| K <sub>2</sub> O: cwt per acre*               |                           |       |           |                 |                          |
| 0.9   | 14.53                     | 17.47 | 13.65     | 14.40           | 15.01                    |
| 1.8   | 16.75                     | 18.25 | 15.96     | 16.67           | 16.91                    |
| Difference ( $\pm 0.567$ )                    | +2.22                     | +0.78 | +2.31     | +2.27           | +1.90<br>( $\pm 0.284$ ) |
|   | <u>Fosters</u>            |       |           |                 |                          |
| Mean  | 14.23                     | 14.76 | 13.37     | 14.70           | 14.27                    |
| N: cwt per acre                               |                           |       |           |                 |                          |
| 0.5   | 14.22                     | 14.40 | 13.62     | 14.18           | 14.10                    |
| 1.0   | 14.24                     | 15.12 | 13.12     | 15.22           | 14.43                    |
| Difference ( $\pm 0.375$ )                    | +0.02                     | +0.72 | -0.50     | +1.04           | +0.33<br>( $\pm 0.188$ ) |
| Dung: tons per acre                           |                           |       |           |                 |                          |
| None  | 12.95                     | 14.28 | 12.01     | 13.37           | 13.15                    |
| 12  | 15.51                     | 15.24 | 14.73     | 16.03           | 15.38                    |
| Difference ( $\pm 0.375$ )                    | +2.56                     | +0.96 | +2.72     | +2.66           | +2.23<br>( $\pm 0.188$ ) |
| P <sub>2</sub> O <sub>5</sub> : cwt per acre* |                           |       |           |                 |                          |
| 0.9   | 14.44                     | 14.79 | 12.94     | 14.53           | 14.17                    |
| 1.8   | 14.02                     | 14.73 | 13.80     | 14.87           | 14.36                    |
| Difference ( $\pm 0.505$ )                    | -0.42                     | -0.06 | +0.86     | +0.34           | +0.19<br>( $\pm 0.253$ ) |
| K <sub>2</sub> O: cwt per acre*               |                           |       |           |                 |                          |
| 0.9   | 13.65                     | 14.41 | 13.13     | 14.68           | 13.97                    |
| 1.8   | 14.81                     | 15.11 | 13.61     | 14.72           | 14.56                    |
| Difference ( $\pm 0.505$ )                    | +1.16                     | +0.70 | +0.48     | +0.04           | +0.59<br>( $\pm 0.253$ ) |

\*Including basal dressing

56/Bc/1.10

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

|      | Dung: tons<br>per acre | P <sub>2</sub> O <sub>5</sub> : cwt<br>per acre* | K <sub>2</sub> O: cwt<br>per acre* |
|------|------------------------|--|------------------------------------|
| None | 12                     | 0.9 1.8  | 0.9 1.8                            |

Highfield

| N: cwt per acre     | (±0.533)    | (1) and (2) | (1) and (2) |
|---------------------|-------------|-------------|-------------|
| 0.5                 | 13.88 18.09 | 16.07 15.90 | 15.02 16.95 |
| 1.0                 | 14.63 17.25 | 15.60 16.27 | 15.01 16.87 |
| Dung: tons per acre |             | (1) and (2) | (1) and (2) |
| None                |             | 14.09 14.42 | 12.51 15.99 |
| 12                  |             | 17.58 17.76 | 17.51 17.82 |

| Lucerne rotation only                         | K <sub>2</sub> O: cwt per acre* |       | Mean  |
|---|---------------------------------|-------|-------|
|   | 0.9                             | 1.8   |       |
| P <sub>2</sub> O <sub>5</sub> : cwt per acre* | (3) and (4)                     |       |       |
| 0.9   | 14.87                           | 16.63 | 15.75 |
| 1.8   | 14.19                           | 16.88 | 15.54 |
| Mean  | 14.53                           | 16.75 | 15.64 |

|      | Dung: tons<br>per acre | P <sub>2</sub> O <sub>5</sub> : cwt<br>per acre* | K <sub>2</sub> O: cwt<br>per acre* |
|------|------------------------|--|------------------------------------|
| None | 12                     | 0.9 1.8  | 0.9 1.8                            |

Fosters

| N: cwt per acre     | (± 0.188)   | (1) and (2) | (1) and (2) |
|---------------------|-------------|-------------|-------------|
| 0.5                 | 13.04 15.17 | 14.08 14.13 | 13.82 14.38 |
| 1.0                 | 13.27 15.58 | 14.27 14.58 | 14.11 14.74 |
| Dung: tons per acre |             | (1) and (2) | (1) and (2) |
| None                |             | 13.18 13.13 | 12.59 13.71 |
| 12                  |             | 15.17 15.58 | 15.34 15.41 |

| Lucerne rotation only                         | K <sub>2</sub> O: cwt per acre* |       | Mean  |
|---|---------------------------------|-------|-------|
|   | 0.9                             | 1.8   |       |
| P <sub>2</sub> O <sub>5</sub> : cwt per acre* | (3) and (4)                     |       |       |
| 0.9   | 13.80                           | 15.09 | 14.44 |
| 1.8   | 13.49                           | 14.54 | 14.02 |
| Mean  | 13.65                           | 14.81 | 14.23 |

\*Including basal dressing.

| Highfield  | Fosters   |
|------------|---|
| (1) ±0.284 | (1) ±0.253 for use in horizontal and interaction comparisons. |
| (2) ±0.427 | (2) ±0.223 for use in all others.                             |
| (3) ±1.066 | (3) ±0.375 for use only in testing the PK interaction.        |
| (4) ±0.854 | (4) ±0.445 for use in all other comparisons.                  |

56/Bc/1.11

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

|   | Treatment crops 1952-1954 |      |           |                 | Mean |
|---|---------------------------|------|-----------|-----------------|------|
|   | Lucerne                   | Ley  | Cut Grass | Arable with hay |      |
| <u>Highfield</u>                              |                           |      |           |                 |      |
| Mean  | 77.3                      | 74.3 | 69.6      | 67.5            | 72.2 |
| N: cwt per acre                               |                           |      |           |                 |      |
| 0.5   | 80.6                      | 75.3 | 69.5      | 70.8            | 74.0 |
| 1.0   | 74.0                      | 73.3 | 69.7      | 64.2            | 70.3 |
| Difference                                    | -6.6                      | -2.0 | +0.2      | -6.6            | -3.7 |
| Dung: tons per acre                           |                           |      |           |                 |      |
| None  | 74.7                      | 75.1 | 71.7      | 67.6            | 72.3 |
| 12  | 79.9                      | 73.5 | 67.5      | 67.4            | 72.1 |
| Difference                                    | +5.2                      | -1.6 | -4.2      | -0.2            | -0.2 |
| P <sub>2</sub> O <sub>5</sub> : cwt per acre* |                           |      |           |                 |      |
| 0.9   | 79.9                      | 73.7 | 69.2      | 65.6            | 72.1 |
| 1.8   | 74.6                      | 75.0 | 70.0      | 69.4            | 72.2 |
| Difference                                    | -5.3                      | +1.3 | +0.8      | +3.8            | +0.1 |
| K <sub>2</sub> O: cwt per acre*               |                           |      |           |                 |      |
| 0.9   | 78.0                      | 70.6 | 70.0      | 66.0            | 71.2 |
| 1.8   | 76.6                      | 78.0 | 69.2      | 69.0            | 73.2 |
| Difference                                    | -1.4                      | +7.4 | -0.8      | +3.0            | +2.0 |
| <u>Fosters</u>                                |                           |      |           |                 |      |
| Mean  | 91.2                      | 89.3 | 89.7      | 91.0            | 90.3 |
| N: cwt per acre                               |                           |      |           |                 |      |
| 0.5   | 91.4                      | 89.7 | 90.2      | 91.8            | 90.8 |
| 1.0   | 90.9                      | 88.9 | 89.1      | 90.3            | 89.8 |
| Difference                                    | -0.5                      | -0.8 | -1.1      | -1.5            | -1.0 |
| Dung: tons per acre                           |                           |      |           |                 |      |
| None  | 90.3                      | 91.3 | 89.6      | 90.8            | 90.5 |
| 12  | 92.0                      | 87.3 | 89.8      | 91.4            | 90.1 |
| Difference                                    | +1.7                      | -4.0 | +0.2      | +0.6            | -0.4 |
| P <sub>2</sub> O <sub>5</sub> : cwt per acre* |                           |      |           |                 |      |
| 0.9   | 92.2                      | 88.4 | 89.4      | 91.2            | 90.3 |
| 1.8   | 90.1                      | 90.2 | 89.9      | 90.9            | 90.2 |
| Difference                                    | -2.1                      | +1.8 | +0.5      | -0.3            | -0.1 |
| K <sub>2</sub> O: cwt per acre*               |                           |      |           |                 |      |
| 0.9   | 90.4                      | 89.3 | 90.3      | 90.1            | 90.0 |
| 1.8   | 91.9                      | 89.3 | 89.0      | 92.0            | 90.6 |
| Difference                                    | +1.5                      | 0.0  | -1.3      | +1.9            | +0.6 |

\*Including basal dressing.

56/Bc/1.12

Potatoes 2nd test crop. Percentage ware (1½" riddle)

|  | Dung: tons<br>per acre | P <sub>2</sub> O <sub>5</sub> : cwt<br>per acre* | K <sub>2</sub> O: cwt<br>per acre* |
|--|------------------------|--|------------------------------------|
|  | None 12                | 0.9 1.8  | 0.9 1.8                            |

Highfield

|                     |      |      |      |      |      |      |
|---------------------|------|------|------|------|------|------|
| N: cwt per acre     |      |      |      |      |      |      |
| 0.5                 | 74.7 | 73.4 | 75.0 | 73.1 | 73.9 | 74.2 |
| 1.0                 | 69.8 | 70.8 | 69.2 | 71.4 | 68.4 | 72.2 |
| Dung: tons per acre |      |      |      |      |      |      |
| None                |      |      | 73.0 | 71.5 | 71.8 | 72.7 |
| 12                  |      |      | 71.2 | 72.9 | 70.5 | 73.6 |

| <u>Lucerne rotation only</u>                  | K <sub>2</sub> O: cwt per acre* |      | Mean |
|---|---------------------------------|------|------|
|   | 0.9                             | 1.8  |      |
| P <sub>2</sub> O <sub>5</sub> : cwt per acre* |                                 |      |      |
| 0.9   | 81.0                            | 78.9 | 79.9 |
| 1.8   | 75.0                            | 74.2 | 74.6 |
| Mean  | 78.0                            | 76.6 | 77.3 |

|  | Dung: tons<br>per acre | P <sub>2</sub> O <sub>5</sub> : cwt<br>per acre* | K <sub>2</sub> O: cwt<br>per acre* |
|--|------------------------|--|------------------------------------|
|  | None 12                | 0.9 1.8  | 0.9 1.8                            |

Fosters

|                     |      |      |      |      |      |      |
|---------------------|------|------|------|------|------|------|
| N: cwt per acre     |      |      |      |      |      |      |
| 0.5                 | 90.9 | 90.7 | 90.4 | 91.2 | 90.6 | 91.0 |
| 1.0                 | 90.0 | 89.5 | 90.2 | 89.3 | 89.5 | 90.1 |
| Dung: tons per acre |      |      |      |      |      |      |
| None                |      |      | 90.9 | 90.0 | 90.6 | 90.3 |
| 12                  |      |      | 89.7 | 90.5 | 89.4 | 90.8 |

| <u>Lucerne rotation only</u>                  | K <sub>2</sub> O: cwt per acre* |      | Mean |
|---|---------------------------------|------|------|
|   | 0.9                             | 1.8  |      |
| P <sub>2</sub> O <sub>5</sub> : cwt per acre* |                                 |      |      |
| 0.9   | 90.5                            | 94.0 | 92.2 |
| 1.8   | 90.4                            | 89.8 | 90.1 |
| Mean  | 90.4                            | 91.9 | 91.2 |

\*Including basal dressing.

56/Bc/1.13

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

|   | Treatment crops 1951-1953 |      |                 |                 | Mean                   |
|---|---------------------------|------|-----------------|-----------------|------------------------|
|   | Lucerne                   | Ley  | Cut Grass       | Arable with hay |                        |
|   | <u>Highfield</u>          |      |                 |                 |                        |
| Mean                                    | 31.5                      | 33.2 | 35.9            | 36.8            | 34.3                   |
| N: cwt per acre                         |                           |      |                 |                 |                        |
| None                                    | 32.8                      | 33.9 | 35.4            | 39.7            | 35.4                   |
| 0.2                                     | 30.2                      | 32.5 | 36.4            | 34.0            | 33.3                   |
| Difference ( $\pm 1.93$ )               | -2.6                      | -1.4 | +1.0            | -5.7            | -2.1<br>( $\pm 0.97$ ) |
| Dung to potatoes 1955:<br>tons per acre |                           |      |                 |                 |                        |
| None                                    | 30.6                      | 32.6 | 37.2            | 35.9            | 34.1                   |
| 12                                      | 32.3                      | 33.8 | 34.6            | 37.7            | 34.6                   |
| Difference ( $\pm 1.93$ )               | +1.7                      | +1.2 | -2.6            | +1.8            | +0.5<br>( $\pm 0.97$ ) |
|   | <u>Fosters</u>            |      |                 |                 |                        |
| Mean                                    | 36.7                      | 38.8 | 40.3            | 39.8            | 38.9                   |
| N: cwt per acre                         |                           |      |                 |                 |                        |
| 0.2                                     | 36.6                      | 39.3 | 41.6            | 39.9            | 39.3                   |
| 0.4                                     | 36.9                      | 38.4 | 39.1            | 39.7            | 38.5                   |
| Difference ( $\pm 1.16$ )               | +0.3                      | -0.9 | -2.5            | -0.2            | -0.8<br>( $\pm 0.58$ ) |
| Dung to potatoes 1955:<br>tons per acre |                           |      |                 |                 |                        |
| None                                    | 38.2                      | 38.9 | 40.3            | 40.5            | 39.5                   |
| 12                                      | 35.3                      | 38.7 | 40.4            | 39.1            | 38.4                   |
| Difference ( $\pm 1.16$ )               | -2.9                      | -0.2 | +0.1            | -1.4            | -1.1<br>( $\pm 0.58$ ) |
|   | <u>Highfield</u>          |      | <u>Fosters</u>  |                 |                        |
|   | N: cwt per acre           |      | N: cwt per acre |                 |                        |
|   | None   0.2                |      | 0.2   0.4       |                 |                        |
| Dung to potatoes 1955:<br>tons per acre | ( $\pm 0.97$ )            |      | ( $\pm 0.58$ )  |                 |                        |
| None                                    | 36.4                      | 31.8 | 39.6            | 39.4            |                        |
| 12                                      | 34.5                      | 34.7 | 39.1            | 37.6            |                        |
| Mean dry matter % as harvested:         |                           |      |                 |                 |                        |
| Highfield: 79.3                         |                           |      |                 |                 |                        |
| Fosters: 80.3                           |                           |      |                 |                 |                        |

56/Bc/1.14

Barley 3rd test crop. Straw: cwt per acre

|   | Treatment crops 1951-53 |      |           |                 | Mean |
|---|-------------------------|------|-----------|-----------------|------|
|   | Lucerne                 | Ley  | Cut Grass | Arable with hay |      |
|   | <u>Highfield*</u>       |      |           |                 |      |
| Mean                                    | 38.4                    | 37.5 | 33.5      | 35.4            | 36.2 |
| N: cwt per acre                         |                         |      |           |                 |      |
| None                                    | 38.1                    | 33.9 | 33.9      | 33.1            | 34.8 |
| 0.2                                     | 38.7                    | 41.1 | 33.1      | 37.8            | 37.7 |
| Difference                              | +0.6                    | +7.2 | -0.8      | +4.7            | +2.9 |
| Dung to potatoes 1955:<br>tons per acre |                         |      |           |                 |      |
| None                                    | 35.8                    | 36.8 | 31.2      | 34.2            | 34.5 |
| 12                                      | 41.1                    | 38.2 | 35.8      | 36.7            | 37.9 |
| Difference                              | +5.3                    | +1.4 | +4.6      | +2.5            | +3.4 |
|   | <u>Fosters</u>          |      |           |                 |      |
| Mean                                    | 27.7                    | 30.0 | 28.2      | 29.6            | 28.9 |
| N: cwt per acre                         |                         |      |           |                 |      |
| 0.2                                     | 26.5                    | 28.5 | 28.0      | 29.5            | 28.1 |
| 0.4                                     | 29.0                    | 31.5 | 28.5      | 29.6            | 29.6 |
| Difference                              | +2.5                    | +3.0 | +0.5      | +0.1            | +1.5 |
| Dung to potatoes 1955:<br>tons per acre |                         |      |           |                 |      |
| None                                    | 27.7                    | 29.1 | 28.1      | 30.1            | 28.8 |
| 12                                      | 27.8                    | 30.9 | 28.4      | 29.0            | 29.0 |
| Difference                              | +0.1                    | +1.8 | +0.3      | -1.1            | +0.2 |

|   | <u>Highfield</u> |      | <u>Fosters</u>  |      |
|---|------------------|------|-----------------|------|
|   | N: cwt per acre  |      | N: cwt per acre |      |
|   | None             | 0.2  | 0.2             | 0.4  |
| Dung to potatoes 1955:<br>tons per acre |                  |      |                 |      |
| None                                    | 33.5             | 35.5 | 28.2            | 29.3 |
| 12                                      | 36.0             | 39.8 | 28.1            | 30.0 |

Mean dry matter % as harvested:  
Highfield: 73.7  
Fosters: 84.0

\*At 85% dry matter.

56/Bc/1.15

Treatment crops Arable and Hay rotation

(values based on Mean of 2 sub plots only)

|   | Highfield                       |             |       | Fosters                         |             |       |
|---|---------------------------------|-------------|-------|---------------------------------|-------------|-------|
|   | N: cwt per acre applied in 1956 |             |       | N: cwt per acre applied in 1956 |             |       |
|   | Single rate                     | Double rate | Mean  | Single rate                     | Double rate | Mean  |
| Hay (dry matter): cwt per acre          |                                 |             |       |                                 |             |       |
| No dung                                 | 50.7                            | 59.2        | 55.0  | 41.4                            | 48.3        | 44.9  |
| Dung in 1954                            | 61.0                            | 55.4        | 58.2  | 39.6                            | 57.0        | 48.3  |
| Mean                                    | 55.8                            | 57.3        | 56.6  | 40.5                            | 52.7        | 46.6  |
| Potatoes, total tubers: tons per acre   |                                 |             |       |                                 |             |       |
| No dung                                 | 11.78                           | 13.14       | 12.46 | 12.77                           | 12.17       | 12.47 |
| Dung in 1956                            | 17.46                           | 18.91       | 18.19 | 14.35                           | 15.14       | 14.74 |
| Mean                                    | 14.62                           | 16.03       | 15.32 | 13.56                           | 13.66       | 13.61 |
| Potatoes, percentage ware (1½" riddle)  |                                 |             |       |                                 |             |       |
| No dung                                 | 64.2                            | 73.0        | 68.6  | 92.2                            | 89.3        | 90.8  |
| Dung in 1956                            | 71.1                            | 74.2        | 72.6  | 88.6                            | 90.4        | 89.5  |
| Mean                                    | 67.7                            | 73.6        | 70.6  | 90.4                            | 89.9        | 90.2  |
| Oats                                    |                                 |             |       |                                 |             |       |
|   | None                            | 0.2         |       | 0.2                             | 0.4         |       |
| Grain (at 85% dry matter): cwt per acre |                                 |             |       |                                 |             |       |
| No dung                                 | 30.6                            | 30.0        | 30.3  | 33.6                            | 38.7        | 36.2  |
| Dung in 1955                            | 32.4                            | 30.2        | 31.3  | 37.1                            | 34.4        | 35.8  |
| Mean                                    | 31.5                            | 30.1        | 30.8  | 35.3                            | 36.6        | 36.0  |
| Straw: cwt per acre                     |                                 |             |       |                                 |             |       |
| No dung                                 | 32.7                            | 28.7        | 30.7  | 25.0                            | 24.2        | 24.6  |
| Dung in 1955                            | 25.8                            | 31.2        | 28.5  | 25.5                            | 33.3        | 29.4  |
| Mean                                    | 29.2                            | 29.9        | 29.6  | 25.3                            | 28.7        | 27.0  |

Highfield, Oats, Mean dry matter % as harvested Grain: 78.3 Straw: 85.7  
 Fosters, Oats, Mean dry matter % as harvested Grain: 81.5 Straw: 84.7

Cut grass. Dry Matter: cwt per acre

|                            | Corrective dressing of K <sub>2</sub> O: cwt per acre<br>3.0 | Highfield   |  | Fosters   |  | Mean |
|----------------------------|--|---|--|---|--|------|
|                            |  | N: to previous 3 test crops<br>Single rate<br>Double rate | Dung to potatoes 1954: tons per acre<br>None<br>12 | N: to previous 3 test crops<br>Single rate<br>Double rate | Dung to potatoes 1954: tons per acre<br>None<br>12 |      |
| 1st year                   |  |   |  |   |  |      |
| N(1) to cut grass (4 cuts) |  |   |  |   |  |      |
| Single rate                |  | 55.7  | 56.7   | 56.2  | 36.4   | 40.7 |
| Double rate                |  | 63.4  | 61.9   | 62.7  | 46.2   | 49.3 |
| N to test crops            |  |   |  |   |  |      |
| Single rate                |  |   |  | 59.5  | 41.4   | 41.2 |
| Double rate                |  |   |  | 59.3  | 44.9   | 45.0 |
| Mean                       |  |   | 58.2   | 59.4  | 43.1   | 43.1 |
|                            |  |   |  |   |  |      |
|                            |  | Highfield   |  | Fosters   |  | Mean |
|                            |  | N to cut grass (1)<br>Single rate<br>Double rate          | Mean   | N to cut grass (1)<br>Single rate<br>Double rate          | Mean   |      |
| 2nd year (6 cuts)          | 1.5  | 60.6  | 86.9   | 73.8  | 54.2   | 73.3 |
| 3rd year (6 cuts)          | 1.5  | 65.1  | 86.2   | 75.7  | 63.2   | 77.9 |

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



56/Bc/1.17

Lucerne. Dry matter: cwt per acre

| 1st year<br>(2 cuts)     | Corrective<br>dressing<br>of K <sub>2</sub> O: cwt<br>per acre<br>3.0 | Highfield                        |                |      | Fosters                          |                |       |
|--------------------------|---|----------------------------------|----------------|------|----------------------------------|----------------|-------|
|                          |   | N to 3<br>previous<br>test crops |                | Mean | N to 3<br>previous<br>test crops |                | Mean  |
|                          |   | Single<br>rate                   | Double<br>rate |      | Single<br>rate                   | Double<br>rate |       |
| Dung to<br>potatoes 1954 |   |                                  |                |      |                                  |                |       |
| None                     |   | 43.0                             | 48.0           | 45.5 | 32.9                             | 35.7           | 34.3  |
| 12 tons                  |   | 45.1                             | 48.6           | 46.8 | 32.2                             | 33.0           | 32.6  |
| Mean                     |   | 44.1                             | 48.3           | 46.2 | 32.6                             | 34.4           | 33.5  |
| 2nd year<br>(3 cuts)     | 1.0   |                                  |                | 88.0 |                                  |                | 90.1  |
| 3rd year<br>(3 cuts)     | 1.0   |                                  |                | 96.6 |                                  |                | 105.4 |

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

|          | Highfield                   |      |      | Fosters                     |      |      |
|----------|-----------------------------|------|------|-----------------------------|------|------|
|          | N: cwt per<br>acre (yearly) |      | Mean | N: cwt per<br>acre (yearly) |      | Mean |
|          | 0.15                        | 0.30 |      | 0.15                        | 0.30 |      |
| 1st year | 20.7                        | 19.8 | 20.3 | 15.4                        | 18.2 | 16.8 |
| 2nd year | 25.0                        | 29.5 | 27.2 | 25.0                        | 23.0 | 24.0 |
| 3rd year | 29.8                        | 30.6 | 30.2 | 21.1                        | 24.3 | 22.7 |

56/Bc/1.18

Reseeded Grass. Dry matter: cwt per acre

|                                    | Corrective dressing of K <sub>2</sub> O: cwt per acre | Cut for hay |             | Mean | Grazed<br>Estimated from sampling cuts |             |       |
|------------------------------------|---|-------------|-------------|------|--|-------------|-------|
|                                    |   | Single rate | Double rate |      | Single rate                            | Double rate | Mean  |
| <u>Highfield</u>                   |   |             |             |      |  |             |       |
| 6th exptl. year<br>Blocks 9-12     | None  |             |             |      | 32.5                                   | 33.6        | 33.0  |
| 7th exptl. year<br>Blocks 6 and 7  | None  |             |             |      | 25.0                                   | 33.3        | 29.1  |
| Blocks 5 and 8                     | 1.2   | 59.8        | 63.2        | 61.5 | 19.9*                                  | 25.9*       | 22.9* |
| 8th exptl. year<br>Blocks 1-4      | None  |             |             |      | 23.5                                   | 28.8        | 26.2  |
| <u>Fosters</u>                     |   |             |             |      |  |             |       |
| 6th exptl. year<br>Blocks 6, 10-12 | None  |             |             |      | 17.2                                   | 18.5        | 17.8  |
| 7th exptl. year<br>Blocks 8 and 9  | None  |             |             |      | 13.0                                   | 17.0        | 15.0  |
| Blocks 5 and 7                     | 1.2   | 33.1        | 37.7        | 35.4 | 16.2*                                  | 21.6*       | 18.9* |
| 8th exptl. year<br>Blocks 1-4      | None  |             |             |      | 24.5                                   | 21.4        | 22.9  |

Permanent Grass. Dry matter: cwt per acre

|                                   |      |      |      |      |       |       |       |
|-----------------------------------|------|------|------|------|-------|-------|-------|
| <u>Highfield</u>                  |      |      |      |      |       |       |       |
| 6th exptl. year<br>Blocks 9-12    | None |      |      |      | 31.4  | 31.9  | 31.6  |
| 7th exptl. year<br>Blocks 6 and 7 | None |      |      |      | 21.7  | 25.0  | 23.4  |
| Blocks 5 and 8                    | 1.2  | 39.6 | 43.9 | 41.7 | 25.1* | 26.6* | 25.8* |
| 8th exptl. year<br>Blocks 1-4     | None |      |      |      | 24.7  | 29.1  | 26.9  |

\*Aftermath grazing.

56/Ba/1.1

### GREEN MANURING EXPERIMENT

Woburn Stackyard - 1956, the 3rd year of the revised scheme.

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

Note: In 1955 the green manure crops undersown in the barley failed; these were resown after the barley was cut.

The straw treatment due to be applied after harvest was given only to the "fallow" (i.e. not undersown) plots, the application of straw to the green manure plots being postponed until later.

Area of each plot: 0.0395 acres. Area harvested: Potatoes, 0.0237; barley, 0.0395 acres.

#### Cultivations, etc.:

Green manures after barley: Trefoil at 30 lb per acre, ryegrass at 40 lb per acre, resown: Sept 6, 1955. Varieties: Trefoil-English; Ryegrass-Western Wolths.

Early Potatoes: Straw applied to "fallow" plots only: Sept 27, 1955.

"Fallow" plots ploughed: Sept 28. Straw applied to trefoil and

ryegrass plots: Dec 8. "Fallow" plots ploughed: Jan 5, 1956.

All plots ploughed: Mar 6. Basal fertilizers applied: Mar 19.

'Nitro-Chalk' applied: Mar 21. Potatoes mechanically planted:

Mar 24. Earthed up: June 1. Lifted: July 25. Variety:

Ulster Chieftain.

Green manures after early potatoes: Trefoil at 30 lb per acre, ryegrass at 40 lb per acre, sown: July 29, 1955. Varieties: Trefoil-English; Ryegrass-Western Wolths.

Barley: "Fallow" and "early" green manure plots ploughed:

Nov 17, 1955 and Jan 7, 1956. All plots ploughed including

"late" green manure plots: Mar 7. Ground chalk at 20 cwt per

acre applied: Mar 9. 'Nitro-Chalk' applied: Mar 16. Seed

drilled at  $2\frac{1}{2}$  bushels per acre: Mar 17. Trefoil and ryegrass

undersown: Apr 23. Harvested: Aug 15. Variety: Herta.

#### Standard errors per plot:

Potatoes, Total tubers: 0.967 tons per acre or 12.3% (18 d.f.)

Barley, Grain: 2.64 cwt per acre or 8.8% (20 d.f.)

56/Ba/1.2

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

|                           | Green manure | Ploughed in | Dry matter | Nitrogen |
|---------------------------|--------------|-------------|------------|----------|
| <u>For Early Potatoes</u> | Trefoil      |             | 5.9        | 0.187    |
|                           | Ryegrass     |             | 6.9        | 0.153    |
| <u>For Barley</u>         | Trefoil      | Early       | 17.4       | 0.572    |
|                           | Ryegrass     | Early       | 11.8       | 0.347    |
|                           | Trefoil      | Late        | 4.9        | 0.183    |
|                           | Ryegrass     | Late        | 7.2        | 0.218    |

Erratum to "Results of the Field Experiments" 1955 page 55/Ba/1.2.

Excluding plots fallow under old scheme:

S.E. of straw x N table should read ( $\pm 0.130$ ) not ( $\pm 0.120$ ).

56/Ba/1.3

Summary of Results

Early Potatoes, total tubers: tons per acre

|  |                         |   |  |      |
|--|-------------------------|---|--|------|
|  | Straw: tons<br>per acre | N: cwt per acre<br>(including<br>basal) | Dung to<br>cabbages 1952:<br>tons per acre | Mean |
|  | None   1½               | 0.23   0.46                             | None   10                                  |      |

Excluding plots fallow under old scheme

|                                      |             |             |             |          |
|--------------------------------------|-------------|-------------|-------------|----------|
| Undersown green manures for potatoes | (±0.342)    | (±0.342)    | (±0.342)    | (±0.242) |
| None                                 | 7.69   7.94 | 7.88   7.74 | 6.94   8.69 | 7.81     |
| Trefoil                              | (±0.484)    | (±0.484)    | (±0.484)    | (±0.342) |
| Ryegrass                             | 8.71   7.65 | 8.24   8.11 | 7.24   9.12 | 8.18     |
|                                      | 8.25   7.61 | 7.83   8.03 | 7.16   8.70 | 7.93     |
| Straw: tons per acre                 |             | (±0.342)    | (±0.342)    | (±0.242) |
| None                                 |             | 8.33   7.84 | 7.02   9.15 | 8.08     |
| 1½                                   |             | 7.60   7.97 | 7.12   8.45 | 7.78     |
| N: cwt per acre (including basal)    |             |             |             |          |
| 0.23                                 |             |             | 7.08   8.84 | 7.96     |
| 0.46                                 |             |             | 7.05   8.76 | 7.91     |
| Mean (±0.242)                        |             |             | 7.07   8.80 | 7.93     |

Plots fallow under old scheme

|                                   |             |             |          |
|-----------------------------------|-------------|-------------|----------|
| Straw: tons per acre              | (±0.684)    | (±0.684)    | (±0.484) |
| None                              | 7.14   7.88 | 6.60   8.42 | 7.51     |
| 1½                                | 7.18   8.12 | 6.70   8.60 | 7.66     |
| N: cwt per acre (including basal) |             |             |          |
| 0.23                              |             | 6.14   8.19 | 7.16     |
| 0.46                              |             | 7.16   8.84 | 8.00     |
| Mean (±0.484)                     |             | 6.65   8.52 | 7.58     |

|            |                                      |          |          |          |      |
|------------|--------------------------------------|----------|----------|----------|------|
| Old scheme | Undersown green manures for potatoes |          |          |          | Mean |
|            | None Fallow                          | None     | Trefoil  | Ryegrass |      |
|            | 7.58                                 | 7.81     | 8.18     | 7.93     | 7.86 |
|            | (±0.342)                             | (±0.242) | (±0.342) |          |      |

Barley, grain: cwt per acre

|  | Green manures                        |  | In barley for potatoes<br>None   Undersown | N: cwt per acre<br>(including basal)<br>0.23   0.46 | Dung to cabbages 1953:<br>tons per acre<br>None   10 | Mean    |
|--|--------------------------------------|--|--|---|--|---------|
|  | Ploughed in<br>Early   Late          | Green manures after<br>None   Trefoil   Ryegrass |  |   |  |         |
| <u>Excluding plots fallow under old scheme</u>                 |                                      |  |  |   |  |         |
| Green manures after potatoes for barley<br>Trefoil<br>Ryegrass | (±0.93)                              | (±0.93)  | (±0.93)                                    | (±0.93)   | (±0.93)  | (±0.66) |
|  | 29.1   30.3   32.1                   | 31.5   27.9   31.8                               | 28.3   31.1   33.4                         | 28.4   31.0   33.4                                  | 29.7   32.6  |         |
| Green manures ploughed in<br>Early<br>Late                     | 32.2   32.6                          | 29.0   30.7                                      | 31.8   33.0                                | 30.4   29.8   | 30.6   31.7  |         |
|  | 31.5   28.2                          | 33.3   31.5                                      | 32.2   28.0                                | 31.4   32.9   | 29.9   32.4  |         |
| Mean (±0.66)   | 30.1                                 | 32.2   | 31.1                                       | 30.1  | 31.1   |         |
| <u>Plots fallow under old scheme</u>                           |                                      |  |  |   |  |         |
| Green manures after potatoes for barley<br>None<br>Fallow      | 25.6                                 | 32.6   | 30.0                                       | 26.5  | 24.6   | 25.6    |
|  | (±0.93)                              | (±0.66)  |  |   |  |         |
| Old scheme   | 29.7                                 | 32.6   | 30.0                                       | 26.5  | 24.6   | 25.6    |
|  | (±0.93)                              | (±0.66)  |  |   |  |         |
| <u>Plots fallow under old scheme</u>                           |                                      |  |  |   |  |         |
|  | N: cwt per acre<br>(including basal) |  | N: cwt per acre<br>(including basal)       |   | N: cwt per acre<br>(including basal)                 |         |
|  | 0.23   0.46                          |  | 0.23   0.46                                |   | 0.23   0.46  |         |
|  | 24.8   28.2                          |  | 24.8   28.2                                |   | 24.8   28.2  |         |
|  | 22.5   26.8                          |  | 22.5   26.8                                |   | 22.5   26.8  |         |
|  | 23.6   27.4                          |  | 23.6   27.4                                |   | 23.6   27.4  |         |
|  | 26.5                                 |  | 26.5                                       |   | 26.5   |         |
|  | 24.6                                 |  | 24.6                                       |   | 24.6   |         |
|  | 25.6                                 |  | 25.6                                       |   | 25.6   |         |

56/Bd/1.4

56/Ba/1.5

Barley, straw: cwt per acre

|  | Green manures |      | In barley for potatoes | N: cwt per acre (including basal) | Dung to cabbages 1953: |               | Mean |
|--|---------------|------|------------------------|-----------------------------------|------------------------|---------------|------|
|  | Ploughed in   | None |                        |                                   | None                   | tons per acre |      |
|  | Early         | Late | Undersown              | 0.23                              | 0.46                   | 10            |      |
| <u>Excluding plots fallow under old scheme</u> |               |      |                        |                                   |                        |               |      |
| Green manures after potatoes for barley        |               |      |                        |                                   |                        |               |      |
| Trefoil  | 23.1          | 25.1 | 22.2                   | 22.6                              | 25.5                   | 26.1          | 24.1 |
| Ryegrass                                       | 25.3          | 26.7 | 25.0                   | 25.5                              | 26.5                   | 26.7          | 26.0 |
| Green manures ploughed in                      |               |      |                        |                                   |                        |               |      |
| Early  |               |      | 22.2                   | 23.0                              | 25.4                   | 24.9          | 24.2 |
| Late   |               |      | 25.1                   | 25.2                              | 26.7                   | 27.9          | 25.9 |
| Green manures in barley for potatoes           |               |      |                        |                                   |                        |               |      |
| None   |               |      |                        | 25.6                              | 27.4                   | 27.4          | 26.5 |
| Undersown                                      |               |      |                        | 22.6                              | 24.7                   | 25.4          | 23.6 |
| N: cwt per acre (including basal)              |               |      |                        |                                   |                        |               |      |
| 0.23   |               |      |                        | 22.3                              | 25.9                   | 25.9          | 24.1 |
| 0.46   |               |      |                        | 25.1                              | 27.0                   | 27.0          | 26.0 |
| Mean   |               |      |                        | 23.7                              | 26.4                   | 26.4          | 25.1 |
| <u>Plots fallow under old scheme</u>           |               |      |                        |                                   |                        |               |      |
| Green manures after potatoes for barley        |               |      |                        |                                   |                        |               |      |
| None   |               |      |                        | 0.23                              | 18.6                   | 18.6          | 19.5 |
| Fallow   |               |      |                        | 0.46                              | 22.8                   | 22.9          | 22.9 |
| Ryegrass                                       |               |      |                        |                                   |                        |               |      |
| Excluding fallow                               |               |      |                        |                                   |                        |               |      |
| Mean   |               |      |                        |                                   |                        |               |      |
| Old scheme                                     | 21.2          | 24.1 | 26.0                   |                                   |                        |               | 21.2 |
| Mean   |               |      | 24.3                   |                                   |                        |               |      |

56/Be/1.1

## LEY AND ARABLE ROTATIONS

Woburn Stackyard 1956 - the 19th year.

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

In 1956 carrots replaced sugar beet as the 3rd course of the arable rotation. Sugar beet replaced potatoes as the 1st test crop. The seeds hay split plot test of N after the first crop was discontinued.

Cultivations, etc.:

### Treatment crops

#### Ley rotations

Ley 1st year. Ploughed twice: Sept 23, 1955 and Oct 28. Basal fertilizers applied, seed sown: Apr 16, 1956. 2nd dressing 'Nitro-Chalk' applied: Aug 29. Grazed 6 circuits: June 25 - 29, July 25 - Aug 2, Aug 19 - 29, Sept 14 - 22, Oct 9 - 17, Nov 2 - 10. Seed mixture (sown at 40 lb per acre) 20 lb S24 Perennial Ryegrass, 11 lb S143 Cocksfoot, 6 lb Late Flowering Red Clover, 3 lb S100 White Clover.

Ley 2nd year. Basal potash applied: Apr 13, 1956. 'Nitro-Chalk' applied: May 20 and Sept 3. Grazed 8 circuits: May 4 - 12, May 20 - 28, June 17 - 25, July 7 - 15, Aug 8 - 17, Sept 6 - 14, Oct 1 - 9, Oct 25 - Nov 2.

Ley 3rd year. Basal potash applied: Apr 13, 1956. 'Nitro-Chalk' applied: May 16 and Sept 5. Grazed 9 circuits: Apr 26 - May 4, May 12 - 20, June 9 - 17, June 29 - July 7, July 17 - 25, Aug 2 - 11, Aug 29 - Sept 6, Sept 22 - Oct 1, Oct 17 - 25.

Lucerne 1st year. Ploughed twice: Sept 23, 1955 and Oct 28. Basal fertilizers applied, seed sown at 25 lb per acre: Apr 16, 1956. Dusted with 5% DDT: May 5. Sprayed with DDT emulsion, 3 pints per acre: May 7 and June 2. Cut twice: Aug 8 and Nov 16. Variety: Du Puits.

Lucerne 2nd year. Basal potash applied: Apr 13, 1956. Cut 3 times: June 21, Aug 8, Nov 16.

Lucerne 3rd year. Basal potash applied: Apr 13, 1956. Cut 3 times: June 21, Aug 8, Nov 16.

#### Arable rotations

Potatoes 1st course. Ploughed twice: Sept 23, 1955 and Oct 28. Basal fertilizers applied: Apr 11, 1956. Ridged, potatoes planted: Apr 13. Earthed up: June 22. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 23. Sprayed with arsenious compound, 1 gallon in 40 gallons per acre: Sept 4. Lifted: Oct 4 - 5. Variety: Majestic.

Rye 2nd course. Ploughed: Sept 3, 1955. Seed drilled at 3 bushels per acre: Oct 15. 'Nitro-Chalk' applied: Apr 16, 1956. Seeds hay mixture undersown on 4 plots: Apr 20. Harvested: Aug 22. Variety: King II.



56/Be/1.2

Seeds hay 3rd course. Seeds undersown in rye: May 9, 1955.  
 Basal fertilizers applied: Apr 9, 1956. 1st cut: June 21.  
 'Nitro-Chalk' applied: June 22. 2nd cut: Nov 16. Seeds  
 mixture per acre: 19 lb S24 Perennial Ryegrass, 9 lb Late  
 Flowering Red Clover, 2 lb Alsike American.  
 Carrots 3rd course. Ploughed twice: Sept 6, 1955 and Dec 12.  
 Basal fertilizer applied, seed drilled at 6 lb per acre:  
 Apr 13, 1956. Singled: June 21 - 26. Lifted: Nov 8.  
 Variety: James' Scarlet Intermediate.

Test crops

Sugar beet 1st test crop. Ploughed: Nov 9 - 11, 1955. Dung  
 applied, ploughed: Mar 8, 1956. Basal and treatment  
 fertilizers applied, rubbed seed drilled at 12 lb per acre:  
 Apr 9. Sprayed with DDT emulsion, 3 pints in 40 gallons:  
 May 7. Singled: June 1 - 5. Lifted: Oct 22 - 26.  
 Variety: Klein E.

Barley 2nd test crop. Ploughed: Oct 29, 1955. Ground chalk  
 applied: Dec 8. Potash applied to equalise treatment  
 dressings to 1955 potatoes: Jan 16, 1956. 'Nitro-Chalk'  
 applied: Mar 13. Seed drilled at 2½ bushels per acre:  
 Mar 16. Additional 'Nitro-Chalk' applied: Apr 19.  
 Harvested: Aug 21. Variety: Herta.

Note. The change of 1st test crop from potatoes to sugar beet, was  
 decided on in spring, and the application of dung necessitated  
 a second ploughing; this gave poor seed bed conditions after the  
 leys and the yield of sugar beet after lucerne was possibly  
 depressed as a result.

Standard errors per plot. Test Crops.

|                          |             |                              |           |
|--------------------------|-------------|------------------------------|-----------|
| Sugar beet. Total sugar. | Whole plot: | 3.36 cwt per acre or 6.2%    | (3 d.f.)  |
|                          | ½ plot:     | 3.88 cwt per acre or 7.2%    | (4 d.f.)  |
|                          | ⅓ plot:     | 3.41 cwt per acre or 6.3%    | (24 d.f.) |
| Tops.                    | Whole plot: | 0.758 tons per acre or 5.0%  | (3 d.f.)  |
|                          | ½ plot:     | 0.856 tons per acre or 5.7%  | (4 d.f.)  |
|                          | ⅓ plot:     | 1.786 tons per acre or 11.8% | (24 d.f.) |
| Barley. Grain            | Whole plot: | 2.24 cwt per acre or 6.3%    | (4 d.f.)  |
|                          | ½ plot:     | 1.90 cwt per acre or 5.4%    | (4 d.f.)  |

Errata to "Results of the Field Experiments" 1939-47, Vol.I.

Page Bf/1.4. Potatoes 1947. Date sown should read 'May 12' not  
 'Apr 12'.

Page Bf/1.16. Barley 1947. Order of crops previous to potatoes,  
 for grain and straw tables should read "Lucerne, Arable with  
 sugar beet, Arable with hay, Ley" and not as shown.

56/Be/1.3

Summary of Results

Treatment crops

Ley, sheep days of grazing per acre

| 1st year | 2nd year | 3rd year |
|----------|----------|----------|
| 1212     | 1746     | 2073     |

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

|                             | 1st crop | 2nd crop | 3rd crop | Total |
|-----------------------------|----------|----------|----------|-------|
| <u>1st year</u>             |          |          |          |       |
| Dung in 1954: tons per acre |          |          |          |       |
| None                        | 10.5     | 4.8      |          | 15.3  |
| 15                          | 11.5     | 6.9      |          | 18.4  |
| Difference                  | +1.0     | +2.1     |          | +3.1  |
| Previous rotation           |          |          |          |       |
| Lucerne                     | 10.4     | 5.7      |          | 16.1  |
| Arable with hay             | 11.6     | 6.0      |          | 17.6  |
| Mean                        | 11.0     | 5.8      |          | 16.8  |
| <u>2nd year</u>             |          |          |          |       |
| Dung in 1953: tons per acre |          |          |          |       |
| None                        | 27.4     | 23.6     | 9.7      | 60.7  |
| 15                          | 33.5     | 27.7     | 11.7     | 72.9  |
| Difference                  | +6.1     | +4.1     | +2.0     | +12.2 |
| Previous rotation           |          |          |          |       |
| Lucerne                     | 28.6     | 25.3     | 10.3     | 64.2  |
| Arable with sugar beet      | 32.3     | 26.0     | 11.1     | 69.4  |
| Mean                        | 30.4     | 25.6     | 10.7     | 66.7  |
| <u>3rd year</u>             |          |          |          |       |
| Dung in 1952: tons per acre |          |          |          |       |
| None                        | 30.4     | 24.5     | 9.7      | 64.6  |
| 15                          | 37.3     | 28.0     | 11.9     | 77.2  |
| Difference                  | +6.9     | +3.5     | +2.2     | +12.6 |
| Previous rotation           |          |          |          |       |
| Lucerne                     | 31.5     | 24.3     | 10.2     | 66.0  |
| Arable with hay             | 36.2     | 28.2     | 11.4     | 75.8  |
| Mean                        | 33.8     | 26.2     | 10.8     | 70.8  |

56/Be/1.4

Treatment crops

|                        | Potatoes                       |                    | Rye                    |        |
|------------------------|--------------------------------|--------------------|------------------------|--------|
|                        | Total tubers:<br>tons per acre | Percentage<br>ware | Grain:<br>cwt per acre | Straw: |
| Dung: tons per acre    |                                |                    |                        |        |
| None                   | 13.58                          | 90.5               | 41.2                   | 46.3   |
| 15*                    | 14.43                          | 88.9               | 42.6                   | 49.9   |
| Difference             | +0.85                          | -1.6               | +1.4                   | +3.6   |
| Previous rotation      |                                |                    |                        |        |
| Ley                    | 15.40                          | 89.6               | 44.4                   | 50.5   |
| Lucerne                | 14.07                          | 90.4               | 42.0                   | 48.5   |
| Arable with hay        | 13.32                          | 89.8               | 39.5                   | 44.0   |
| Arable with sugar beet | 13.22                          | 89.2               | 41.7                   | 49.5   |
| Mean                   | 14.00                          | 89.7               | 41.9                   | 48.1   |

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

|                             | 1st crop | 2nd crop | Total |
|-----------------------------|----------|----------|-------|
| Dung in 1952: tons per acre |          |          |       |
| None                        | 48.2     | 20.7     | 68.9  |
| 15                          | 50.3     | 24.0     | 74.3  |
| Difference                  | 2.1      | 3.3      | 5.4   |
| Previous rotation           |          |          |       |
| Lucerne                     | 48.9     | 23.7     | 72.6  |
| Arable with hay             | 49.6     | 21.0     | 70.6  |
| Mean                        | 49.2     | 22.4     | 71.6  |

Carrots

|                             | Roots<br>(washed):<br>tons per acre | Tops: |
|-----------------------------|-------------------------------------|-------|
| Dung in 1952: tons per acre |                                     |       |
| None                        | 15.43                               | 4.52  |
| 15                          | 17.85                               | 4.94  |
| Difference                  | 2.42                                | 0.42  |
| Previous rotation           |                                     |       |
| Ley                         | 19.40                               | 5.67  |
| Arable with sugar beet      | 13.88                               | 3.79  |
| Mean                        | 16.64                               | 4.73  |

\*Dung applied: Potatoes - for test crop potatoes in 1954.  
Rye - for test crop potatoes in 1953.

56/Be/1.5

|  | 1st Test Crop     |         |                 |                        | Mean  |
|--|-------------------|---------|-----------------|------------------------|-------|
|  | Previous rotation |         |                 |                        |       |
|  | Ley               | Lucerne | Arable with hay | Arable with sugar beet |       |
| Sugar beet, roots (washed): tons per acre                |                   |         |                 |                        |       |
| Mean   | 16.82             | 15.05   | 14.80           | 15.71                  | 15.59 |
| Dung: tons per acre                                      |                   |         |                 |                        |       |
| None   | 15.55             | 13.41   | 12.15           | 13.29                  | 13.60 |
| 15   | 18.10             | 16.70   | 17.44           | 18.13                  | 17.59 |
| Difference   | +2.55             | +3.29   | +5.29           | +4.84                  | +3.99 |
| Response to additional 0.72 cwt N per acre               |                   |         |                 |                        |       |
| No dung  | +0.33             | -0.85   | -0.61           | +0.81                  | -0.08 |
| Dung 15 tons per acre                                    | +0.53             | +0.01   | +0.51           | +0.94                  | +0.49 |
| Response to additional 0.9 cwt K <sub>2</sub> O per acre |                   |         |                 |                        |       |
| No dung  | +0.79             | +1.79   | +1.38           | -0.71                  | +0.81 |
| Dung 15 tons per acre                                    | +0.45             | +1.23   | +0.39           | -0.85                  | +0.31 |
| Sugar beet, sugar percentage                             |                   |         |                 |                        |       |
| Mean   | 16.9              | 17.4    | 17.4            | 18.0                   | 17.4  |
| Dung: tons per acre                                      |                   |         |                 |                        |       |
| None   | 17.1              | 17.4    | 17.6            | 18.0                   | 17.6  |
| 15   | 16.6              | 17.3    | 17.2            | 18.0                   | 17.3  |
| Difference   | -0.5              | -0.1    | -0.4            | 0.0                    | -0.3  |
| Response to additional 0.72 cwt N per acre               |                   |         |                 |                        |       |
| No dung  | -0.4              | -0.4    | -1.0            | -0.8                   | -0.6  |
| Dung 15 tons per acre                                    | -0.4              | -0.4    | -0.2            | -0.5                   | -0.4  |
| Response to additional 0.9 cwt K <sub>2</sub> O per acre |                   |         |                 |                        |       |
| No dung  | +0.4              | 0.0     | +0.3            | -0.2                   | +0.1  |
| Dung 15 tons per acre                                    | 0.0               | +0.2    | +0.2            | -0.4                   | 0.0   |

56/Be/1.6

|  | 1st Test Crop |                   |                 |                        | Mean                     |
|--|---------------|-------------------|-----------------|------------------------|--------------------------|
|  | Ley           | Previous rotation |                 | Arable with sugar beet |                          |
|  |               | Lucerne           | Arable with hay |                        |                          |
| Sugar beet, total sugar: cwt per acre                    |               |                   |                 |                        |                          |
| Mean ( $\pm 2.38$ )                                      | 56.7          | 52.3              | 51.4            | 56.5                   | 54.2                     |
| Dung: tons per acre                                      |               |                   |                 |                        |                          |
| None ( $\pm 3.07$ )*                                     | 53.2          | 46.7              | 42.9            | 47.9                   | 47.7                     |
| 15   | 60.2          | 57.9              | 59.9            | 65.2                   | 60.8                     |
| Difference ( $\pm 3.88$ )                                | +7.0          | +11.2             | +17.0           | +17.3                  | +13.1<br>( $\pm 1.94$ )  |
| Response to additional 0.72 cwt N per acre               |               | ( $\pm 2.41$ )    |                 |                        | ( $\pm 1.21$ )           |
| No dung  | -0.3          | -3.9              | -4.5            | +0.8                   | -2.0                     |
| Dung 15 tons per acre                                    | +0.7          | -1.6              | +0.8            | +1.5                   | +0.3                     |
| Response to additional 0.9 cwt K <sub>2</sub> O per acre |               | ( $\pm 2.41$ )    |                 |                        | ( $\pm 1.21$ )           |
| No dung  | +3.7          | +6.3              | +5.5            | -3.2                   | +3.0                     |
| Dung 15 tons per acre                                    | +1.3          | +5.2              | +2.0            | -4.0                   | +1.1                     |
| Sugar beet, tops: tons per acre                          |               |                   |                 |                        |                          |
| Mean ( $\pm 0.536$ )                                     | 17.15         | 15.59             | 16.26           | 11.33                  | 15.08                    |
| Dung: tons per acre                                      |               |                   |                 |                        |                          |
| None ( $\pm 0.686$ )*                                    | 16.64         | 15.31             | 14.75           | 9.98                   | 14.17                    |
| 15   | 17.66         | 15.88             | 17.78           | 12.69                  | 16.00                    |
| Difference ( $\pm 0.856$ )                               | +1.02         | +0.57             | +3.03           | +2.71                  | +1.83<br>( $\pm 0.428$ ) |
| Response to additional 0.72 cwt N per acre               |               | ( $\pm 1.263$ )   |                 |                        | ( $\pm 0.631$ )          |
| No dung  | +3.57         | +1.60             | +2.85           | +2.36                  | +2.59                    |
| Dung 15 tons per acre                                    | +3.35         | +1.08             | +1.88           | +1.79                  | +2.03                    |
| Response to additional 0.9 cwt K <sub>2</sub> O per acre |               | ( $\pm 1.263$ )   |                 |                        | ( $\pm 0.631$ )          |
| No dung  | +2.14         | +1.04             | +0.95           | +0.11                  | +1.06                    |
| Dung 15 tons per acre                                    | +0.45         | -0.74             | -1.19           | -1.67                  | -0.79                    |

\*For use in comparisons other than vertical.

56/Be/1.7

1st Test Crop

Plots receiving no additional N or K

| Dung: tons per acre                       | Previous Rotation |         |                 |                        | Mean  |
|---|-------------------|---------|-----------------|------------------------|-------|
|   | Ley               | Lucerne | Arable with hay | Arable with sugar beet |       |
| Sugar beet, roots (washed): tons per acre |                   |         |                 |                        |       |
| Mean                                      | 16.26             | 14.81   | 14.58           | 15.81                  | 15.36 |
| None                                      | 14.83             | 13.42   | 12.22           | 13.76                  | 13.56 |
| 15  | 17.68             | 16.20   | 16.92           | 17.87                  | 17.17 |
| Difference                                | +2.85             | +2.78   | +4.70           | +4.11                  | +3.61 |
| Sugar beet, sugar percentage              |                   |         |                 |                        |       |
| Mean                                      | 16.9              | 17.5    | 17.5            | 18.5                   | 17.6  |
| None                                      | 17.1              | 17.5    | 17.9            | 18.4                   | 17.7  |
| 15  | 16.7              | 17.5    | 17.1            | 18.7                   | 17.5  |
| Difference                                | -0.4              | 0.0     | -0.8            | +0.3                   | -0.2  |
| Sugar beet, total sugar: cwt per acre     |                   |         |                 |                        |       |
| Mean ( $\pm 2.83$ )                       | 54.8              | 51.7    | 50.9            | 58.7                   | 54.0  |
| None ( $\pm 4.01$ )*                      | 50.5              | 46.8    | 43.8            | 50.6                   | 47.9  |
| 15  | 59.2              | 56.6    | 58.0            | 66.8                   | 60.2  |
| Difference ( $\pm 5.53$ )                 | +8.7              | +9.8    | +14.2           | +16.2                  | +12.3 |
| Sugar beet, tops: tons per acre           |                   |         |                 |                        |       |
| Mean ( $\pm 0.913$ )                      | 14.75             | 14.42   | 15.33           | 10.62                  | 13.78 |
| None ( $\pm 1.291$ )*                     | 13.58             | 13.62   | 13.19           | 8.91                   | 12.32 |
| 15  | 15.92             | 15.22   | 17.47           | 12.33                  | 15.24 |
| Difference ( $\pm 1.768$ )                | +2.34             | +1.60   | +4.28           | +3.42                  | +2.92 |

\*For use in comparisons other than vertical.

56/Be/1.8

2nd Test Crop

| Dung in 1955:<br>tons per acre | Previous Rotation |         |                       | Arable<br>with<br>sugar<br>beet | Mean                   |
|--------------------------------|-------------------|---------|-----------------------|---------------------------------|------------------------|
|                                | Ley               | Lucerne | Arable<br>with<br>hay |                                 |                        |
| Barley, grain: cwt per acre    |                   |         |                       |                                 |                        |
| None                           | 36.3              | 35.1    | 33.7                  | 31.3                            | 34.1                   |
| 15 ( $\pm 1.85$ )*             | 35.6              | 41.7    | 36.1                  | 32.5                            | 36.5                   |
| Mean ( $\pm 1.58$ )            | 35.9              | 38.4    | 34.9                  | 31.9                            | 35.3                   |
| Difference ( $\pm 1.90$ )      | -0.7              | +6.6    | +2.4                  | +1.2                            | +2.4<br>( $\pm 0.95$ ) |

| Barley, straw: cwt per acre |      |      |      |      |      |
|-----------------------------|------|------|------|------|------|
| None                        | 30.1 | 29.2 | 28.3 | 26.0 | 28.4 |
| 15                          | 32.3 | 33.0 | 29.1 | 27.5 | 30.5 |
| Mean                        | 31.2 | 31.1 | 28.7 | 26.8 | 29.4 |
| Difference                  | +2.2 | +3.8 | +0.8 | +1.5 | +2.1 |

\*For use in comparisons other than vertical.

56/Bf/1.1

WOBURN MARKET GARDEN EXPERIMENT

Organic manures and nitrogen - Lansome 1956 the 15th year.

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

In 1956 the spring cabbages failed because of bird damage and were replaced by early potatoes; in future early potatoes will take the place of spring cabbages in the rotation. The treatments are unaltered except that early potatoes receive N in one dose only.

Note: the results for the 1956-57 leeks will be included in the 1957 report.

Area of each plot: 0.0125 acre.

Cultivations, etc.:

Leeks 1955-56.

Organic manures applied, all plots ploughed: July 22, 1955.

'Nitro-Chalk' and basal fertilizers applied: Aug 15. Planted:

Aug 17. Second dressing of 'Nitro-Chalk' applied: Oct 21.

Harvested: Mar 8 - Apr 11, 1956. Variety: Musselburgh.

Early potatoes (replacement for spring cabbage).

Organic manures spread and ploughed in: Sept 20, 1955. Aldrin

(for cutworm) at  $1\frac{1}{2}$  cwt per acre, basal fertilizers applied:

Sept 22. Spring cabbages (Durham Early) planted: Sept 27.

Crop remnants ploughed in: Mar 6, 1956. All 'Nitro-Chalk'

applied: Mar 20. Planted: Mar 23. Ridged: May 19. Lifted:

July 24. Variety: Arran Pilot.

Globe beet.

Organic manures applied: Apr 25, 1956. Ploughed: Apr 26.

Ground chalk at 20 cwt per acre, basal fertilizers and 'Nitro-

Chalk' applied: Apr 27. Seed drilled at 14 lb per acre: Apr 28.

5% DDT dust at 20 lb per acre applied: May 9. Sprayed with DDT,

3 pints in 20 gallons per acre: May 23. Singled: June 6 - 18.

Second dressing of 'Nitro-Chalk' applied: June 18. Harvested:

July 30 - Aug 28. Variety: Detroit.

Standard errors per plot:

Leeks 1955-56. Saleable produce: 0.262 tons per acre or 10.6% (17 d.f.)

Early potatoes. Total tubers: 0.609 tons per acre or 7.5% (17 d.f.)

Globe beet. Saleable bulbs: 1.97 tons per acre or 31.3% (17 d.f.)



56/Bf/1.2

Summary of Results

Leeks 1955-56

| Organic manures                 | Level of manuring:<br>tons per acre | N: cwt per acre   |                   |      |          | Mean  |
|---------------------------------|-------------------------------------|-------------------|-------------------|------|----------|-------|
|                                 |                                     | None              | 0.3               | 0.6  | 0.9      |       |
| Saleable produce: tons per acre |                                     |                   |                   |      |          |       |
|                                 |                                     | (±0.185)          |                   |      | (±0.131) |       |
| None                            |                                     | 1.75              | 1.80              | 2.03 | 1.35     | 1.77* |
| Dung                            | 10                                  | 2.57              | 2.81              |      |          | 2.69  |
|                                 | 20                                  | 3.35              | 3.71              |      |          | 3.53  |
| Sludge compost                  | 10                                  | 2.51              | 2.19              |      |          | 2.35  |
|                                 | 20                                  | 2.35              | 2.88              |      |          | 2.61  |
| Sludge                          | 10                                  | 1.85              | 1.97              |      |          | 1.91  |
|                                 | 20                                  | 1.80              | 2.23              |      |          | 2.02  |
| Vegetable compost               | 10                                  | 2.51              | 2.59              |      |          | 2.55  |
|                                 | 20                                  | 3.28              | 3.73              |      |          | 3.50  |
| Mean (±0.065)                   |                                     | 2.53 <sup>†</sup> | 2.76 <sup>†</sup> |      |          | 2.46  |

Percentage saleable, (by number)

|                   |    |                   |                   |      |      |       |
|-------------------|----|-------------------|-------------------|------|------|-------|
| None              |    | 93.7              | 93.9              | 95.4 | 85.6 | 93.8* |
| Dung              | 10 | 96.2              | 95.0              |      |      | 95.6  |
|                   | 20 | 96.1              | 96.4              |      |      | 96.2  |
| Sludge compost    | 10 | 97.5              | 95.2              |      |      | 96.3  |
|                   | 20 | 95.3              | 98.0              |      |      | 96.6  |
| Sludge            | 10 | 93.1              | 95.8              |      |      | 94.4  |
|                   | 20 | 94.7              | 93.2              |      |      | 94.0  |
| Vegetable compost | 10 | 95.1              | 94.8              |      |      | 95.0  |
|                   | 20 | 97.7              | 97.1              |      |      | 97.4  |
| Mean              |    | 95.7 <sup>†</sup> | 95.7 <sup>†</sup> |      |      | 95.0  |

Early Potatoes

Total tubers: tons per acre

|                   |    |                   |                   |      |          |       |
|-------------------|----|-------------------|-------------------|------|----------|-------|
|                   |    | (±0.431)          |                   |      | (±0.305) |       |
| None              |    | 5.23              | 6.04              | 7.89 | 8.03     | 5.64* |
| Dung              | 10 | 8.76              | 8.70              |      |          | 8.73  |
|                   | 20 | 8.86              | 10.06             |      |          | 9.46  |
| Sludge compost    | 10 | 7.84              | 8.15              |      |          | 8.00  |
|                   | 20 | 8.69              | 7.96              |      |          | 8.32  |
| Sludge            | 10 | 7.60              | 8.29              |      |          | 7.94  |
|                   | 20 | 7.32              | 7.41              |      |          | 7.36  |
| Vegetable compost | 10 | 7.78              | 8.98              |      |          | 8.38  |
|                   | 20 | 9.42              | 8.72              |      |          | 9.07  |
| Mean (±0.152)     |    | 8.28 <sup>†</sup> | 8.53 <sup>†</sup> |      |          | 8.09  |

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

<sup>†</sup>Excluding 'No organics'.

56/Bf/1.3

Globe beet

| Organic manures                             | Level of manuring:<br>tons per acre | N: cwt per acre    |                    |      |          | Mean  |
|---|-------------------------------------|--------------------|--------------------|------|----------|-------|
|   |                                     | None               | 0.3                | 0.6  | 0.9      |       |
| Saleable bulbs: tons per acre               |                                     |                    |                    |      |          |       |
|   |                                     | (±1.392)           |                    |      | (±0.984) |       |
| None  |                                     | 1.75               | 2.20               | 3.32 | 0.92     | 1.98* |
| Dung  | 10                                  | 5.82               | 7.26               |      |          | 6.54  |
|   | 20                                  | 10.27              | 11.11              |      |          | 10.69 |
| Sludge compost                              | 10                                  | 6.65               | 4.00               |      |          | 5.32  |
|   | 20                                  | 8.28               | 9.18               |      |          | 8.73  |
| Sludge                                      | 10                                  | 4.44               | 3.25               |      |          | 3.84  |
|   | 20                                  | 5.42               | 6.47               |      |          | 5.95  |
| Vegetable compost                           | 10                                  | 5.98               | 8.12               |      |          | 7.05  |
|   | 20                                  | 10.14              | 11.23              |      |          | 10.68 |
| Mean (±0.492)                               |                                     | 7.12 <sup>†</sup>  | 7.58 <sup>†</sup>  |      |          | 6.29  |
| Total produce (whole plants): tons per acre |                                     |                    |                    |      |          |       |
| None  |                                     | 4.60               | 4.24               | 6.26 | 3.06     | 4.42* |
| Dung  | 10                                  | 9.84               | 12.38              |      |          | 11.11 |
|   | 20                                  | 17.28              | 19.47              |      |          | 18.38 |
| Sludge compost                              | 10                                  | 11.87              | 9.01               |      |          | 10.44 |
|   | 20                                  | 15.60              | 17.60              |      |          | 16.60 |
| Sludge                                      | 10                                  | 9.21               | 8.05               |      |          | 8.63  |
|   | 20                                  | 12.22              | 13.26              |      |          | 12.74 |
| Vegetable compost                           | 10                                  | 9.61               | 14.21              |      |          | 11.91 |
|   | 20                                  | 17.12              | 18.56              |      |          | 17.84 |
| Mean  |                                     | 12.84 <sup>†</sup> | 14.07 <sup>†</sup> |      |          | 11.67 |
| Plant number: thousands per acre            |                                     |                    |                    |      |          |       |
| None  |                                     | 77.7               | 69.1               | 76.4 | 93.6     | 73.4* |
| Dung  | 10                                  | 64.4               | 80.4               |      |          | 72.4  |
|   | 20                                  | 92.4               | 100.6              |      |          | 96.5  |
| Sludge compost                              | 10                                  | 79.8               | 105.4              |      |          | 92.6  |
|   | 20                                  | 82.5               | 83.4               |      |          | 83.0  |
| Sludge                                      | 10                                  | 93.9               | 114.9              |      |          | 104.4 |
|   | 20                                  | 97.6               | 110.6              |      |          | 104.1 |
| Vegetable compost                           | 10                                  | 66.2               | 94.8               |      |          | 80.5  |
|   | 20                                  | 82.6               | 81.4               |      |          | 82.0  |
| Mean  |                                     | 82.4 <sup>†</sup>  | 96.4 <sup>†</sup>  |      |          | 87.4  |

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

<sup>†</sup>Excluding 'No organics'.

56/Bg/1.1

IRRIGATION EXPERIMENT

The 6th year

The effects of irrigation and nitrogen - Woburn Butt Close 1956.

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

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

Area harvested (acres): Potatoes, 0.0155; sugar beet, 0.0176;

barley, 0.0168; cut grass, 0.0165.

Rainfall and Irrigation: inches

| Week ending | Rain-fall | Potatoes | Sugar beet | Barley | Cut grass |      |      |
|-------------|-----------|----------|------------|--------|-----------|------|------|
|             |           | A & C    | B & C      | B & C  | A         | B    | C    |
| May 7       | .04       |          |            |        |           |      | .52  |
| 14          | .10       |          |            | 1.12   |           | .50  | .50  |
| 21          | -         |          |            | .50    |           |      | .50  |
| 28          | .10       |          |            | .50    | 1.00      | .50  | .75  |
| June 4      | .51       |          |            | .50    |           | .50  | .52  |
| 11          | 1.11      |          | .87        |        |           |      |      |
| 18          | .93       |          |            |        |           |      |      |
| 25          | .07       |          |            |        |           |      |      |
| July 2      | .18       | .50      |            |        |           | .50  | .50  |
| 9           | 1.27      |          | .50        |        | 1.00      |      |      |
| 16          | .73       |          |            |        |           |      | .57  |
| 23          | 1.09      |          |            |        |           |      |      |
| 30          | .73       |          |            |        |           |      |      |
| Aug 6       | 1.56      |          |            |        |           |      |      |
| 13          | .71       |          |            |        |           |      |      |
| 20          | .98       |          |            |        |           |      |      |
| 27          | .46       |          |            |        |           |      |      |
| Sept 3      | 1.03      |          |            |        |           |      |      |
| 10          | 1.05      |          |            |        |           |      |      |
| 17          | .06       |          |            |        |           |      |      |
| 24          | .21       |          |            |        |           |      |      |
| Oct 1       | .24       |          |            |        |           |      |      |
| Total       | 13.16     | 0.50     | 1.37       | 2.62   | 2.00      | 2.00 | 3.86 |

Note: On sugar beet and barley 0 = A, B = C; on potatoes 0 = B, A = C.

56/Bg/1.2

Cultivations, etc.:

Potatoes. Ploughed: Aug 18, 1955. Dung applied: Nov 21.  
 Ploughed: Nov 23. Fertilizers applied: Mar 26, 1956.  
 Potatoes planted by machine: Mar 28. Earthed up: June 20.  
 Sprayed with copper fungicide, 5 lb in 40 gallons per acre:  
 July 23. Sprayed with arsenious compound, 1 gallon in 40  
 gallons per acre: Aug 31. Lifted: Oct 6. Variety: Majestic.  
 Sugar beet. Ploughed: Oct 7, 1955. Ground chalk applied at 20  
 cwt per acre: Dec 8. Salt applied: Mar 26, 1956. Fertilizers  
 applied, seed drilled at 12 lb per acre (rubbed and graded):  
 Apr 6. Sprayed with Parathion against leaf miner, 8 oz in 40  
 gallons per acre: May 25. Singled: May 31. Lifted: Nov 21.  
 Variety: Klein E.  
 Barley. Ploughed: Nov 24, 1955. Fertilizers applied: Mar 12, 1956.  
 Seed drilled at  $2\frac{1}{2}$  bushels per acre: Mar 15. Harvested:  
 Aug 14. Variety: Herta.  
 Cut grass. Basal fertilizer applied: Jan 12, 1956. 1st application  
 of 'Nitro-Chalk': Mar 12. Cut 6 times (all plots): May 28,  
 June 22, July 17, Aug 13, Sept 7 and Nov 19. 'Nitro-Chalk'  
 applied after each cut except the last. Variety: Cocksfoot S37.

Standard errors per plot:

|             |                           |                             |           |
|-------------|---------------------------|-----------------------------|-----------|
| Potatoes.   | Total tubers, whole plot: | 1.115 tons per acre or 7.4% | (8 d.f.)  |
|             | sub plot:                 | 0.757 tons per acre or 5.0% | (10 d.f.) |
| Sugar beet. | Total sugar, whole plot:  | 2.34 cwt per acre or 3.8%   | (8 d.f.)  |
|             | sub plot:                 | 2.70 cwt per acre or 4.4%   | (10 d.f.) |
|             | Tops, whole plot:         | 1.017 tons per acre or 9.4% | (8 d.f.)  |
|             | sub plot:                 | 0.969 tons per acre or 8.9% | (10 d.f.) |
| Barley.     | Grain, whole plot:        | 2.40 cwt per acre or 8.0%   | (8 d.f.)  |
|             | sub plot:                 | 2.18 cwt per acre or 7.3%   | (10 d.f.) |
| Cut grass.  | Dry matter, whole plot:   | 5.66 cwt per acre or 7.5%   | (6 d.f.)  |
|             | sub plot:                 | 3.75 cwt per acre or 5.0%   | (8 d.f.)  |

56/Bg/1.3

Summary of Results

| N: cwt per acre<br>including basal | Irrigation |       |      | Irrigation |       |      |
|------------------------------------|------------|-------|------|------------|-------|------|
|                                    | O & B      | A & C | Mean | O & B      | A & C | Mean |

Potatoes

|            | total tubers:<br>tons per acre<br>( $\pm 0.505$ )* |       |           | percentage ware<br>( $1\frac{5}{8}$ " riddle) |      |      |
|------------|--|-------|-----------|---|------|------|
|            | 0.5  | 14.20 | 14.76     | 14.48   | 88.4 | 87.6 |
| 1.0        | 15.64  | 16.06 | 15.85     | 89.6  | 92.4 | 91.0 |
| Mean       | 14.92  | 15.41 | 15.16     | 89.0  | 90.0 | 89.5 |
|            | (± 0.455)  |       |           |   |      |      |
| Difference | 1.44   | 1.30  | 1.37      | 1.2   | 4.8  | 3.0  |
|            | (± 0.437)  |       | (± 0.309) |   |      |      |

| N: cwt per acre<br>including basal | Irrigation |       |      | Irrigation |       |      |
|------------------------------------|------------|-------|------|------------|-------|------|
|                                    | O & A      | B & C | Mean | O & A      | B & C | Mean |

Sugar Beet

|            | roots (washed):<br>tons per acre |       |       | sugar percentage |      |      |
|------------|----------------------------------|-------|-------|------------------|------|------|
|            | 0.4                              | 16.24 | 15.06 | 15.65            | 18.6 | 18.3 |
| 0.8        | 18.54                            | 17.46 | 18.00 | 18.2             | 18.6 | 18.4 |
| Mean       | 17.39                            | 16.26 | 16.83 | 18.4             | 18.5 | 18.4 |
| Difference | +2.30                            | +2.40 | +2.35 | -0.4             | +0.3 | -0.1 |

|            | total sugar:<br>cwt per acre<br>( $\pm 1.23$ )* |      |          | tops: tons per acre<br>( $\pm 0.501$ )* |       |           |
|------------|---|------|----------|---|-------|-----------|
|            | 0.4   | 60.3 | 55.3     | 57.8                                    | 10.21 | 9.35      |
| 0.8        | 67.4  | 65.2 | 66.3     | 12.45                                   | 11.48 | 11.96     |
| Mean       | 63.8  | 60.2 | 62.0     | 11.33                                   | 10.41 | 10.87     |
|            | (± 0.95)  |      |          | (± 0.415)                               |       |           |
| Difference | 7.1   | 9.9  | 8.5      | 2.24                                    | 2.13  | 2.18      |
|            | (± 1.56)  |      | (± 1.10) | (± 0.560)                               |       | (± 0.396) |

\* for use in comparisons other than vertical.

56/Bg/1.4

| N: cwt per acre<br>including basal | Irrigation |       |      | Irrigation |       |      |
|------------------------------------|------------|-------|------|------------|-------|------|
|                                    | 0 & A      | B & C | Mean | 0 & A      | B & C | Mean |

Barley

|            | grain: cwt per acre |      |                     | straw: cwt per acre |      |      |
|------------|---------------------|------|---------------------|---------------------|------|------|
|            | $(\pm 1.16)^*$      |      |                     |                     |      |      |
| 0.2        | 24.6                | 29.1 | 26.8                | 20.2                | 30.6 | 25.4 |
| 0.4        | 31.2                | 34.7 | 32.9                | 26.4                | 41.2 | 33.8 |
| Mean       | 27.9                | 31.9 | 29.9                | 23.3                | 35.9 | 29.6 |
| Difference | 6.6<br>$(\pm 0.98)$ | 5.6  | 6.1<br>$(\pm 0.89)$ | 6.2                 | 10.6 | 8.4  |

| Level of N  | Irrigation     |      |      |      | Mean              |
|---|----------------|------|------|------|-------------------|
|   | 0              | A    | B    | C    |                   |
| Cut grass, dry matter: cwt per acre (Total of 6 cuts) |                |      |      |      |                   |
|   | $(\pm 3.61)^*$ |      |      |      |                   |
| 1   | 55.7           | 61.8 | 63.8 | 72.0 | 63.3              |
| 2   | 81.4           | 83.0 | 84.3 | 99.7 | 87.1              |
| Mean  | 68.6           | 72.4 | 74.1 | 85.8 | 75.2              |
| Difference  | 25.7           | 21.2 | 20.5 | 27.7 | 23.8 $(\pm 1.53)$ |

\*for use in comparisons other than vertical.

Cut grass. Levels of N

- 1 = 0.15 cwt N per acre in spring and after each cut except the last.
- 2 = 0.30 cwt N per acre in spring and after each cut except the last.

56/Ca/1.1

#### WINTER WHEAT

The effects of crop sequences, varieties, seed rates, nitrogen and sulphuric acid spray on the incidence of Eyespot (Cercospora herpotrichoides) - Long Hoos I, II and III, 1956. The 3rd (final) year.

Details of treatments and crop sequences etc., are as stated in "Results of the Field Experiments" 1954, Section 54/Ca/2.1, modified as follows:

1. Seed rates in 1955 and 1956,  
Holdfast:  $1\frac{1}{2}$ , 3 bushels per acre  
Cappelle: 2, 4 bushels per acre.
2. In 1956 only, 8 of the 16 blocks were sprayed with sulphuric acid ( $12\frac{1}{2}\%$  BOV in 80 gallons per acre).

Area of each plot: 0.0146 acres. Area harvested: 0.0095 acres.

Basal dressing in spring: 1 cwt per acre of compound granular fertilizer (12% N, 12%  $P_2O_5$ , 15%  $K_2O$ ) combine drilled with seed.

Note: In 1956 each plot was reduced in length to allow the growing of a small area of winter oats but these failed and were abandoned.

Cultivations, etc.: Ploughed: Oct 5, 1955. Seed combine drilled: Oct 26. Acid spray applied: Mar 14, 1956. Nitrochalk applied: Mar 16, May 10. Sprayed with MCPA, 3 pints in 40 gallons per acre: May 15. Combine harvested: Sept 1.

Standard errors per plot: Grain (at 85% dry matter): cwt per acre.

Block: 1.27 cwt per acre or 4.0% (6 d.f.)

Plot: 1.83 cwt per acre or 5.8% (23 d.f.)

- Note
- (1) Germination on the Holdfast plots was very uneven.
  - (2) Records of incidence of disease (Eyespot and Take-All), estimates of % area lodged, and counts of plant, shoot and straw numbers were made.
  - (3) In 1955 the potatoes (Majestic) received 10 tons dung and 12 cwt compound fertilizer (7% N, 7%  $P_2O_5$ ,  $10\frac{1}{2}\%$   $K_2O$ ) per acre.

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

| Previous rotation<br>1954 | Spray Sulphuric acid |         | Seed Rate<br>Single Double | Diff.            | N:                   |      | Diff.            | Mean             |
|---------------------------|----------------------|---------|----------------------------|------------------|----------------------|------|------------------|------------------|
|                           | None                 | (±1.10) |                            |                  | cwt per acre<br>0.46 | 0.93 |                  |                  |
| <u>Holdfast</u>           |                      |         | (±1.01)*                   | (± 1.29)         | (±1.01)*             |      | (± 1.29)         | (± 0.78)         |
| Wheat                     | 18.8                 | 18.6    | 18.5 18.9                  | +0.4             | 16.0 21.4            |      | +5.4             | 18.7             |
| Potatoes                  | 24.2                 | 23.3    | 21.6 25.8                  | +4.2             | 21.2 26.2            |      | +5.0             | 23.7             |
| Wheat                     | 29.6                 | 25.7    | 23.8 31.6                  | +7.8             | 26.0 29.4            |      | +3.4             | 27.7             |
| Beans                     | 37.0                 | 32.7    | 31.6 38.2                  | +6.6             | 34.6 35.2            |      | +0.6             | 34.9             |
| Mean                      | 27.4                 | 25.1    | 23.9 28.6                  | +4.7<br>(± 0.65) | 24.4 28.0            |      | +3.6<br>(± 0.65) | 26.2<br>(± 0.32) |
|                           |                      |         |                            |                  | (±0.65)**            |      | (± 1.10)         |                  |
|                           |                      |         | Seed rate                  | Single           | 22.4                 | 25.3 | +2.9             |                  |
|                           |                      |         | Double                     | Double           | 26.5                 | 30.8 | +4.3             |                  |
|                           |                      |         | Difference (±1.10)         |                  | +4.1                 | +5.5 | +1.4             | (± 1.56)         |
| <u>Cappelle</u>           |                      |         | (±1.01)*                   | (± 1.29)         | (±1.01)*             |      | (± 1.29)         | (± 0.78)         |
| Wheat                     | 24.2                 | 20.8    | 23.6 21.4                  | -2.2             | 20.4 24.7            |      | +4.3             | 22.5             |
| Potatoes                  | 35.6                 | 36.0    | 34.7 36.9                  | +2.2             | 31.2 40.4            |      | +9.2             | 35.8             |
| Wheat                     | 39.6                 | 39.3    | 36.6 42.3                  | +5.7             | 37.6 41.3            |      | +3.7             | 39.5             |
| Beans                     | 49.3                 | 49.8    | 47.0 52.1                  | +5.1             | 48.4 50.7            |      | +2.3             | 49.6             |
| Mean                      | 37.2                 | 36.5    | 35.5 38.2                  | +2.7<br>(± 0.65) | 34.4 39.3            |      | +4.9<br>(± 0.65) | 36.8<br>(± 0.32) |
|                           |                      |         | Seed rate                  | Single           | (±0.65)**            |      | (± 1.10)         |                  |
|                           |                      |         | Double                     | Double           | 33.0 38.0            |      | +5.0             |                  |
|                           |                      |         | Difference (±1.10)         |                  | 35.8 40.6            |      | +4.8             |                  |
|                           |                      |         |                            |                  | +2.8                 | +2.6 | -0.2             | (± 1.56)         |

Mean dry matter % as harvested: 73.8  
\* for use in comparisons other than horizontal  
\*\* for use in diagonal comparisons only

Note. The standard errors are for use only in comparisons within the same variety.



56/Ga/2

WINTER WHEAT

Control of wheat bulb fly by insecticides - Pennell's Piece 1956.

Design: 5 randomized blocks of 6 plots each.

Area of each plot: 0.00643 acres. Area harvested: 0.00621 acres.

Treatments: Insecticides:-

- None (2 plots per block). (0)
- 4% Dieldrin dust at 1 cwt per acre combine drilled with seed. (1)
- 4% Dieldrin dust at 1 cwt per acre broadcast on surface. (2)
- Sprayed early with Parathion 0.1% v/v at 100 gallons per acre. (3)
- Sprayed late with Parathion 0.1% v/v at 100 gallons per acre. (4)

Basal dressing: 3 cwt 'Nitro-Chalk' per acre.

Note: all seed dressed with organo-mercurial fungicide.

Cultivations, etc.:

Ploughed: Sept 5, 1955. Seed drilled at 2 bushels per acre: Nov 1.  
 Dieldrin dust broadcast: Feb 16, 1956. Sprayed with Parathion:  
 '3' plots - Mar 8, '4' plots - Apr 12. 'Nitro-Chalk' applied:  
 Apr 30. Combine harvested: Sept 4. Variety: Cappelle. Previous  
 crop: Bare fallow.

Standard error per plot:

Grain (at 85% dry matter): 4.29 cwt per acre or 9.2% (21 d.f.)

Counts of numbers of plants, tillers, damaged tillers and of wheat bulb fly larvae were made.

Summary of Results

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

|                         | 0                   | Insecticides |      |      |      | Mean |
|-------------------------|---------------------|--------------|------|------|------|------|
|                         |                     | 1            | 2    | 3    | 4    |      |
| Mean ( $\pm 1.92$ )     | 43.9 <sup>(1)</sup> | 47.3         | 52.5 | 46.1 | 47.2 | 46.8 |
| Increase ( $\pm 2.35$ ) |                     | 3.4          | 8.6  | 2.2  | 3.3  |      |
| (1) $\pm 1.36$          |                     |              |      |      |      |      |

Mean dry matter % as harvested: 69.8.

56/Ca/3.1

### WINTER WHEAT

Seed rates in relation to control of wheat bulb fly - Long Hoos VII  
the 3rd (final) year.

Design: 4 4x4 squares with treatments on rows in 1954 and on columns  
in 1955.

Area of each plot: 0.0151 acres. Area harvested: 0.0050 acres.

Treatments to spring wheat 1954 and to winter wheat 1955.

Bare fallow.

Seed rates:  $\frac{1}{3}$ ; 1; 3 bushels per acre.

Basal dressings per acre for 1956 crop: 1 cwt compound granular  
fertilizer (12% N, 12% P<sub>2</sub>O<sub>5</sub>, 15% K<sub>2</sub>O) combine drilled with seed;  
0.8 cwt N as "Nitro-Chalk".

Cultivations, etc.:

Ploughed: Sept 14, 1955. Seed combine drilled (all at  $2\frac{3}{4}$  bushels  
per acre): Oct 28. 'Nitro-Chalk' applied: Apr 30, 1956.

Combine harvested: Aug 31. Variety: Cappelle.

Note: seed treated with organo-mercurial fungicide only.

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

Row: 1.94 cwt per acre or 5.7% (9 d.f.)

Column: 2.65 cwt per acre or 7.8% (9 d.f.)

Plot: 2.03 cwt per acre or 6.0% (27 d.f.)

Records were made of:

Number of wheat bulb fly larvae, weight per ear, number of grains  
per ear and plant number.

56/Ga/3.2

Summary of Results

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

| 1954 Treatments     |               | 1955 Treatments     |                                |      |      | Mean           |
|---------------------|---------------|---------------------|--------------------------------|------|------|----------------|
|                     |               | Fallow              | Seed rate:<br>bushels per acre |      |      |                |
|                     |               |                     | $\frac{1}{3}$                  | 1    | 3    |                |
|                     |               | (1) (2) (3) and (4) |                                |      |      | ( $\pm 0.97$ ) |
| Seed rate:          | Fallow        | 50.4                | 37.1                           | 37.7 | 36.2 | 40.4           |
| bushels             | $\frac{1}{3}$ | 47.7                | 30.8                           | 28.4 | 23.3 | 32.6           |
| per acre            | 1             | 47.3                | 28.1                           | 27.8 | 20.5 | 30.9           |
|                     | 3             | 47.5                | 31.1                           | 26.6 | 23.1 | 32.1           |
| Mean ( $\pm 1.32$ ) |               | 48.2                | 31.8                           | 30.1 | 25.8 | 34.0           |

- (1)  $\pm 1.59$  for use in horizontal comparisons only.
- (2)  $\pm 1.31$  for use in vertical comparisons only.
- (3)  $\pm 1.79$  for use in diagonal comparisons only.
- (4)  $\pm 1.01$  for use in interaction comparisons only.

Mean dry matter % as harvested: 74.9

56/Ca/4.1

### WINTER WHEAT

Varieties, seed rates, levels and times of application of N - Woburn, Roadpiece 1956, the 3rd year.

Design: 4 randomized blocks of 8 plots each, certain high order interactions being confounded with block differences. In addition each block contained 2 plots with no nitrogen, the variety  $\times$  seed rate interaction being confounded.

Area of each plot: 0.0182 acres. Area harvested: 0.0138 acres.

Treatments: All combinations of:-

Varieties: Holdfast; Cappelle.

Seed rates: Holdfast,  $1\frac{1}{2}$ ; 3 bushels per acre.

Cappelle, 2; 4 bushels per acre.

Nitrogen: 0.5; 1.0 cwt N per acre applied as 'Nitro-Chalk'.

Time of application of N: half dressing in March and again in May; whole dressing mid March; mid April; mid May.

Basal dressing: 1 cwt per acre compound granular fertilizer (12% N, 12% P<sub>2</sub>O<sub>5</sub>, 15% K<sub>2</sub>O) combine drilled with seed.

Cultivations, etc.: Ploughed: Sept 29, 1955. Combine drilled: Oct 26. March top dressing applied: Mar 8, 1956. April top dressing applied: Apr 12. All plots sprayed with DNOC at 8 lb in 90 gallons per acre: May 1. May top dressing applied: May 17. Combine harvested: Sept 13. Previous crop: Wheat.

Standard error per plot.

Grain (at 85% dry matter): 1.82 cwt per acre or 17.6% (12 d.f.)

Note (1) The experiment is a repetition on the same plots of the ones carried out in 1955 and 1954 (see "Results of the Field Experiments" 55/Ca/4 and 54/Ca/7.)

(2) The crop was severely and irregularly infested with weeds particularly twitch (*Agrostis gigantea*) and Mayweed (*Matricaria*).

(3) Records of incidence of disease (Take-all and Eyespot) and weeds and counts of plant, shoot and ear numbers were made.

56/Ca/4.2

Summary of Results

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

|                    | T <sub>1</sub> | T <sub>2</sub> | T <sub>3</sub> | T <sub>4</sub> | Mean           |         |
|--------------------|----------------|----------------|----------------|----------------|----------------|---------|
| Mean (±0.65)       | 12.1           | 12.8           | 14.7           | 6.9            | 11.6           |         |
|                    | (±0.91)        |                |                |                |                |         |
| V <sub>1</sub>     | 10.7           | 10.2           | 12.8           | 6.8            | 10.1           |         |
| V <sub>2</sub>     | 13.5           | 15.5           | 16.5           | 6.9            | 13.1           |         |
| Difference (±1.29) | +2.8           | +5.3           | +3.7           | +0.1           | +3.0 (±0.65)   |         |
| R <sub>1</sub>     | 10.1           | 12.0           | 11.9           | 4.7            | 9.7            |         |
| R <sub>2</sub>     | 14.0           | 13.7           | 17.5           | 9.0            | 13.6           |         |
| Difference (±1.29) | +3.9           | +1.7           | +5.6           | +4.3           | +3.9 (±0.65)   |         |
| N <sub>1</sub>     | 11.2           | 10.9           | 10.6           | 7.8            | 10.1           |         |
| N <sub>2</sub>     | 12.9           | 14.8           | 18.7           | 5.9            | 13.1           |         |
| Difference (±1.29) | +1.7           | +3.9           | +8.1           | -1.9           | +3.0 (±0.65)   |         |
|                    | R <sub>1</sub> | R <sub>2</sub> | N <sub>0</sub> | N <sub>1</sub> | N <sub>2</sub> | Mean    |
| Mean               |                |                | (±0.65)        | (±0.46)        |                |         |
|                    |                |                | 5.3            | 10.1           | 13.1           | 10.3    |
|                    | (±0.65)        |                | (±0.91)        | (±0.65)        |                | (±0.41) |
| V <sub>1</sub>     | 9.0            | 11.2           | 5.1            | 8.7            | 11.6           | 9.1     |
| V <sub>2</sub>     | 10.3           | 15.9           | 5.5            | 11.6           | 14.6           | 11.6    |
| R <sub>1</sub>     |                |                | 5.3            | 8.4            | 10.9           | 8.8     |
| R <sub>2</sub>     |                |                | 5.3            | 11.8           | 15.3           | 11.9    |

Mean dry matter % as harvested: 78.7

Treatments

V<sub>1</sub> Holdfast  
V<sub>2</sub> Cappelle

R<sub>1</sub>, R<sub>2</sub> 1½, 3 bushels per acre  
R<sub>1</sub>, R<sub>2</sub> 2, 4 bushels per acre

N<sub>0</sub> No N  
N<sub>1</sub> 0.46 cwt N per acre  
N<sub>2</sub> 0.93 cwt N per acre

T<sub>1</sub> 'Nitro-Chalk' half in March half in May  
T<sub>2</sub> 'Nitro-Chalk' all in mid March  
T<sub>3</sub> 'Nitro-Chalk' all in mid April  
T<sub>4</sub> 'Nitro-Chalk' all in mid May

The V × R table does not include the plots receiving no nitrogen.

56/Ca/5.1

### SPRING WHEAT

Rates and times of application of nitrogen - Rothamsted (R) Little Hoos and Woburn (W) Stackyard, Series C.

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

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

Treatments: None, and all combinations of:-

Nitrogen: 0.3; 0.6; 0.9 cwt N per acre as 'Nitro-Chalk'.

Times of application: All in seed bed (S); all as early top dressing (E); all as late top dressing (L);  $\frac{1}{2}$  S &  $\frac{1}{2}$  E;  $\frac{1}{2}$  S &  $\frac{1}{2}$  L;  $\frac{1}{2}$  E &  $\frac{1}{2}$  L;  $\frac{1}{3}$  S,  $\frac{1}{3}$  E &  $\frac{1}{3}$  L.

Basal dressing:

Rothamsted: 1 cwt superphosphate per acre combine drilled with seed.

Woburn: 1 cwt compound fertilizer (16% P<sub>2</sub>O<sub>5</sub>, 16% K<sub>2</sub>O) per acre combine drilled with seed.

Cultivations, etc.:

Little Hoos (R). Ploughed: Oct 14, 1955 and Jan 24, 1956. Seed bed 'Nitro-Chalk' applied, seed combine drilled at 2 $\frac{3}{4}$  bushels per acre: Mar 17. Early 'Nitro-Chalk' top dressing applied: Apr 16. Sprayed with DNOC 6 lb in 90 gallons per acre: May 4. Late 'Nitro-Chalk' top dressing applied: May 17. Combine harvested: Sept 20. Variety: Koga II. Previous crop: Potatoes.

Stackyard (W). Ploughed: Nov 12, 1955. Seed bed 'Nitro-Chalk' applied: Mar 14, 1956. Seed combine drilled at 3 bushels per acre: Mar 16. Early 'Nitro-Chalk' top dressing applied: Apr 16. Late 'Nitro-Chalk' top dressing applied: May 16. Sprayed with MCPA, 3 pints in 20 gallons per acre: May 31. Combine harvested: Sept 12. Variety: Peko. Previous crop: Wheat.

Standard errors per plot. Grain (at 85% dry matter): cwt per acre.

Little Hoos (R): 1.87 cwt per acre or 5.7% (27 d.f.)

Stackyard (W): 1.53 cwt per acre or 7.1% (27 d.f.)

Summary of Results

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

Rothamsted Little Hoos

| N: cwt per acre | S    | E    | Time of application |                            |                            |                            | $\frac{1}{3}S\frac{1}{3}E\frac{1}{3}L$ | Mean                |
|-----------------|------|------|---------------------|----------------------------|----------------------------|----------------------------|--|---------------------|
|                 |      |      | L                   | $\frac{1}{2}S\frac{1}{2}E$ | $\frac{1}{2}S\frac{1}{2}L$ | $\frac{1}{2}E\frac{1}{2}L$ |  |                     |
|                 |      |      | (±1.41)             |                            |                            |                            | (±0.94)                                | (±0.47)             |
| None            |      |      |                     |                            |                            |                            |  | 26.3 <sup>(1)</sup> |
| 0.3             | 32.6 | 31.0 | 33.1                | 33.7                       | 33.1                       | 30.7                       | 31.6                                   | 32.2                |
| 0.6             | 35.6 | 36.4 | 34.4                | 31.0                       | 33.4                       | 32.6                       | 34.3                                   | 34.0                |
| 0.9             | 34.2 | 33.3 | 32.9                | 34.4                       | 33.5                       | 32.5                       | 36.0                                   | 34.1                |
| Mean (±0.78)    | 34.1 | 33.6 | 33.5                | 33.0                       | 33.3                       | 31.9                       | 34.0 <sup>(2)</sup>                    | 32.9                |

(1) ±0.94      (2) ±0.54

Mean dry matter % as harvested: 80.2

Woburn Stackyard Field

| N: cwt per acre | S    | E    | Time of application |                            |                            |                            | $\frac{1}{3}S\frac{1}{3}E\frac{1}{3}L$ | Mean                |
|-----------------|------|------|---------------------|----------------------------|----------------------------|----------------------------|--|---------------------|
|                 |      |      | L                   | $\frac{1}{2}S\frac{1}{2}E$ | $\frac{1}{2}S\frac{1}{2}L$ | $\frac{1}{2}E\frac{1}{2}L$ |  |                     |
|                 |      |      | (±1.15)             |                            |                            |                            | (±0.77)                                | (±0.38)             |
| None            |      |      |                     |                            |                            |                            |  | 11.4 <sup>(1)</sup> |
| 0.3             | 19.6 | 18.0 | 18.3                | 19.4                       | 18.5                       | 20.7                       | 20.6                                   | 19.4                |
| 0.6             | 23.6 | 21.6 | 20.7                | 24.9                       | 24.0                       | 22.4                       | 25.0                                   | 23.4                |
| 0.9             | 23.0 | 22.0 | 22.8                | 25.8                       | 25.0                       | 23.8                       | 25.1                                   | 24.1                |
| Mean (±0.64)    | 22.1 | 20.5 | 20.6                | 23.4                       | 22.5                       | 22.3                       | 23.5 <sup>(2)</sup>                    | 21.5                |

(1) ±0.77      (2) ±0.44

Mean dry matter % as harvested: 68.0

Time of application

- S In seedbed.
- E Early top dressing.
- L Late top dressing.

56/Ca/6

SPRING WHEAT

Varieties and levels of nitrogen - Little Hoos 1956.

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

Area of each sub plot: 0.0101 acres. Area harvested: 0.0067 acres.

Treatments: All combinations of:

Whole plots. Varieties: Atle (1); Atson (2); Bersee (3),  
Koga II (4); Miana (5); Peko (6); Progress (7); Svenno (8).  
Sub plots. Nitrogen: 0.3; 0.6 cwt N per acre applied as  
'Nitro-Chalk'.

Basal dressing: 1 cwt superphosphate per acre combine drilled with seed.

Cultivations, etc.: Ploughed: Oct 14, 1955 and again Jan 24, 1956.  
'Nitro-Chalk' applied, seed combine drilled at  $2\frac{3}{4}$  bushels per acre: Mar 19. Sprayed with DNOC at 6 lb in 90 gallons: May 4.  
Combine harvested: Sept 20. Previous crop: Potatoes.

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

Whole plot: 1.74 cwt per acre or 5.7% (14 d.f.)  
Sub plot: 1.76 cwt per acre or 5.8% (16 d.f.)

Summary of Results

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

| N: cwt per acre    | Variety  |      |      |      |      |      |      |      | Mean    |
|--------------------|----------|------|------|------|------|------|------|------|---------|
|                    | 1        | 2    | 3    | 4    | 5    | 6    | 7    | 8    |         |
|                    | (±1.24)* |      |      |      |      |      |      |      |         |
| 0.3                | 29.5     | 32.2 | 24.6 | 33.5 | 25.3 | 34.3 | 30.6 | 28.7 | 29.8    |
| 0.6                | 29.9     | 33.8 | 26.9 | 33.2 | 26.6 | 33.5 | 31.2 | 32.0 | 30.9    |
| Mean (±1.01)       | 29.7     | 33.0 | 25.8 | 33.4 | 25.9 | 33.9 | 30.9 | 30.3 | 30.4    |
| Difference (±1.43) | +0.4     | +1.6 | +2.3 | -0.3 | +1.3 | -0.8 | +0.6 | +3.3 | +1.1    |
|                    |          |      |      |      |      |      |      |      | (±0.51) |

\* for use in comparisons other than vertical.

Mean dry matter % as harvested: 80.5



56/Cb/1.1

## BARLEY

Rates and times of application of nitrogen - Rothamsted (R) Little Hoos and Woburn (W) Stackyard, Series C.

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

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

Treatments: None and all combinations of:-

Nitrogen:  $N_1$ ;  $N_2$ ;  $N_3$  applied as 'Nitro-Chalk'.

Times of application: All in seedbed (S); all as early top dressing (E); all as late top dressing (L);  $\frac{1}{2}$  S &  $\frac{1}{2}$  E;  $\frac{1}{2}$  S &  $\frac{1}{2}$  L;  $\frac{1}{2}$  E &  $\frac{1}{2}$  L;  $\frac{1}{3}$  S,  $\frac{1}{3}$  E &  $\frac{1}{3}$  L.

Where  $N_1$ ;  $N_2$ ;  $N_3$  =

Little Hoos (R): 0.23; 0.46; 0.69 cwt N per acre.

Stackyard (W): 0.3; 0.6; 0.9 cwt N per acre.

Basal dressing:

Rothamsted: 1 cwt superphosphate per acre combine drilled with seed.

Woburn: Ground chalk to part area. 1 cwt compound fertilizer (16%  $P_2O_5$ , 16%  $K_2O$ ) per acre combine drilled with seed.

Cultivations, etc.:

Little Hoos (R). Ploughed: Oct 14, 1955 and Jan 24, 1956. Seed combine drilled at 2 bushels per acre: Mar 17. Seed bed 'Nitro-Chalk' applied: Mar 19. Early 'Nitro-Chalk' top dressing applied: Apr 16. Sprayed with DNOC 6 lb in 90 gallons per acre: May 4. Late 'Nitro-Chalk' top dressing applied: May 17. Combine harvested: Sept 20. Variety: Herta. Previous crop: Potatoes.

Stackyard (W). Ploughed: Nov 12, 1955. Seed bed 'Nitro-Chalk' applied; seed combine drilled at 2 bushels per acre: Mar 16, 1956. Early 'Nitro-Chalk' top dressing applied: Apr 12. Late 'Nitro-Chalk' top dressing: May 16. Sprayed with MCPA, 3 pints in 20 gallons per acre: May 31. Combine harvested: Sept 8. Variety: Herta. Previous crop: Wheat.

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

Little Hoos (R): 2.50 cwt per acre or 6.3% (27 d.f.)

Stackyard (W): 2.56 cwt per acre or 11.8% (27 d.f.)

56/Cb/1.2

Summary of Results

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

Rothamsted Little Hoos

| N: cwt per acre | Time of application |      |      |                            |                            |                            |  | Mean                |
|-----------------|---------------------|------|------|----------------------------|----------------------------|----------------------------|--|---------------------|
|                 | S                   | E    | L    | $\frac{1}{2}S\frac{1}{2}E$ | $\frac{1}{2}S\frac{1}{2}L$ | $\frac{1}{2}E\frac{1}{2}L$ | $\frac{1}{3}S\frac{1}{3}E\frac{1}{3}L$ |                     |
|                 | (±1.88)             |      |      |                            |                            |                            | (±1.25)                                | (±0.63)             |
| None            |                     |      |      |                            |                            |                            |  | 32.8 <sup>(1)</sup> |
| 0.23            | 37.1                | 39.6 | 36.8 | 38.9                       | 39.5                       | 38.9                       | 38.3                                   | 38.4                |
| 0.46            | 42.7                | 42.4 | 39.8 | 41.3                       | 41.0                       | 42.2                       | 39.3                                   | 41.0                |
| 0.69            | 41.9                | 38.1 | 40.7 | 41.7                       | 40.1                       | 42.0                       | 41.7                                   | 41.0                |
| Mean (±1.05)    | 40.6                | 40.0 | 39.1 | 40.6                       | 40.2                       | 41.1                       | 39.7 <sup>(2)</sup>                    | 39.6                |

(1) ±1.25      (2) ±0.72

Mean dry matter % as harvested: 79.8

Woburn Stackyard Field

| N: cwt per acre | Time of application |      |      |                            |                            |                            |  | Mean               |
|-----------------|---------------------|------|------|----------------------------|----------------------------|----------------------------|--|--------------------|
|                 | S                   | E    | L    | $\frac{1}{2}S\frac{1}{2}E$ | $\frac{1}{2}S\frac{1}{2}L$ | $\frac{1}{2}E\frac{1}{2}L$ | $\frac{1}{3}S\frac{1}{3}E\frac{1}{3}L$ |                    |
|                 | (±1.93)             |      |      |                            |                            |                            | (±1.28)                                | (±0.64)            |
| None            |                     |      |      |                            |                            |                            |  | 9.6 <sup>(1)</sup> |
| 0.3             | 16.4                | 17.2 | 19.0 | 17.7                       | 18.5                       | 18.9                       | 19.8                                   | 18.4               |
| 0.6             | 22.2                | 24.9 | 21.4 | 20.8                       | 24.4                       | 26.2                       | 22.4                                   | 23.1               |
| 0.9             | 26.7                | 26.8 | 28.6 | 27.0                       | 25.6                       | 23.2                       | 28.1                                   | 26.8               |
| Mean (±1.07)    | 21.8                | 23.0 | 23.0 | 21.8                       | 22.9                       | 22.8                       | 23.4 <sup>(2)</sup>                    | 21.8               |

(1) ±1.28      (2) ±0.74

Mean dry matter % as harvested: 77.3

Time of application

- S In seedbed
- E Early top dressing
- L Late top dressing

56/Cc/1

SPRING OATS

Varieties and levels of nitrogen - Pastures 1956.

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

Area of each sub plot: 0.0101 acres. Area harvested: 0.0067 acres.

Treatments: All combinations of:

Whole plots. Varieties: Blenda (1); Deva (2); Flamande (3);  
Milford (4); Opus (5); Palu (6); Sun II (7); de Wattines (8).  
Sub plots. Nitrogen: None; 0.36 cwt N per acre applied as  
'Nitro-Chalk'.

Basal dressing: 4 cwt compound granular fertilizer (9% N, 9% P<sub>2</sub>O<sub>5</sub>, 15% K<sub>2</sub>O) per acre.

Cultivations, etc.: Ploughed: Nov 15 - Dec 3, 1955. Basal fertilizer applied: Mar 13, 1956. 'Nitro-Chalk' applied: Mar 20. Seed drilled at 3½ bushels per acre: Mar 22. Grass seed undersown at 30 lb per acre: Apr 26. Combine harvested: Sept 15. Previous crop: Barley.

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

Whole plot: 1.79 cwt per acre or 7.5% (14 d.f.)  
Sub plot: 1.19 cwt per acre or 5.0% (16 d.f.)

Summary of Results

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

| N: cwt per acre<br>(including basal) | Variety  |      |      |      |      |      |      |      | Mean    |
|--------------------------------------|----------|------|------|------|------|------|------|------|---------|
|                                      | 1        | 2    | 3    | 4    | 5    | 6    | 7    | 8    |         |
|                                      | (±1.14)* |      |      |      |      |      |      |      |         |
| 0.36                                 | 22.9     | 24.2 | 26.9 | 12.9 | 19.1 | 25.6 | 25.4 | 26.5 | 22.9    |
| 0.72                                 | 23.6     | 25.6 | 26.9 | 14.1 | 20.2 | 30.2 | 25.3 | 29.9 | 24.5    |
| Mean (±1.03)                         | 23.2     | 24.9 | 26.9 | 13.5 | 19.7 | 27.9 | 25.3 | 28.2 | 23.7    |
| Difference (±0.97)                   | +0.7     | +1.4 | 0.0  | +1.2 | +1.1 | +4.6 | -0.1 | +3.4 | +1.6    |
|                                      |          |      |      |      |      |      |      |      | (±0.34) |

\* for use in comparisons other than vertical.

Mean dry matter % as harvested: 75.2

56/Ca/1

SPRING BEANS

The control of Aphids (Aphis Fabae) by time of sowing and spraying - Great Knott I 1956.

Design: 4 x 4 Latin square, plots being split into 4 for the application of sprays.

Area of each sub plot: 0.0194 acres. Area harvested: 1st sowing, 0.0097; later sowings, 0.0194 acres.

Treatments. All combinations of:-

Whole plots. Times of sowing: Mar 10 (A); Apr 3 (B); Apr 24 (C); May 15 (D).

Sub plots. Spray: None; June 22; July 11; June 22 and July 11.

The insecticide spray was Metasystox, 12 oz. in 80 gallons per acre.

Basal dressing: 7 cwt compound granular fertilizer (10% P<sub>2</sub>O<sub>5</sub>, 20% K<sub>2</sub>O) per acre.

Cultivations, etc.: Ploughed: Nov 26, 1955 and Jan 18, 1956. Basal fertilizer applied: Mar 6. Seed drilled at 200 lb per acre: Mar 10, Apr 3, Apr 24, May 15. Sprayed with miscible DDT: June 2. Sprayed with Metasystox, early application: June 22. Late spray application: July 11. Combine harvested: A - Oct 5; B & C - Oct 15; D - Oct 29. Variety: Spring Tick. Previous crop: Barley.

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

Whole plot: 1.08 cwt per acre or 4.8% (6 d.f.)

Sub plot: 1.24 cwt per acre or 5.4% (36 d.f.)

Note: Counts of aphids were made at weekly intervals from early June to end of September: the infestation was very light on all plots.

Summary of Results

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

| Time of Spraying   | Time of Sowing |       |        |        | Mean     |
|--|----------------|-------|--------|--------|----------|
|  | Mar 10         | Apr 3 | Apr 24 | May 15 |          |
|  | (1) & (2)      |       |        |        | (± 0.31) |
| None   | 26.7           | 26.9  | 20.9   | 13.7   | 22.1     |
| June 22  | 28.5           | 29.5  | 21.6   | 13.9   | 23.4     |
| July 11  | 27.6           | 28.9  | 22.1   | 12.9   | 22.9     |
| June 22 and July 11  | 26.1           | 28.3  | 20.7   | 14.7   | 22.4     |
| Mean (±0.54)   | 27.2           | 28.4  | 21.3   | 13.8   | 22.7     |
| (1) ±0.62 for use in vertical and interaction comparisons. |                |       |        |        |          |
| (2) ±0.76 for use in horizontal and diagonal comparisons.  |                |       |        |        |          |
| Mean dry matter % as harvested                             | 72.3           | 70.9  | 54.6   | 43.1   | 60.2     |

56/Ca/2.1

### SPRING BEANS

Control of weeds by spraying and cultivations - Great Field 1 1956.

Design: 4 randomized blocks of 7 plots each, 2 blocks being sprayed and 2 unsprayed.

Area of each plot: 0.0194 acres. Area harvested: 0.0139 acres.

Treatments: All combinations of:-

Spraying (on blocks): None; DNEP 5 pints in 80 gallons per acre.

Treatment cultivations:

|                                | <u>Additional cultivations</u> |     |
|--------------------------------|--------------------------------|-----|
| With inter-row cultivations    | None                           | (1) |
|                                | Harrowed once                  | (2) |
|                                | Harrowed three times           | (3) |
|                                | Mechanical weeder once         | (4) |
|                                | Mechanical weeder three times  | (5) |
| Without inter-row cultivations | Harrowed as required           | (6) |
|                                | Mechanical weeder as required  | (7) |

Basal dressing: 6 cwt compound granular fertilizer (10% P<sub>2</sub>O<sub>5</sub>, 20% K<sub>2</sub>O) per acre.

Cultivations, etc.: Ploughed: Nov 15, 1955. Basal fertilizer applied: Mar 13, 1956. Seed drilled at 200 lb per acre: Mar 14.

Appropriate blocks sprayed with DNEP, 5 pints in 80 gallons per acre: May 7. Inter-row cultivated: Treatments (2), (3), (4), (5) - May 23.

(1) - June 6. Combine harvested: Oct 12. Variety: Spring Tick.

Previous crop: Barley.

Additional treatment cultivations:

(2) and (4): Apr 27.

(3), (5) and (6): Apr 27, May 4, May 9.

(7): Apr 27, May 4 (twice), May 9.

Standard error per plot:

Grain (at 85% dry matter): 1.52 cwt per acre or 7.1% (12 d.f.)

56/cd/2.2

Summary of Results

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

| Spray                      | Treatment cultivations |      |      |      |      |      |      | Mean |
|----------------------------|------------------------|------|------|------|------|------|------|------|
|                            | 1                      | 2    | 3    | 4    | 5    | 6    | 7    |      |
|                            | (±1.07)*               |      |      |      |      |      |      |      |
| None                       | 21.3                   | 20.6 | 18.8 | 17.9 | 20.7 | 21.1 | 19.1 | 19.9 |
| DNBP                       | 20.6                   | 23.2 | 23.2 | 25.0 | 22.7 | 22.5 | 21.7 | 22.7 |
| Mean (±0.76)               | 21.0                   | 21.9 | 21.0 | 21.4 | 21.7 | 21.8 | 20.4 | 21.3 |
| Diff. (±1.52) <sup>+</sup> | -0.7                   | +2.6 | +4.4 | +7.1 | +2.0 | +1.4 | +2.6 | +2.8 |

\*for use in horizontal comparisons only.

<sup>+</sup>for use in the comparison of two differences only.

Mean dry matter % as harvested: 73.9

Treatment cultivations:

- |                                   |                                |
|-----------------------------------|--------------------------------|
| (1) None                          | With inter-row cultivations    |
| (2) Harrowed once                 | " " " " "                      |
| (3) Harrowed three times          | " " " " "                      |
| (4) Mechanical weeder once        | " " " " "                      |
| (5) Mechanical weeder three times | " " " " "                      |
| (6) Harrowed as required          | Without inter-row cultivations |
| (7) Mechanical weeder as required | " " " " " "                    |

56/Oa/3

SPRING BEANS

Flower drop - hormone sprays - Great Field I 1956.

Design: 4 randomized blocks of 6 plots each.

Area of each plot: 0.0064 acres. Area harvested: 0.0046 acres.

Treatments: Hormone sprays

- None (2 plots per block) (0)
- 2; 4 applications of 4-chlorophenoxyacetic acid (1) & (2)
- 2; 4 applications of  $\alpha$ (2, 4, 5 trichlorophenoxy) propionic acid (3) & (4)

The sprays were applied at a concentration of 5 p.p.m.

Basal dressing: 6 cwt compound granular fertilizer (10% P<sub>2</sub>O<sub>5</sub>, 20% K<sub>2</sub>O) per acre.

Cultivations, etc.: Ploughed: Nov 10 - 15, 1955. Basal fertilizer applied: Mar 13, 1956. Seed drilled at 200 lb per acre: Mar 14. All plots (except control) sprayed with hormone sprays at approx. 150 gallons followed by 250 gallons per acre: June 18 and June 25. Appropriate plots sprayed again with hormone sprays at 350 gallons per acre: July 4 and July 10. Combine harvested: Oct 12. Variety: Spring Tick. Previous crop: Barley.

Standard error per plot:

Grain (at 85% dry matter): 1.61 cwt per acre or 6.6% (16 d.f.)

Note: Counts of numbers of pods were made.

Summary of Results

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

|          |         | Treatment           |      |      |      |      |      |
|----------|---------|---------------------|------|------|------|------|------|
|          |         | 0                   | 1    | 2    | 3    | 4    | Mean |
| Mean     | (±0.80) | 24.4 <sup>(1)</sup> | 25.7 | 27.0 | 23.0 | 22.7 | 24.5 |
| Increase | (±0.99) |                     | +1.3 | +2.6 | -1.4 | -1.7 |      |

(1) ±0.57

Mean dry matter % as harvested: 72.7

56/Ca/4.1

BEANS

Time of sowing, spraying, P and K - Rothamsted (R) Great Harpenden II and Woburn (W) Broadmead I 1956.

Design: 3 blocks of 4 whole plots each split into 3, with spraying on pairs of whole-plots and PK partially confounded.

Area of each sub-plot: Rothamsted, 0.0283 acres; Woburn, 0.0337 acres.  
Area harvested: Rothamsted, 0.0088 acres; Woburn, 0.0105 acres.

Treatments. All combinations of:

Time of sowing: Autumn; spring.

Spray: None; "Metasystox" at 2 pints in 80 gallons per acre.

Phosphate: None; 0.5; 1.0 cwt  $P_2O_5$  per acre as superphosphate.

Potash: None; 1.0; 2.0 cwt  $K_2O$  per acre as muriate of potash.

Basal dressing: None.

Note. At Woburn the autumn sown beans failed because of bird damage.

Cultivations, etc.:

Rothamsted. Ploughed: Oct 3, 1955. Fertilizers applied for autumn beans, seed drilled at 300 lb per acre: Oct 18. Fertilizers applied for spring beans: Mar 7, 1956. Spring beans sown at 200 lb per acre: Mar 10. Appropriate plots sprayed: June 23. Combine harvested: Oct 4. Previous crop: Barley.

Woburn. Ploughed: Oct 21, 1955. Fertilizers applied for winter beans: Nov 1. Ground chalk at 18 cwt per acre applied: Nov 14. Seed drilled at 275 lb per acre: Nov 15. Fertilizers applied for spring beans: Mar 20, 1956. Seed drilled at 200 lb per acre: Mar 22. Appropriate plots sprayed: June 26. Combine harvested: Oct 23. Variety: Winter-S.Q.Giant, Spring-Albyn.

Standard errors per plot. Grain (at 85% dry matter): cwt per acre.

Great Harpenden II (R), whole plot: 3.06 cwt per acre or 17.3%  
(4 d.f.)

sub plot: 2.59 cwt per acre or 14.6%  
(12 d.f.)

Broadmead I (W),

Spring beans sub plot: 2.28 cwt per acre or 13.7%  
(4 d.f.)



Summary of Results

Great Harpenden II (Rothamsted)

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

|              | Sown   |        | Diff-<br>erence | F205: cwt per acre |      | K20: cwt per acre |            | Mean     |
|--------------|--------|--------|-----------------|--------------------|------|-------------------|------------|----------|
|              | Autumn | Spring |                 | None               | 1.0  | None              | 1.0        |          |
| <u>Spray</u> |        |        |                 |                    |      |                   |            |          |
| None         | 17.9   | 16.1   | -1.8            | 17.5               | 17.6 | 15.7              | 17.6       | 17.0     |
| Metasystox   | 19.0   | 17.8   | -1.2            | 17.9               | 18.8 | 15.6              | 20.6       | 18.4     |
| Difference   | +1.1   | +1.7   | +0.6            | +0.4               | +1.2 | -0.1              | +3.0       | +1.4     |
|              |        |        | (± 3.53)        |                    |      |                   | (± 1.06)*  |          |
|              |        |        |                 |                    |      |                   | (± 1.49)** |          |
| <u>Sown</u>  |        |        |                 |                    |      |                   | (1) & (2)  |          |
| Autumn       | 17.8   | 19.6   |                 | 17.8               | 17.8 | 15.0              | 20.4       | 18.4     |
| Spring       | 17.6   | 16.8   |                 | 16.5               | 16.5 | 16.3              | 17.8       | 17.0     |
| Mean         | 17.7   | 18.2   |                 | 17.2               | 17.2 | 15.7              | 19.1       | 17.7     |
| Difference   |        |        |                 |                    |      |                   | (± 0.75)   |          |
| (± 2.15)     |        |        |                 |                    |      |                   | -2.6       |          |
|              |        |        |                 |                    |      |                   | -3.1       |          |
|              |        |        |                 |                    |      |                   |            | (± 1.77) |

Mean dry matter % as harvested: 72.2

\*For use in horizontal comparisons only

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

(1) ±1.52 for use in diagonal comparisons only

(2) ±1.06 for use in horizontal comparisons only

Broadmead I (Woburn)

56/Oa/4.3

Spring beans

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

| Spray      | P <sub>2</sub> O <sub>5</sub> : cwt per acre |      |      | K <sub>2</sub> O: cwt per acre |      |      | Mean |      |
|------------|--|------|------|--------------------------------|------|------|------|------|
|            | None   | 0.5  | 1.0  | None                           | 1.0  | 2.0  |      |      |
|            | (± 1.32)*                                    |      |      | (± 1.32)*                      |      |      |      |      |
| None       | 15.4   | 15.7 | 15.0 | 10.9                           | 15.4 | 19.9 | 15.4 |      |
| Metasystox | 20.6   | 17.5 | 15.6 | 14.0                           | 17.0 | 22.7 | 17.9 |      |
| Mean       | (±0.93)                                      | 18.0 | 16.6 | 15.3                           | 12.5 | 16.2 | 21.3 | 16.7 |
| Difference | (±1.86)**                                    | 5.2  | 1.8  | 0.6                            | 3.1  | 1.6  | 2.8  | 2.5  |

\*For use in horizontal comparisons only

\*\*For use only in testing the difference of 2 differences

Mean dry matter % as harvested: 66.5

56/Ce/1

POTATOES

Placement of nitrogen and potash - West Barnfield I 1956.

Design: 4 randomized blocks of 18 plots each.

Area of each plot: 0.0140 acres. Area harvested: 0.0057 acres.

Treatments: None (2 plots per block) and all combinations of:-

Nitrogen: 0.5; 1.0 cwt N per acre as sulphate of ammonia.

Potash: 0.75; 1.5 cwt K<sub>2</sub>O per acre as sulphate of potash.

Methods of placement: Broadcast on flat before planting; Fertilizer placed 3" to side and 1" below seed at planting.

Basal dressing: 1.0 cwt P<sub>2</sub>O<sub>5</sub> per acre as superphosphate placement drilled.

Cultivations, etc.: Ploughed: Nov 1, 1955. Broadcast fertilizers applied: Apr 11, 1956. Potatoes machine planted with placed fertilizers: Apr 12. Earthed up: June 28. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 24. Sprayed again at 5 lb in 90 gallons per acre: Aug 25. Sprayed with sulphuric acid, 20% B.O.V.: Sept 14. Lifted: Oct 16 - 20. Variety: King Edward. Previous crop: Wheat.

Standard error per plot:

Total tubers: 0.750 tons per acre or 6.4% (52 d.f.)

Summary of Results

Total tubers: tons per acre

| K <sub>2</sub> O:<br>cwt per acre | N: cwt per acre |       |        |       | Mean           |
|-----------------------------------|-----------------|-------|--------|-------|----------------|
|                                   | Broadcast       |       | Placed |       |                |
|                                   | 0.5             | 1.0   | 0.5    | 1.0   |                |
|                                   | (± 0.375)       |       |        |       | (± 0.187)      |
| Broadcast                         |                 |       |        |       |                |
| 0.75                              | 10.28           | 12.55 | 9.94   | 10.81 | 10.90          |
| 1.5                               | 12.06           | 14.34 | 11.82  | 12.86 | 12.77          |
| Placed                            |                 |       |        |       |                |
| 0.75                              | 11.68           | 12.98 | 12.23  | 12.43 | 12.33          |
| 1.5                               | 12.77           | 14.48 | 13.48  | 14.32 | 13.76          |
| Mean (±0.187)                     | 11.70           | 13.59 | 11.87  | 12.61 | 12.44 (±0.094) |
| No N or K <sub>2</sub> O          |                 |       |        |       | 6.72 (±0.265)  |
| General mean                      |                 |       |        |       | 11.80          |

56/Ce/2.1

## POTATOES

Control of virus spread by insecticide - Great Knott III 1956.

Design: 5 × 5 Latin square.

Area of each plot: 0.0602 acres. Area harvested: 0.0120 acres.

Treatments: No insecticide; high; low volume spraying of DDT emulsion, 2 lb active ingredient per acre per application.

High volume: 80 gallons per acre. 4; 6 times applied during season.

Low volume: 25 gallons per acre. 4; 6 times applied during season.

Infectior plants: 6 leaf roll and 6 virus Y infected plants planted in each plot.

Note: The tractor used for spraying was driven over all plots on each occasion always passing over the same rows. Yields were taken from the undamaged rows and an estimate of the loss of the yield due to tractor damage was made from an area of 0.0602 acres.

Basal dressing per acre: 8 tons dung; 10 $\frac{1}{2}$  cwt compound granular fertilizer (9% N, 3% P<sub>2</sub>O<sub>5</sub>, 15% K<sub>2</sub>O).

Cultivations, etc.: Dung applied: Sept 24, 1955. Ploughed: Sept 26. Basal fertilizers applied on the flat: Apr 4, 1956. Potatoes machine planted: Apr 7 - 10. Earthed up: June 26. Sprayed with copper fungicide, 3 lb in 80 gallons per acre: Aug 8. Sprayed with sulphuric acid, 20% BOV: Sept 13. Lifted: Oct 23 - 24. Variety: Majestic. Previous crop: Wheat.

Dates of DDT sprayings (both high and low volume):

4 times: June 14; June 26; July 12; Aug 8.

6 times: May 30 and Aug 29 in addition to above dates.

Standard error per plot:

Total tubers: 1.25 tons per acre or 8.9% (12 d.f.)

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

56/Ce/2.2

Summary of Results

|  | Number of sprayings with DDT |             |       |            |       | Mean  |
|--|------------------------------|-------------|-------|------------|-------|-------|
|  | None                         | High volume |       | Low volume |       |       |
|  |                              | 4           | 6     | 4          | 6     |       |
| Total tubers: tons per acre                |                              |             |       |            |       |       |
| Mean ( $\pm 0.559$ )                       | 13.35                        | 13.97       | 14.62 | 14.41      | 13.63 | 14.00 |
| Increase ( $\pm 0.791$ )                   |                              | +0.62       | +1.27 | +1.06      | +0.28 |       |
| Percentage ware ( $1\frac{1}{2}$ " riddle) |                              |             |       |            |       |       |
| Mean                                       | 76.2                         | 80.4        | 75.1  | 79.1       | 78.8  | 77.9  |
| Increase                                   |                              | +4.2        | -1.1  | +2.9       | +2.6  |       |

Estimated loss of yield in damaged rows due to

6 passages of the tractor: 6.4%

Estimated loss of yield in whole crop due to

6 passages of the tractor along 4 rows out of 8: 3.2%

56/Oe/3.1

POTATOES

The control of blight by copper and sulphuric sprays - Great Knott III. 1956.

Design: 4 × 4 Latin square, plots being split into 2 for determination of the effect of tractor damage.

Area of each sub plot: 0.0140 acres.

Treatments:

Whole Plots: No spray; copper fungicide sprayed twice; sulphuric acid, sprayed to destroy haulm; copper fungicide and sulphuric acid sprayed as above. The tractor used for spraying was driven over all the plots on each occasion.

Sub plots: 4 rows damaged by two passages of the tractor during copper spray operations were compared with 4 undamaged rows.

Basal dressing per acre: 8 tons dung; 10½ cwt compound granular fertilizer (9% N, 9% P<sub>2</sub>O<sub>5</sub>, 15% K<sub>2</sub>O).

Cultivations, etc.: Dung applied, ploughed in: Sept 28, 1955. Basal fertilizer applied on flat: Apr 4, 1956. Potatoes machine planted: Apr 5 - 6. Earthed up: June 25. Fungicide treatment 3 lb in 80 gallons per acre applied: Aug 15 and again at 5 lb in 90 gallons per acre: Aug 25. Sprayed with sulphuric acid 20% B.O.V., 80 gallons per acre: Sept 17. Lifted: Oct 22. Previous crop: Wheat.

Standard errors per plot: Total tubers.

Whole plot: 0.938 tons per acre or 6.0% (6 d.f.)

Sub plot: 0.801 tons per acre or 5.1% (12 d.f.)

Note: Estimates were made of the rate of bulking, destruction of foliage by blight, amount of blight on the tubers.

56/Ce/3.2

Summary of Results

|                              | Spray |                  |                |                                     | Mean              |
|------------------------------|-------|------------------|----------------|-------------------------------------|-------------------|
|                              | None  | Copper fungicide | Sulphuric acid | Copper fungicide and sulphuric acid |                   |
| Total tubers: tons per acre  |       |                  |                |                                     |                   |
| (±0.548)*                    |       |                  |                |                                     |                   |
| Undamaged rows               | 14.65 | 18.26            | 14.73          | 16.79                               | 16.11             |
| Damaged rows                 | 14.10 | 16.12            | 14.46          | 16.57                               | 15.31             |
| Mean (±0.469)                | 14.38 | 17.19            | 14.60          | 16.68                               | 15.71             |
| Difference (±0.566)          | -0.55 | -2.14            | -0.27          | -0.22                               | -0.80<br>(±0.283) |
| Percentage ware (1½" riddle) |       |                  |                |                                     |                   |
| Undamaged rows               | 87.5  | 85.9             | 87.2           | 88.6                                | 87.3              |
| Damaged rows                 | 85.6  | 86.0             | 84.6           | 88.8                                | 86.2              |
| Mean                         | 86.6  | 85.9             | 85.9           | 88.7                                | 86.8              |
| Difference                   | -1.9  | +0.1             | -2.6           | +0.2                                | -1.1              |

\*For use in comparisons other than vertical.

56/Ce/4.1

## POTATOES

Dung, N, P and K - Rothamsted (R) Great Field II and Woburn (W) Butt Close 1956.

Design (each field): 4 randomized blocks of 16 plots each, a high order interaction being confounded with block differences.

Area of each plot: 0.0200 acres. Area harvested: 0.0133 acres.

Treatments: All combinations of:-

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

Basal dressing: None

Cultivations, etc.:

Great Field II (R).

Ploughed: Nov 12, 1955. Dung applied, ploughed: Apr 9, 1956.  
Fertilizers applied: Apr 20. Potatoes machine planted: Apr 23.  
Earthed up: June 30. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 24. Sprayed again at 3 lb in 80 gallons: Aug 14. Sprayed with sulphuric acid, 20% BOV, 80 gallons per acre: Sept 24. Lifted: Oct 15 - 16. Variety: Majestic. Previous crop: Wheat.

Butt Close (W).

Ploughed: Nov 9, 1955. Dung applied: Apr 17 - 18, 1956.  
Ploughed: Apr 19. Fertilizers applied: Apr 20. Potatoes machine planted: Apr 23. Earthed up: June 21. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 23. Sprayed with sodium arsenite, 1 gallon in 40 gallons per acre: Sept 1. Lifted: Oct 1. Variety: Majestic. Previous crop: Barley.

Standard errors per plot. Total tubers: tons per acre.

Great Field II (R): 0.960 tons per acre or 6.6% (29 d.f.)

Butt Close (W): 1.47 tons per acre or 13.1% (30 d.f.)

Notes:

Great Field II (R). The yields of total tubers were adjusted to allow for tractor damage to some of the rows during spraying.

Butt Close (W). The crop was infested by potato root eelworm (*Heterodera Rostochiensis*), the symptoms being more severe on the plots receiving no dung or 5 tons per acre. No adjustment was made.



56/Ce/4.2

Summary of Results

Total tubers: tons per acre

|  |          | Dung: tons per acre |       |       |       | Mean           |
|--|----------|---------------------|-------|-------|-------|----------------|
|  |          | None                | 5     | 10    | 20    |                |
| Great Field (Rothamsted)                     |          |                     |       |       |       |                |
| Mean   | (±0.240) | 12.62               | 14.20 | 15.43 | 15.89 | 14.54          |
|  |          | (±0.339)            |       |       |       |                |
| N: cwt per acre                              |          |                     |       |       |       |                |
| None   |          | 11.77               | 13.09 | 14.69 | 15.51 | 13.76          |
| 0.9  |          | 13.48               | 15.33 | 16.17 | 16.27 | 15.31          |
| Difference                                   | (±0.480) | +1.71               | +2.24 | +1.48 | +0.76 | +1.55 (±0.240) |
| P <sub>2</sub> O <sub>5</sub> : cwt per acre |          |                     |       |       |       |                |
| None   |          | 11.33               | 13.01 | 14.41 | 14.84 | 13.40          |
| 0.75   |          | 13.91               | 15.41 | 16.46 | 16.95 | 15.68          |
| Difference                                   | (±0.480) | +2.58               | +2.40 | +2.05 | +2.11 | +2.28 (±0.240) |
| K <sub>2</sub> O: cwt per acre               |          |                     |       |       |       |                |
| None   |          | 11.88               | 13.39 | 14.92 | 15.72 | 13.98          |
| 1.5  |          | 13.37               | 15.03 | 15.94 | 16.06 | 15.10          |
| Difference                                   | (±0.480) | +1.49               | +1.64 | +1.02 | +0.34 | +1.12 (±0.240) |
| Butt Close (Woburn)                          |          |                     |       |       |       |                |
| Mean   | (±0.368) | 9.33                | 10.50 | 11.59 | 13.60 | 11.25          |
|  |          | (±0.520)            |       |       |       |                |
| N: cwt per acre                              |          |                     |       |       |       |                |
| None   |          | 6.25                | 6.98  | 8.28  | 11.80 | 8.33           |
| 0.9  |          | 12.40               | 14.02 | 14.90 | 15.40 | 14.18          |
| Difference                                   | (±0.736) | +6.15               | +7.04 | +6.62 | +3.60 | +5.85 (±0.368) |
| P <sub>2</sub> O <sub>5</sub> : cwt per acre |          |                     |       |       |       |                |
| None   |          | 9.02                | 10.28 | 11.52 | 13.63 | 11.11          |
| 0.75   |          | 9.64                | 10.72 | 11.66 | 13.57 | 11.40          |
| Difference                                   | (±0.736) | +0.62               | +0.44 | +0.14 | -0.06 | +0.29 (±0.368) |
| K <sub>2</sub> O: cwt per acre               |          |                     |       |       |       |                |
| None   |          | 8.75                | 10.95 | 11.62 | 14.17 | 11.37          |
| 1.5  |          | 9.90                | 10.05 | 11.56 | 13.04 | 11.14          |
| Difference                                   | (±0.736) | +1.15               | -0.90 | -0.06 | -1.13 | -0.23 (±0.368) |

56/Ce/4.3

| Percentage Ware                              |                     |       |       |      |       |
|--|---------------------|-------|-------|------|-------|
|  | Dung: tons per acre |       |       |      |       |
|  | None                | 5     | 10    | 20   | Mean  |
| Great Field (Rothamsted) <sup>(1)</sup>      |                     |       |       |      |       |
| Mean   | 88.7                | 88.6  | 84.9  | 86.3 | 87.1  |
| N: cwt per acre                              |                     |       |       |      |       |
| None   | 89.2                | 90.0  | 86.5  | 89.7 | 88.8  |
| 0.9  | 88.3                | 87.2  | 83.3  | 82.9 | 85.4  |
| Difference                                   | -0.9                | -2.8  | -3.2  | -6.8 | -3.4  |
| P <sub>2</sub> O <sub>5</sub> : cwt per acre |                     |       |       |      |       |
| None   | 89.6                | 88.8  | 86.7  | 87.0 | 88.0  |
| 0.75   | 87.8                | 88.4  | 83.0  | 85.6 | 86.2  |
| Difference                                   | -1.8                | -0.4  | -3.7  | -1.4 | -1.8  |
| K <sub>2</sub> O: cwt per acre               |                     |       |       |      |       |
| None   | 88.5                | 88.3  | 85.0  | 86.4 | 87.1  |
| 1.5  | 88.9                | 88.8  | 84.7  | 86.2 | 87.2  |
| Difference                                   | +0.4                | +0.5  | -0.3  | -0.2 | +0.1  |
| Butt Close (Woburn) <sup>(2)</sup>           |                     |       |       |      |       |
| Mean   | 69.1                | 76.7  | 79.4  | 82.9 | 77.0  |
| N: cwt per acre                              |                     |       |       |      |       |
| None   | 58.5                | 66.8  | 72.7  | 79.2 | 69.3  |
| 0.9  | 79.6                | 86.6  | 86.1  | 86.6 | 84.7  |
| Difference                                   | +21.1               | +19.8 | +13.4 | +7.4 | +15.4 |
| P <sub>2</sub> O <sub>5</sub> : cwt per acre |                     |       |       |      |       |
| None   | 70.1                | 75.5  | 79.3  | 82.9 | 76.9  |
| 0.75   | 68.1                | 77.9  | 79.5  | 82.9 | 77.1  |
| Difference                                   | -2.0                | +2.4  | +0.2  | 0.0  | +0.2  |
| K <sub>2</sub> O: cwt per acre               |                     |       |       |      |       |
| None   | 67.5                | 77.1  | 77.6  | 82.1 | 76.1  |
| 1.5  | 70.7                | 76.3  | 81.3  | 83.7 | 78.0  |
| Difference                                   | +3.2                | -0.8  | +3.7  | +1.6 | +1.9  |

Riddle (1) 1½" (2) 1⅜".

56/Ce/4.4

Total tubers: tons per acre

| Response to | Responses to treatments<br>cwt per acre |     |                               |      |                  |     |
|-------------|---|-----|-------------------------------|------|------------------|-----|
|             | N                                       |     | P <sub>2</sub> O <sub>5</sub> |      | K <sub>2</sub> O |     |
|             | None                                    | 0.9 | None                          | 0.75 | None             | 1.5 |

Great Field (Rothamsted)

(± 0.339)

|                               |       |       |       |       |       |       |
|-------------------------------|-------|-------|-------|-------|-------|-------|
| N                             | -     | -     | +0.72 | +2.38 | +1.50 | +1.60 |
| P <sub>2</sub> O <sub>5</sub> | +1.45 | +3.11 | -     | -     | +1.80 | +2.76 |
| K <sub>2</sub> O              | +1.07 | +1.17 | +0.64 | +1.60 | -     | -     |

Butt Close (Woburn)

(± 0.520)

|                               |       |       |       |       |       |       |
|-------------------------------|-------|-------|-------|-------|-------|-------|
| N                             | -     | -     | +5.88 | +5.82 | +5.49 | +6.21 |
| P <sub>2</sub> O <sub>5</sub> | +0.32 | +0.26 | -     | -     | +1.15 | -0.57 |
| K <sub>2</sub> O              | -0.60 | +0.12 | +0.62 | -1.10 | -     | -     |

Percentage Ware

| Response to | Responses to treatments<br>cwt per acre |     |                               |      |                  |     |
|-------------|---|-----|-------------------------------|------|------------------|-----|
|             | N                                       |     | P <sub>2</sub> O <sub>5</sub> |      | K <sub>2</sub> O |     |
|             | None                                    | 0.9 | None                          | 0.75 | None             | 1.5 |

Great Field (Rothamsted)<sup>(1)</sup>

|                               |      |      |      |      |      |      |
|-------------------------------|------|------|------|------|------|------|
| N                             | -    | -    | -1.9 | -4.9 | -3.9 | -2.9 |
| P <sub>2</sub> O <sub>5</sub> | -0.3 | -3.3 | -    | -    | -2.2 | -1.4 |
| K <sub>2</sub> O              | -0.4 | +0.6 | -0.3 | +0.5 | -    | -    |

Butt Close (Woburn)<sup>(2)</sup>

|                               |      |      |       |       |       |       |
|-------------------------------|------|------|-------|-------|-------|-------|
| N                             | -    | -    | +17.0 | +13.8 | +16.5 | +14.3 |
| P <sub>2</sub> O <sub>5</sub> | +1.8 | -1.4 | -     | -     | + 2.2 | - 1.8 |
| K <sub>2</sub> O              | +3.1 | +0.9 | + 4.0 | 0.0   | -     | -     |

Riddle (1) 1½" (2) 1⅝".

56/Ce/5.1

## POTATOES

Control of skin spot (Oospora pustulans) by fungicides - Great Knott III 1956.

Design: 3 randomized blocks of 15 plots each.

Area of each plot: 0.0140 acres. Area harvested: 0.0070 acres.

### Treatments:

None (3 plots per block).

PCNB, 20% Parachloronitro benzene dust applied: to seed at 3 oz. per cwt (S); to furrows before planting at 300 lb per acre (F); (S) and (F).

Calomel, 4% dust applied: to seed at 12 oz. per cwt (S); to furrows before planting at 100 lb per acre (F); (S) and (F).

Nomersan, 10% Thiram dust applied: to seed at 3 oz. per cwt (S); to furrows before planting at 100 lb per acre (F); (S) and (F).

Griseofulvin applied: to seed as 50% glycerol paste at 0.6 g. per tuber (S); to furrows before planting as 0.4% suspension at 100 gallons per acre (F); to foliage as 0.04% suspension at 50 gallons per acre (L).

Basal dressing: 8 tons dung per acre ploughed in; 10 $\frac{1}{2}$  cwt compound granular fertilizer (9% N, 9% P<sub>2</sub>O<sub>5</sub>, 15% K<sub>2</sub>O) per acre before ridging.

Cultivations, etc.: Dung applied, ploughed in: Sept 28, 1955. Basal fertilizer applied on flat: Apr 4, 1956. Ridged: Apr 16. Potatoes hand planted: Apr 17. Earthed up: June 29. Sprayed with copper fungicide, 5 lb in 40 gallons per acre: July 23. Sprayed again at 3 lb in 80 gallons per acre: Aug 15. Sprayed with sulphuric acid, 20% BOV, 80 gallons per acre: Sept 12. Lifted: Oct 9. Variety: Majestic. Previous crop: Wheat.

### Standard error per plot:

Total tubers: 1.12 tons per acre or 7.5% (30 d.f.)

Note: Emergence counts and records of incidence of root browning and skin spot (Oospora pustulans), black scurf and stem canker (Corticium solani) and common scab (Actinomyces scabies) were made.

56/Ce/5.2

Summary of Results

| Method of Application       | Fungicide |       |           |       |       | Mean                 |
|-----------------------------|-----------|-------|-----------|-------|-------|----------------------|
|                             | None      | P     | C         | N     | A     |                      |
| Total tubers: tons per acre |           |       |           |       |       |                      |
|                             |           |       | (± 0.649) |       |       | (± 0.324)            |
| S                           |           | 13.67 | 14.73     | 15.31 | 12.95 | 14.16                |
| F                           |           | 14.31 | 16.77     | 14.97 | 16.07 | 15.53 <sup>(1)</sup> |
| SF                          |           | 14.69 | 14.97     | 14.50 |       | 14.72 <sup>(2)</sup> |
| L                           |           |       |           |       | 15.48 | 15.48 <sup>(2)</sup> |
| Mean (±0.375)               | 15.11     | 14.22 | 15.49     | 14.92 | 14.83 | 14.92                |

(1) ±0.375    (2) ±0.649

Percentage ware (1½" riddle)

|      |      |      |      |      |      |
|------|------|------|------|------|------|
| S    | 88.1 | 84.1 | 91.4 | 80.5 | 86.0 |
| F    | 85.3 | 87.2 | 86.2 | 88.0 | 86.7 |
| SF   | 90.1 | 85.9 | 86.5 |      | 87.5 |
| L    |      |      |      | 87.5 | 87.5 |
| Mean | 86.2 | 87.9 | 85.7 | 88.0 | 85.3 |

Fungicide

P = PCNB (Parachloronitro benzene) 20% dust.  
 C = Calomel 4% dust.  
 N = Nomersan 10% thiram dust.  
 A = Griseofulvin.

Methods of application

S = Seed treated.  
 F = Applied to furrows before planting.  
 L = Applied as spray to foliage.

56/Cf/1.1

### SUGAR BEET

Dung, N, P, K and Salt - Rothamsted (R) Great Field II and Woburn (W)  
Butt Close 1956.

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

Area of each plot: Rothamsted, 0.0158 acres; Woburn, 0.0167 acres.  
Area harvested: Rothamsted, 0.0106 acres; Woburn, 0.0110 acres.

Treatments. All combinations of:

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

Basal dressing:

Rothamsted: Ground chalk at various rates to bring plots to uniform pH.  
Woburn: Ground chalk at 10 cwt per acre.

Cultivations, etc.:

Great Field (R). Ploughed: Nov 12, 1955. Salt applied: Apr 5, 1956.  
Dung applied, all plots ploughed: Apr 9. Ground chalk applied:  
Apr 11. Fertilizers applied, seed drilled at 18 lb per acre:  
Apr 20. Singled: June 13 - 16. Lifted: Dec 12 - 19. Variety:  
Klein E. Previous crop: Wheat.

Butt Close (W). Ploughed: Nov 9, 1955. Salt applied: Apr 11, 1956.  
Dung applied, all plots ploughed: Apr 18 - 19. Ground chalk  
applied: Apr 19. Fertilizers applied: Apr 23. Seed drilled at  
12 lb per acre: Apr 26. Sprayed with parathion,  $\frac{1}{2}$  pint in 40  
gallons per acre: May 25. Singled: June 11 - 14. Lifted:  
Nov 21 - 23. Variety: Klein E. Previous crop: Wheat.

Standard errors per plot.

Great Field (R). Total sugar, 4.50 cwt per acre or 9.7% (32 d.f.)  
Butt Close (W). Total sugar, 6.27 cwt per acre or 12.0% (32 d.f.)  
Great Field (R). Tops, 2.46 tons per acre or 10.0% (32 d.f.)  
Butt Close (W). Tops, 1.12 tons per acre or 10.9% (32 d.f.)

Summary of Results

Roots (washed): tons per acre

|   | Dung: tons per acre |       |       |       | Mean  |
|---|---------------------|-------|-------|-------|-------|
|   | None                | 5     | 10    | 20    |       |
| Great Field II (Rothamsted)                   |                     |       |       |       |       |
| Mean  | 12.58               | 14.29 | 15.59 | 15.98 | 14.61 |
| N: cwt per acre                               |                     |       |       |       |       |
| None  | 12.72               | 13.90 | 15.28 | 16.03 | 14.48 |
| 0.9   | 12.44               | 14.69 | 15.89 | 15.93 | 14.74 |
| Difference                                    | -0.28               | +0.79 | +0.61 | -0.10 | +0.26 |
| P <sub>25</sub> O <sub>5</sub> : cwt per acre |                     |       |       |       |       |
| None  | 10.59               | 12.43 | 14.73 | 14.54 | 13.08 |
| 0.75  | 14.56               | 16.15 | 16.44 | 17.42 | 16.14 |
| Difference                                    | +3.97               | +3.72 | +1.71 | +2.88 | +3.06 |
| K <sub>2</sub> O: cwt per acre                |                     |       |       |       |       |
| None  | 12.44               | 13.60 | 15.73 | 15.78 | 14.39 |
| 1.5   | 12.71               | 14.98 | 15.44 | 16.18 | 14.83 |
| Difference                                    | +0.27               | +1.38 | -0.29 | +0.40 | +0.44 |
| Salt: cwt per acre                            |                     |       |       |       |       |
| None  | 12.28               | 13.46 | 14.87 | 15.50 | 14.03 |
| 5.0   | 12.87               | 15.13 | 16.30 | 16.47 | 15.19 |
| Difference                                    | +0.59               | +1.67 | +1.43 | +0.97 | +1.16 |
| Butt Close (Woburn)                           |                     |       |       |       |       |
| Mean  | 12.65               | 14.60 | 14.89 | 15.82 | 14.49 |
| N: cwt per acre                               |                     |       |       |       |       |
| None  | 10.19               | 13.13 | 13.36 | 14.80 | 12.87 |
| 0.9   | 15.11               | 16.07 | 16.41 | 16.84 | 16.11 |
| Difference                                    | +4.92               | +2.94 | +3.05 | +2.04 | +3.24 |
| P <sub>25</sub> O <sub>5</sub> : cwt per acre |                     |       |       |       |       |
| None  | 12.47               | 13.88 | 14.87 | 16.13 | 14.33 |
| 0.75  | 12.84               | 15.33 | 14.91 | 15.51 | 14.65 |
| Difference                                    | +0.37               | +1.45 | +0.04 | -0.62 | +0.32 |
| K <sub>2</sub> O: cwt per acre                |                     |       |       |       |       |
| None  | 12.42               | 13.31 | 14.99 | 15.52 | 14.06 |
| 1.5   | 12.88               | 15.90 | 14.78 | 16.12 | 14.92 |
| Difference                                    | +0.46               | +2.59 | -0.21 | +0.60 | +0.86 |
| Salt: cwt per acre                            |                     |       |       |       |       |
| None  | 11.84               | 12.97 | 14.38 | 15.23 | 13.60 |
| 5.0   | 13.46               | 16.24 | 15.40 | 16.41 | 15.38 |
| Difference                                    | +1.62               | +3.27 | +1.02 | +1.18 | +1.78 |

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56/Cf/1.3

|                                | Sugar percentage |                     |      |      | Mean |
|--------------------------------|------------------|---------------------|------|------|------|
|                                | None             | Dung: tons per acre |      | 20   |      |
|                                | 5                | 10                  |      |      |      |
| Great Field II (Rothamsted)    |                  |                     |      |      |      |
| Mean                           | 15.9             | 16.1                | 15.8 | 15.9 | 16.0 |
| N: cwt per acre                |                  |                     |      |      |      |
| None                           | 16.2             | 16.5                | 16.2 | 16.2 | 16.3 |
| 0.9                            | 15.6             | 15.7                | 15.4 | 15.7 | 15.6 |
| Difference                     | -0.6             | -0.8                | -0.8 | -0.5 | -0.7 |
| P <sub>25</sub> : cwt per acre |                  |                     |      |      |      |
| None                           | 15.8             | 16.2                | 15.9 | 16.0 | 16.0 |
| 0.75                           | 16.0             | 16.0                | 15.7 | 15.9 | 15.9 |
| Difference                     | +0.2             | -0.2                | -0.2 | -0.1 | -0.1 |
| K <sub>2</sub> O: cwt per acre |                  |                     |      |      |      |
| None                           | 15.9             | 16.2                | 15.9 | 15.8 | 15.9 |
| 1.5                            | 16.0             | 16.1                | 15.8 | 16.0 | 16.0 |
| Difference                     | +0.1             | -0.1                | -0.1 | +0.2 | +0.1 |
| Salt: cwt per acre             |                  |                     |      |      |      |
| None                           | 16.0             | 16.0                | 15.7 | 16.0 | 15.9 |
| 5.0                            | 15.8             | 16.3                | 15.9 | 15.8 | 16.0 |
| Difference                     | -0.2             | +0.3                | +0.2 | -0.2 | +0.1 |
| Butt Close (Woburn)            |                  |                     |      |      |      |
| Mean                           | 18.1             | 18.2                | 18.0 | 17.9 | 18.1 |
| N: cwt per acre                |                  |                     |      |      |      |
| None                           | 18.0             | 18.2                | 18.2 | 18.2 | 18.2 |
| 0.9                            | 18.1             | 18.2                | 17.9 | 17.6 | 17.9 |
| Difference                     | +0.1             | 0.0                 | -0.3 | -0.6 | -0.3 |
| P <sub>25</sub> : cwt per acre |                  |                     |      |      |      |
| None                           | 18.2             | 18.3                | 18.0 | 18.0 | 18.1 |
| 0.75                           | 17.9             | 18.1                | 18.0 | 17.9 | 18.0 |
| Difference                     | -0.3             | -0.2                | 0.0  | -0.1 | -0.1 |
| K <sub>2</sub> O: cwt per acre |                  |                     |      |      |      |
| None                           | 18.0             | 18.1                | 17.9 | 18.2 | 18.0 |
| 1.5                            | 18.2             | 18.3                | 18.1 | 17.6 | 18.1 |
| Difference                     | +0.2             | +0.2                | +0.2 | -0.6 | +0.1 |
| Salt: cwt per acre             |                  |                     |      |      |      |
| None                           | 18.3             | 18.2                | 18.0 | 18.0 | 18.1 |
| 5.0                            | 17.9             | 18.2                | 18.0 | 17.8 | 18.0 |
| Difference                     | -0.4             | 0.0                 | 0.0  | -0.2 | -0.1 |



56/Cf/1.4

| Total sugar: cwt per acre                     |                     |       |                  |      |                   |
|---|---------------------|-------|------------------|------|-------------------|
|   | Dung: tons per acre |       |                  |      | Mean              |
|   | None                | 5     | 10               | 20   |                   |
| Great Field II (Rothamsted)                   |                     |       |                  |      |                   |
| Mean  | 40.2                | 46.1  | 49.3<br>(± 1.59) | 50.9 | 46.6              |
| N: cwt per acre                               |                     |       |                  |      |                   |
| None  | 41.4                | 46.1  | 49.6             | 51.8 | 47.2              |
| 0.9   | 39.0                | 46.1  | 48.9             | 50.1 | 46.0              |
| Difference (±2.25)                            | -2.4                | 0.0   | -0.7             | -1.7 | -1.2<br>(± 1.12)  |
| P <sub>25</sub> O <sub>5</sub> : cwt per acre |                     |       |                  |      |                   |
| None  | 33.7                | 40.4  | 47.0             | 46.4 | 41.9              |
| 0.75  | 46.7                | 51.8  | 51.6             | 55.5 | 51.4              |
| Difference (±2.25)                            | +13.0               | +11.4 | +4.6             | +9.1 | +9.5<br>(± 1.12)  |
| K <sub>2</sub> O: cwt per acre                |                     |       |                  |      |                   |
| None  | 39.6                | 44.0  | 49.9             | 50.0 | 45.9              |
| 1.5   | 40.8                | 48.1  | 48.7             | 51.8 | 47.4              |
| Difference (±2.25)                            | +1.2                | +4.1  | -1.2             | +1.8 | +1.5<br>(± 1.12)  |
| Salt: cwt per acre                            |                     |       |                  |      |                   |
| None  | 39.5                | 43.0  | 46.6             | 49.7 | 44.7              |
| 5.0   | 40.9                | 49.2  | 51.9             | 52.2 | 48.5              |
| Difference (±2.25)                            | +1.4                | +6.2  | +5.3             | +2.5 | +3.8<br>(± 1.12)  |
| Butt Close (Woburn)                           |                     |       |                  |      |                   |
| Mean  | 45.7                | 53.2  | 53.6<br>(± 2.22) | 56.6 | 52.3              |
| N: cwt per acre                               |                     |       |                  |      |                   |
| None  | 36.7                | 47.9  | 48.6             | 54.0 | 46.8              |
| 0.9   | 54.8                | 58.5  | 58.7             | 59.2 | 57.8              |
| Difference (±3.14)                            | +18.1               | +10.6 | +10.1            | +5.2 | +11.0<br>(± 1.57) |
| P <sub>25</sub> O <sub>5</sub> : cwt per acre |                     |       |                  |      |                   |
| None  | 45.4                | 50.8  | 53.5             | 57.8 | 51.9              |
| 0.75  | 46.1                | 55.6  | 53.7             | 55.4 | 52.7              |
| Difference (±3.14)                            | +0.7                | +4.8  | +0.2             | -2.4 | +0.8<br>(± 1.57)  |
| K <sub>2</sub> O: cwt per acre                |                     |       |                  |      |                   |
| None  | 44.8                | 48.1  | 53.6             | 56.4 | 50.7              |
| 1.5   | 46.7                | 58.3  | 53.6             | 56.7 | 53.8              |
| Difference (±3.14)                            | +1.9                | +10.2 | 0.0              | +0.3 | +3.1<br>(± 1.57)  |
| Salt: cwt per acre                            |                     |       |                  |      |                   |
| None  | 43.2                | 47.1  | 51.9             | 54.8 | 49.3              |
| 5.0   | 48.3                | 59.3  | 55.3             | 58.4 | 55.3              |
| Difference (±3.14)                            | +5.1                | +12.2 | +3.4             | +3.6 | +6.0<br>(± 1.57)  |

56/Gf/1.5

|   | Tops: tons per acre |                     |       |       | Mean               |
|---|---------------------|---------------------|-------|-------|--------------------|
|   | None                | Dung: tons per acre |       | 20    |                    |
|   |                     | 5                   | 10    |       |                    |
| Great Field II (Rothamsted)                   |                     |                     |       |       |                    |
| Mean  | 21.52               | 23.71               | 24.84 | 28.52 | 24.65              |
|   |                     | (± 0.869)           |       |       |                    |
| N: cwt per acre                               |                     |                     |       |       |                    |
| None  | 20.34               | 21.05               | 22.99 | 26.57 | 22.74              |
| 0.9   | 22.69               | 26.37               | 26.69 | 30.48 | 26.56              |
| Difference (±1.229)                           | +2.35               | +5.32               | +3.70 | +3.91 | +3.82<br>(± 0.614) |
| P <sub>25</sub> O <sub>5</sub> : cwt per acre |                     |                     |       |       |                    |
| None  | 19.07               | 21.93               | 23.80 | 27.32 | 23.03              |
| 0.75  | 23.96               | 25.49               | 25.88 | 29.73 | 26.27              |
| Difference (±1.229)                           | +4.89               | +3.56               | +2.08 | +2.41 | +3.24<br>(± 0.614) |
| K <sub>2</sub> O: cwt per acre                |                     |                     |       |       |                    |
| None  | 21.02               | 22.84               | 24.32 | 28.57 | 24.19              |
| 1.5   | 22.02               | 24.57               | 25.36 | 28.47 | 25.11              |
| Difference (±1.229)                           | +1.00               | +1.73               | +1.04 | -0.10 | +0.92<br>(± 0.614) |
| Salt: cwt per acre                            |                     |                     |       |       |                    |
| None  | 20.96               | 21.17               | 23.11 | 27.33 | 23.14              |
| 5.0   | 22.08               | 26.25               | 26.57 | 29.72 | 26.15              |
| Difference (±1.229)                           | +1.12               | +5.08               | +3.46 | +2.39 | +3.01<br>(± 0.614) |
| Butt Close (Woburn)                           |                     |                     |       |       |                    |
| Mean  | 9.43                | 9.89                | 10.50 | 11.44 | 10.32              |
|   |                     | (± 0.398)           |       |       |                    |
| N: cwt per acre                               |                     |                     |       |       |                    |
| None  | 7.27                | 8.30                | 8.81  | 9.74  | 8.53               |
| 0.9   | 11.60               | 11.49               | 12.18 | 13.13 | 12.10              |
| Difference (±0.562)                           | +4.33               | +3.19               | +3.37 | +3.39 | +3.57<br>(± 0.281) |
| P <sub>25</sub> O <sub>5</sub> : cwt per acre |                     |                     |       |       |                    |
| None  | 9.05                | 9.72                | 10.68 | 11.56 | 10.25              |
| 0.75  | 9.82                | 10.07               | 10.31 | 11.32 | 10.38              |
| Difference (±0.562)                           | +0.77               | +0.35               | -0.37 | -0.24 | +0.13<br>(± 0.281) |
| K <sub>2</sub> O: cwt per acre                |                     |                     |       |       |                    |
| None  | 9.70                | 9.56                | 10.58 | 11.21 | 10.26              |
| 1.5   | 9.16                | 10.23               | 10.42 | 11.66 | 10.37              |
| Difference (±0.562)                           | -0.54               | +0.67               | -0.16 | +0.45 | +0.11<br>(± 0.281) |
| Salt: cwt per acre                            |                     |                     |       |       |                    |
| None  | 8.92                | 9.35                | 10.28 | 10.95 | 9.87               |
| 5.0   | 9.95                | 10.44               | 10.71 | 11.92 | 10.76              |
| Difference (±0.562)                           | +1.03               | +1.09               | +0.43 | +0.97 | +0.89<br>(± 0.281) |

56/Cf/1.6

Plant number: thousands per acre

|  | None | Dung: tons per acre |      | 20   | Mean |
|--|------|---------------------|------|------|------|
|  |      | 5                   | 10   |      |      |
| Great Field II (Rothamsted)                  |      |                     |      |      |      |
| Mean   | 27.0 | 27.4                | 26.5 | 25.6 | 26.6 |
| N: cwt per acre                              |      |                     |      |      |      |
| None   | 27.6 | 27.4                | 27.0 | 25.8 | 27.0 |
| 0.9  | 26.4 | 27.4                | 26.1 | 25.4 | 26.3 |
| Difference                                   | -1.2 | 0.0                 | -0.9 | -0.4 | -0.7 |
| P <sub>2</sub> O <sub>5</sub> : cwt per acre |      |                     |      |      |      |
| None   | 27.5 | 28.0                | 26.5 | 25.8 | 26.9 |
| 0.75   | 26.5 | 26.9                | 26.6 | 25.4 | 26.3 |
| Difference                                   | -1.0 | -1.1                | +0.1 | -0.4 | -0.6 |
| K <sub>2</sub> O: cwt per acre               |      |                     |      |      |      |
| None   | 26.3 | 27.5                | 26.5 | 25.6 | 26.5 |
| 1.5  | 27.7 | 27.3                | 26.6 | 25.6 | 26.8 |
| Difference                                   | +1.4 | -0.2                | +0.1 | 0.0  | +0.3 |
| Salt: cwt per acre                           |      |                     |      |      |      |
| None   | 27.1 | 27.0                | 27.0 | 25.8 | 26.7 |
| 5.0  | 26.9 | 27.8                | 26.1 | 25.3 | 26.5 |
| Difference                                   | -0.2 | +0.8                | -0.9 | -0.5 | -0.2 |

Butt Close (Woburn)

Not recorded.

56/Cf/1.7

Roots (washed): tons per acre

|                                |                    | Dung: tons per acre |       |       |       |
|--------------------------------|--------------------|---------------------|-------|-------|-------|
|                                |                    | None                | 5     | 10    | 20    |
| Great Field II (Rothamsted)    |                    |                     |       |       |       |
| K <sub>2</sub> O: cwt per acre | Salt: cwt per acre |                     |       |       |       |
| None                           | None               | 11.51               | 12.52 | 14.75 | 15.76 |
| 1.5                            | None               | 13.06               | 14.40 | 14.98 | 15.24 |
| None                           | 5.0                | 13.38               | 14.69 | 16.71 | 15.81 |
| 1.5                            | 5.0                | 12.36               | 15.57 | 15.90 | 17.13 |

Butt Close (Woburn)

| K <sub>2</sub> O: cwt per acre | Salt: cwt per acre |       |       |       |       |
|--------------------------------|--------------------|-------|-------|-------|-------|
| None                           | None               | 11.84 | 12.21 | 14.16 | 15.10 |
| 1.5                            | None               | 11.85 | 13.73 | 14.60 | 15.36 |
| None                           | 5.0                | 13.00 | 14.40 | 15.83 | 15.95 |
| 1.5                            | 5.0                | 13.92 | 18.07 | 14.97 | 16.87 |

Sugar percentage

|                                |                    | Dung: tons per acre |      |      |      |
|--------------------------------|--------------------|---------------------|------|------|------|
|                                |                    | None                | 5    | 10   | 20   |
| Great Field II (Rothamsted)    |                    |                     |      |      |      |
| K <sub>2</sub> O: cwt per acre | Salt: cwt per acre |                     |      |      |      |
| None                           | None               | 15.9                | 16.0 | 15.7 | 16.1 |
| 1.5                            | None               | 16.2                | 15.9 | 15.7 | 16.0 |
| None                           | 5.0                | 15.9                | 16.3 | 16.0 | 15.6 |
| 1.5                            | 5.0                | 15.8                | 16.2 | 15.8 | 16.0 |

Butt Close (Woburn)

| K <sub>2</sub> O: cwt per acre | Salt: cwt per acre |      |      |      |      |
|--------------------------------|--------------------|------|------|------|------|
| None                           | None               | 18.2 | 18.0 | 18.0 | 18.2 |
| 1.5                            | None               | 18.4 | 18.4 | 18.1 | 17.8 |
| None                           | 5.0                | 17.8 | 18.2 | 17.8 | 18.2 |
| 1.5                            | 5.0                | 18.0 | 18.2 | 18.2 | 17.5 |

56/Cf/1.8

Total sugar: cwt per acre

|  |  | Dung: tons per acre |   |    |    |
|--|--|---------------------|---|----|----|
|  |  | None                | 5 | 10 | 20 |

Great Field II (Rothamsted)

| K <sub>2</sub> O: cwt per acre | Salt: cwt per acre | (± 2.25) |      |      |      |
|--------------------------------|--------------------|----------|------|------|------|
| None                           | None               | 36.8     | 40.2 | 46.3 | 50.6 |
| 1.5                            | None               | 42.3     | 45.8 | 47.0 | 48.8 |
| None                           | 5.0                | 42.4     | 47.9 | 53.5 | 49.5 |
| 1.5                            | 5.0                | 39.4     | 50.5 | 50.4 | 54.9 |

Butt Close (Woburn)

| K <sub>2</sub> O: cwt per acre | Salt: cwt per acre | (± 3.14) |      |      |      |
|--------------------------------|--------------------|----------|------|------|------|
| None                           | None               | 43.1     | 43.7 | 50.8 | 55.1 |
| 1.5                            | None               | 43.3     | 50.6 | 53.0 | 54.5 |
| None                           | 5.0                | 46.5     | 52.5 | 56.4 | 57.8 |
| 1.5                            | 5.0                | 50.1     | 66.0 | 54.3 | 58.9 |

Tops: tons per acre

|  |  | Dung: tons per acre |   |    |    |
|--|--|---------------------|---|----|----|
|  |  | None                | 5 | 10 | 20 |

Great Field II (Rothamsted)

| K <sub>2</sub> O: cwt per acre | Salt: cwt per acre | (± 1.229) |       |       |       |
|--------------------------------|--------------------|-----------|-------|-------|-------|
| None                           | None               | 19.33     | 20.51 | 21.45 | 27.87 |
| 1.5                            | None               | 22.59     | 21.83 | 24.77 | 26.78 |
| None                           | 5.0                | 22.70     | 25.17 | 27.20 | 29.28 |
| 1.5                            | 5.0                | 21.45     | 27.32 | 25.94 | 30.17 |

Butt Close (Woburn)

| K <sub>2</sub> O: cwt per acre | Salt: cwt per acre | (± 0.562) |       |       |       |
|--------------------------------|--------------------|-----------|-------|-------|-------|
| None                           | None               | 9.24      | 9.38  | 10.42 | 11.64 |
| 1.5                            | None               | 8.59      | 9.33  | 10.14 | 10.26 |
| None                           | 5.0                | 10.17     | 9.75  | 10.73 | 10.78 |
| 1.5                            | 5.0                | 9.73      | 11.13 | 10.69 | 13.06 |

Plant number: thousands per acre

|  |  | Dung: tons per acre |   |    |    |
|--|--|---------------------|---|----|----|
|  |  | None                | 5 | 10 | 20 |

Great Field II (Rothamsted)

| K <sub>2</sub> O: cwt per acre | Salt: cwt per acre |      |      |      |      |
|--------------------------------|--------------------|------|------|------|------|
| None                           | None               | 26.5 | 27.4 | 27.6 | 26.1 |
| 1.5                            | None               | 27.7 | 26.6 | 26.5 | 25.5 |
| None                           | 5.0                | 26.2 | 27.6 | 25.4 | 25.0 |
| 1.5                            | 5.0                | 27.7 | 28.1 | 26.8 | 25.7 |

Butt Close (Woburn)  
not recorded.

56/Cf/1.9

| Response to | Responses to treatments<br>cwt per acre |     |                               |      |                  |     |      |     |
|-------------|---|-----|-------------------------------|------|------------------|-----|------|-----|
|             | N                                       |     | P <sub>2</sub> O <sub>5</sub> |      | K <sub>2</sub> O |     | Salt |     |
|             | None                                    | 0.9 | None                          | 0.75 | None             | 1.5 | None | 5.0 |

Roots (washed): tons per acre

Great Field II (Rothamsted)

|                               |       |       |       |       |       |       |       |       |
|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| N                             | -     | -     | +0.05 | +0.47 | -0.29 | +0.31 | +0.41 | +0.11 |
| P <sub>2</sub> O <sub>5</sub> | +2.86 | +3.28 | -     | -     | +2.69 | +3.45 | +3.04 | +3.10 |
| K <sub>2</sub> O              | -0.11 | +0.99 | +0.06 | +0.82 | -     | -     | +0.79 | +0.09 |
| Salt                          | +1.32 | +1.02 | +1.14 | +1.20 | +1.52 | +0.82 | -     | -     |

Butt Close (Woburn)

|                               |       |       |       |       |       |       |       |       |
|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| N                             | -     | -     | +3.75 | +2.73 | +3.71 | +2.77 | +3.57 | +2.91 |
| P <sub>2</sub> O <sub>5</sub> | +0.82 | -0.20 | -     | -     | +0.26 | +0.36 | +0.41 | +0.21 |
| K <sub>2</sub> O              | +1.33 | +0.39 | +0.81 | +0.91 | -     | -     | +0.55 | +1.17 |
| Salt                          | +2.10 | +1.44 | +1.87 | +1.67 | +1.46 | +2.08 | -     | -     |

Sugar percentage

Great Field II (Rothamsted)

|                               |      |      |      |      |      |      |      |      |
|-------------------------------|------|------|------|------|------|------|------|------|
| N                             | -    | -    | -0.7 | -0.7 | -0.9 | -0.5 | -0.8 | -0.6 |
| P <sub>2</sub> O <sub>5</sub> | -0.1 | -0.1 | -    | -    | -0.1 | -0.1 | -0.1 | -0.1 |
| K <sub>2</sub> O              | -0.2 | +0.2 | 0.0  | 0.0  | -    | -    | 0.0  | 0.0  |
| Salt                          | -0.1 | +0.1 | 0.0  | 0.0  | 0.0  | 0.0  | -    | -    |

Butt Close (Woburn)

|                               |      |      |      |      |      |      |      |      |
|-------------------------------|------|------|------|------|------|------|------|------|
| N                             | -    | -    | -0.2 | -0.2 | -0.2 | -0.2 | -0.4 | 0.0  |
| P <sub>2</sub> O <sub>5</sub> | -0.1 | -0.1 | -    | -    | -0.2 | 0.0  | -0.2 | 0.0  |
| K <sub>2</sub> O              | 0.0  | 0.0  | -0.1 | +0.1 | -    | -    | +0.1 | -0.1 |
| Salt                          | -0.4 | 0.0  | -0.3 | -0.1 | -0.1 | -0.3 | -    | -    |

Total sugar: cwt per acre

Great Field II (Rothamsted)

|                               | (± 1.59) |      |      |      |      |       |      |      |
|-------------------------------|----------|------|------|------|------|-------|------|------|
| N                             | -        | -    | -1.5 | -0.9 | -3.6 | +1.2  | -1.0 | -1.4 |
| P <sub>2</sub> O <sub>5</sub> | +9.2     | +9.8 | -    | -    | +3.2 | +10.8 | +9.4 | +9.6 |
| K <sub>2</sub> O              | -0.9     | +3.9 | +0.2 | +2.8 | -    | -     | +2.5 | +0.5 |
| Salt                          | +4.0     | +3.6 | +3.7 | +3.9 | +4.8 | +2.8  | -    | -    |

Butt Close (Woburn)

|                               | (± 2.22) |      |       |      |       |      |       |       |
|-------------------------------|----------|------|-------|------|-------|------|-------|-------|
| N                             | -        | -    | +13.1 | +8.9 | +12.7 | +9.3 | +11.8 | +10.2 |
| P <sub>2</sub> O <sub>5</sub> | +2.9     | -1.3 | -     | -    | +0.2  | +1.4 | +0.9  | +0.7  |
| K <sub>2</sub> O              | +4.8     | +1.4 | +2.5  | +3.7 | -     | -    | +2.2  | +4.0  |
| Salt                          | +6.9     | +5.3 | +6.2  | +6.0 | +5.2  | +7.0 | -     | -     |

56/Cf/1.10

| Response to | Responses to treatments<br>cwt per acre |     |                               |      |                  |     |      |     |
|-------------|---|-----|-------------------------------|------|------------------|-----|------|-----|
|             | N                                       |     | P <sub>2</sub> O <sub>5</sub> |      | K <sub>2</sub> O |     | Salt |     |
|             | None                                    | 0.9 | None                          | 0.75 | None             | 1.5 | None | 5.0 |

Tops: tons per acre

Great Field II (Rothamsted)

(± 0.869)

|                               |       |       |       |       |       |       |       |       |
|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| N                             | -     | -     | +2.94 | +4.70 | +3.87 | +3.77 | +3.84 | +3.80 |
| P <sub>2</sub> O <sub>5</sub> | +2.36 | +4.12 | -     | -     | +2.95 | +3.53 | +1.91 | +4.57 |
| K <sub>2</sub> O              | +0.97 | +0.87 | +0.63 | +1.21 | -     | -     | +1.70 | +0.14 |
| Salt                          | +3.03 | +2.99 | +1.68 | +4.34 | +3.79 | +2.23 | -     | -     |

Butt Close (Woburn)

(± 0.398)

|                               |       |       |       |       |       |       |       |       |
|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| N                             | -     | -     | +3.73 | +3.41 | +3.85 | +3.29 | +4.26 | +2.88 |
| P <sub>2</sub> O <sub>5</sub> | +0.29 | -0.03 | -     | -     | +0.51 | -0.25 | +0.87 | -0.61 |
| K <sub>2</sub> O              | +0.38 | -0.18 | +0.48 | -0.28 | -     | -     | -0.59 | +0.79 |
| Salt                          | +1.57 | +0.19 | +1.62 | +0.14 | +0.19 | +1.57 | -     | -     |

Plant number: thousands per acre

Great Field II (Rothamsted)

|                               |      |      |      |      |      |      |      |      |
|-------------------------------|------|------|------|------|------|------|------|------|
| N                             | -    | -    | -0.7 | -0.5 | -0.8 | -0.4 | -0.5 | -0.7 |
| P <sub>2</sub> O <sub>5</sub> | -0.7 | -0.5 | -    | -    | -0.2 | -1.0 | -0.4 | -0.8 |
| K <sub>2</sub> O              | +0.1 | +0.5 | +0.7 | -0.1 | -    | -    | -0.4 | +1.0 |
| Salt                          | -0.1 | -0.3 | 0.0  | -0.4 | -0.9 | +0.5 | -    | -    |

Butt Close (Woburn)

Not recorded

56/Cg/1.1

LUCERNE

Single and repeated applications of potash - Great Harpenden II 1956, the second year.

Design: 6 randomized blocks of 8 plots each.

Area of each plot: 0.0147 acres.

Treatments: (For the 3 years 1955 - 57)

None (2 plots per block).

Single dressings in 1955: 1; 2; 3 cwt  $K_2O$  per acre as muriate of potash.

Annual dressings: 0.33; 0.66; 1.0 cwt  $K_2O$  per acre as muriate of potash.

Note: In spring 1955 all the potash dressings were given in the seed bed. Subsequent annual applications are applied as top dressings.

Basal dressing 1956: 3 tons ground chalk per acre.

Cultivations, etc.: Annual potash dressings applied: Nov 8, 1955.

Ground chalk applied: Mar 12, 1956. Cut and weighed green: three times - June 11, July 24, Oct 24.

Standard errors per plot. Dry matter:

1st cut: 2.15 cwt per acre or 7.4% (36 d.f.)

2nd cut: 2.50 cwt per acre or 9.4% (36 d.f.)

3rd cut: 0.972 cwt per acre or 5.8% (36 d.f.)

Total of 3 cuts: 3.89 cwt per acre or 5.4% (36 d.f.)

Note: For the first year's results, see "Results of the Field Experiments" 1955, Section Ce/1.



56/Cg/1.2

Summary of Results

|   | Dry matter: cwt per acre |              |                       | K <sub>2</sub> O: cwt per acre |                  |                  | Mean |
|---|--------------------------|--------------|-----------------------|--------------------------------|------------------|------------------|------|
|   | None                     | Applied 1955 | Applied 1955 and 1956 | Applied annually               | Applied annually | Applied annually |      |
|   | 1.0                      | 2.0          | 3.0                   | 0.33                           | 0.66             | 1.0              |      |
| 1st cut   |                          |              |                       |                                |                  |                  |      |
|   | (± 0.62)                 |              |                       | (± 0.88)                       |                  |                  |      |
| Mean  | 27.2                     | 29.7         | 30.8                  | 31.9                           | 27.6             | 29.8             | 29.8 |
| Increase (±1.08)                                |                          | 2.5          | 3.6                   | 4.7                            | 0.4              | 2.6              | 2.6  |
| 2nd cut   |                          |              |                       |                                |                  |                  |      |
|   | (± 0.72)                 |              |                       | (± 1.02)                       |                  |                  |      |
| Mean  | 25.5                     | 26.0         | 28.1                  | 27.6                           | 25.9             | 26.7             | 27.1 |
| Increase (±1.25)                                |                          | 0.5          | 2.6                   | 2.1                            | 0.4              | 1.2              | 1.6  |
| 3rd cut   |                          |              |                       |                                |                  |                  |      |
|   | (± 0.28)                 |              |                       | (± 0.40)                       |                  |                  |      |
| Mean  | 16.0                     | 16.8         | 17.6                  | 17.3                           | 16.4             | 17.1             | 17.3 |
| Increase (±0.49)                                |                          | 0.8          | 1.6                   | 1.3                            | 0.4              | 1.1              | 1.3  |
| Total of 3 cuts                                 |                          |              |                       |                                |                  |                  |      |
|   | (± 1.12)                 |              |                       | (± 1.59)                       |                  |                  |      |
| Mean  | 68.7                     | 72.5         | 76.5                  | 76.8                           | 69.8             | 73.6             | 74.2 |
| Increase (±1.95)                                |                          | 3.8          | 7.8                   | 8.1                            | 1.1              | 4.9              | 5.5  |
| 1st cut, Mean dry matter % as cut: 24.2         |                          |              |                       |                                |                  |                  |      |
| 2nd cut, Mean dry matter % as cut: 23.0         |                          |              |                       |                                |                  |                  |      |
| 3rd cut, Mean dry matter % as cut: 24.5         |                          |              |                       |                                |                  |                  |      |
| Total of 3 cuts, Mean dry matter % as cut: 23.9 |                          |              |                       |                                |                  |                  |      |

56/Ch/1

KALE

Placement of nitrogen, phosphate and potash - W.Barnfield I 1956.

Design: 4 randomized blocks of 10 plots each.

Area of each plot: 0.00909 acres. Area harvested: 0.00727 acres.

Treatments: None (2 plots per block) and all combinations of Fertilizer: P; K; PK; NPK.

Method of application: Broadcast in seed bed; drilled in band 2" to side of seed and 2" below soil surface

where N = 0.4 cwt N per acre as sulphate of ammonia  
 P = 0.6 cwt P<sub>2</sub>O<sub>5</sub> per acre as superphosphate  
 K = 1.0 cwt K<sub>2</sub>O per acre as muriate of potash

In addition top dressings were applied:-

To "NPK" plots: 0.8 cwt N per acre as sulphate of ammonia  
 To all other plots: 1.2 cwt N per acre as sulphate of ammonia.

Basal dressing: None.

Cultivations, etc.: Ploughed: Nov 1, 1955. Broadcast fertilizers applied, seed drilled at 6 lb per acre with sideband fertilizer: Apr 17, 1956. Sprayed with miscible DDT, 3 pints in 40 gallons: May 11. Top dressing applied: June 22. Cut (by blocks): Dec 3, 10, 14 and 20. Variety: Marrowstem. Previous crop: Wheat.

Standard error per plot:

Yield: 2.00 tons per acre or 7.9% (28 d.f.)

Summary of Results

Yield: tons per acre

| N top dressing:<br>cwt per acre<br>Treatment at sowing | 1.2       |       |       |       | 0.8   | Mean               |
|--|-----------|-------|-------|-------|-------|--------------------|
|  | None      | P     | K     | PK    | NPK   |                    |
| <u>Method of application</u>                           | (± 0.999) |       |       |       |       |                    |
| Broadcast  |           | 24.28 | 22.90 | 28.04 | 28.04 | 25.81              |
| Drilled  |           | 26.67 | 19.84 | 30.55 | 31.03 | 27.02              |
| Mean (±0.707)  | 20.49     | 25.47 | 21.37 | 29.30 | 29.53 | 25.23              |
| Difference (±1.413)                                    |           | +2.39 | -3.06 | +2.51 | +2.99 | +1.21<br>(± 0.707) |

56/Ci/1.1

GRASS

Rates and times of application of nitrogenous fertilizers - Long Hoos  
1, 2, 3, 1956.

Design: 4 randomized blocks of 16 plots each.

Area of each plot: 0.0075 acres. Area harvested: 0.0045 acres.

Treatments: None (4 plots per block) together with all combinations of:-

Materials and methods of application

Applied in one single dressing

Formalized casein 12.2% N

Casein 12.6% N

Ammonium sulphate 21.0% N

applied in 3 dressings of one third the single rate each

Ammonium sulphate 21.0% N

Urea 43.5% N

Calcium nitrate 15.5% N

Rates of application

0.75; 1.5 cwt N per acre.

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

Cultivations, etc.: Ploughed: Sept 19, 1955. Basal fertilizer  
applied, single dressings and first partial dressings of nitrogen  
applied, seed drilled at 50 lb per acre: Apr 10, 1956. Sprayed  
with MCPA, 3 pints in 40 gallons per acre: May 22. Second and  
third partial dressings applied: July 11, Aug 10. Cut: three  
times - July 10, Aug 9, Oct 23. Variety: New Zealand H1 Ryegrass.  
Previous crop: Wheat.

Note: The ryegrass seed was sown in drills 7" apart and cross drilled.

Standard errors per plot. Grass dry matter:

|                 |                                      |
|-----------------|--------------------------------------|
| 1st cut         | 1.51 cwt per acre or 15.2% (48 d.f.) |
| 2nd cut         | 1.22 cwt per acre or 10.6% (46 d.f.) |
| 3rd cut         | 1.40 cwt per acre or 9.3% (48 d.f.)  |
| Total of 3 cuts | 2.47 cwt per acre or 6.8% (48 d.f.)  |

\*2 missing values.

56/Ci/1.2

Summary of Results

Dry Matter: cwt per acre

| Level of N in fertilizer:<br>cwt per acre | Fertilizer      |      |       |                   |      |      | Mean         |
|---|-----------------|------|-------|-------------------|------|------|--------------|
|   | Single dressing |      |       | Repeated dressing |      |      |              |
|   | F               | C    | A     | A                 | U    | N    |              |
| 1st Cut<br>(±0.75)                        |                 |      |       |                   |      |      |              |
| None                                      |                 |      |       |                   |      |      | 2.8 (±0.38)  |
| 0.75                                      | 3.4             | 17.2 | 16.7  | 8.4               | 8.2  | 9.0  | 10.5 (±0.31) |
| 1.50                                      | 4.1             | 19.9 | 20.2  | 10.8              | 13.1 | 16.6 | 14.1 (±0.31) |
| Mean (±0.53)                              | 3.7             | 18.6 | 18.5  | 9.6               | 10.7 | 12.8 | 9.9          |
| Diff. (±1.07)                             | 0.7             | 2.7  | 3.5   | 2.4               | 4.9  | 7.6  | 3.6 (±0.44)  |
| 2nd Cut<br>(±0.61)                        |                 |      |       |                   |      |      |              |
| None                                      |                 |      |       |                   |      |      | 3.4 (±0.30)  |
| 0.75                                      | 9.6             | 8.5  | 10.2* | 14.3*             | 12.8 | 12.8 | 11.4 (±0.25) |
| 1.50                                      | 15.2            | 15.5 | 16.5  | 19.6              | 16.9 | 18.5 | 17.0 (±0.25) |
| Mean (±0.43)                              | 12.4            | 12.0 | 13.3  | 16.9              | 14.9 | 15.7 | 11.5         |
| Diff. (±0.86)                             | 5.6             | 7.0  | 6.3   | 5.3               | 4.1  | 5.7  | 5.6 (±0.35)  |
| 3rd Cut<br>(±0.70)                        |                 |      |       |                   |      |      |              |
| None                                      |                 |      |       |                   |      |      | 4.9 (±0.35)  |
| 0.75                                      | 16.6            | 8.4  | 8.9   | 18.2              | 20.6 | 17.6 | 15.1 (±0.29) |
| 1.50                                      | 25.8            | 13.4 | 15.5  | 26.7              | 26.0 | 23.0 | 21.7 (±0.29) |
| Mean (±0.49)                              | 21.2            | 10.9 | 12.2  | 22.5              | 23.3 | 20.3 | 15.0         |
| Diff. (±0.99)                             | 9.2             | 5.0  | 6.6   | 8.5               | 5.4  | 5.4  | 6.6 (±0.40)  |
| Total of 3 cuts<br>(±1.24)                |                 |      |       |                   |      |      |              |
| None                                      |                 |      |       |                   |      |      | 11.2 (±0.62) |
| 0.75                                      | 29.7            | 34.2 | 35.8  | 41.0              | 41.6 | 39.5 | 37.0 (±0.50) |
| 1.50                                      | 45.1            | 48.8 | 52.2  | 57.1              | 56.0 | 58.1 | 52.9 (±0.50) |
| Mean (±0.87)                              | 37.4            | 41.5 | 44.0  | 49.0              | 48.8 | 48.8 | 36.5         |
| Diff. (±1.75)                             | 15.4            | 14.6 | 16.4  | 16.1              | 14.4 | 18.6 | 15.9 (±0.71) |

\*Includes 1 estimated value.

Treatments

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

Mean dry matter % as cut:

1st cut: 20.1  
 2nd cut: 21.2  
 3rd cut: 19.9  
 Total of 3 cuts: 20.4

56/E/1

CHEMICAL ANALYSES OF ORGANIC MATERIALS, USED IN THE THREE  
COURSE ROTATION AND MARKET GARDEN EXPERIMENTS 1956

| Material                          | Percentage<br>dry matter<br>in sample | Percentage in dry matter |      |                               |                  |
|-----------------------------------|---------------------------------------|--------------------------|------|-------------------------------|------------------|
|                                   |                                       | Organic<br>matter        | N    | P <sub>2</sub> O <sub>5</sub> | K <sub>2</sub> O |
| Three Course Rotation, Rothamsted |                                       |                          |      |                               |                  |
| Wheat Straw                       | 86.6                                  | 92.8                     | 0.52 | 1.60                          | 1.55             |
| Market Garden Experiment, Woburn  |                                       |                          |      |                               |                  |
| Sewage Sludge                     |                                       |                          |      |                               |                  |
| 1a                                | 51.6                                  | 44.9                     | 2.32 | 3.92                          | 0.21             |
| 1b                                | 52.6                                  | 22.2                     | 1.80 | 1.21                          | 0.12             |
| 2                                 | 78.8                                  | 41.3                     | 2.43 | 3.37                          | 0.19             |
| 3                                 | 54.4                                  | 40.2                     | 2.60 | 3.49                          | 0.16             |
| Sludge Straw Compost              |                                       |                          |      |                               |                  |
| 1                                 | 34.4                                  | 42.4                     | 2.09 | 2.61                          | 0.48             |
| 2                                 | 39.0                                  | 44.4                     | 2.29 | 2.75                          | 0.93             |
| 3                                 | 41.6                                  | 43.2                     | 2.41 | 3.51                          | 0.72             |
| Vegetable Compost                 |                                       |                          |      |                               |                  |
| 1                                 | 24.0                                  | 50.3                     | 2.25 | 4.42                          | 2.52             |
| 2                                 | 27.8                                  | 49.4                     | 2.64 | 4.01                          | 3.15             |
| 3                                 | 25.3                                  | 56.7                     | 2.59 | 3.96                          | 2.53             |
| Farmyard Manure                   |                                       |                          |      |                               |                  |
| 1                                 | 27.0                                  | 53.1                     | 2.34 | 1.79                          | 1.63             |
| 2                                 | 19.2                                  | 57.4                     | 4.14 | 4.18                          | 3.13             |
| 3                                 | 27.7                                  | 56.8                     | 2.54 | 3.53                          | 3.66             |

Note. Samples applied: 1 - July 1955; 2 - September 1955;  
3 - April 1956.

Samples of sewage sludge 1a and 1b represent two batches  
used to provide the requisite amount.

METEOROLOGICAL RECORDS ROTHAMSTED 1956

(Departure from long period means in brackets)

| Month | Total sunshine: hours | Mean temperature: °F |           |                       | Ground (2) frosts | Total rainfall: in. 1/1000 acre gauge | Rain (3) days | Drain- age through 20 in. soil: in. | Wind (4) m.p.h. |     |
|-------|-----------------------|----------------------|-----------|-----------------------|-------------------|---------------------------------------|---------------|-------------------------------------|-----------------|-----|
|       |                       | Air (1)              | Dew point | In ground 1 ft. 4 ft. |                   |                                       |               |                                     |                 |     |
| Jan.  | 53 (+1)               | 37.5 (+0.2)          | 34.7      | 37.5                  | 43.3              | 18                                    | 4.63 (+2.13)  | 26                                  | 3.92            | 5.3 |
| Feb.  | 72 (+3)               | 29.3 (-9.0)          | 27.9      | 34.0                  | 40.7              | 26                                    | 0.68 (-1.25)  | 14                                  | 0.32            | 5.9 |
| Mar.  | 137 (+19)             | 42.5 (+1.2)          | 36.0      | 40.0                  | 40.4              | 14                                    | 1.03 (-0.88)  | 8                                   | 0.42            | 6.3 |
| Apr.  | 167 (+10)             | 43.3 (-2.5)          | 35.9      | 44.3                  | 43.2              | 18                                    | 1.15 (-0.79)  | 9                                   | 0.22            | 5.4 |
| May   | 229 (+34)             | 53.6 (+1.7)          | 43.5      | 53.4                  | 46.9              | 2                                     | 0.63 (-1.54)  | 8                                   | 0.00            | 4.9 |
| June  | 143 (-59)             | 54.5 (-2.8)          | 48.0      | 55.5                  | 50.7              | 0                                     | 3.93 (+1.76)  | 16                                  | 1.66            | 5.1 |
| July  | 159 (-37)             | 60.1 (-0.6)          | 54.4      | 60.5                  | 54.2              | 0                                     | 2.54 (0.00)   | 13                                  | 0.35            | 4.7 |
| Aug.  | 151 (-34)             | 56.3 (-3.9)          | 51.7      | 57.3                  | 55.9              | 0                                     | 5.34 (+2.77)  | 24                                  | 2.42            | 4.1 |
| Sept. | 98 (-48)              | 57.7 (+1.7)          | 53.5      | 56.9                  | 55.5              | 0                                     | 2.28 (-0.09)  | 15                                  | 1.23            | 4.5 |
| Oct.  | 100 (-4)              | 48.1 (-0.8)          | 44.2      | 50.1                  | 54.1              | 3                                     | 1.85 (-1.14)  | 17                                  | 0.65            | 4.3 |
| Nov.  | 56 (-6)               | 41.4 (-1.1)          | 38.6      | 42.5                  | 49.5              | 12                                    | 0.86 (-1.97)  | 16                                  | 0.19            | 5.1 |
| Dec.  | 12 (-33)              | 41.3 (+2.6)          | 39.7      | 41.5                  | 46.3              | 8                                     | 3.86 (+1.30)  | 22                                  | 3.23            | 4.9 |
| Year* | 1377 (-154)           | 47.1 (-1.1)          | 42.3      | 47.8                  | 48.4              | 101                                   | 28.78 (+0.30) | 188                                 | 14.61           | 5.0 |

(1) Mean of maximum and minimum.

(2) Number of nights grass minimum was 30°F

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

(4) At 2 metres above ground level.

\* Mean or total.

56/E/2.2

METEOROLOGICAL RECORDS WOBURN 1956

| Month     | Total sunshine: hours | Mean Temperature: °F |                 | Grass minimum: °F | Total rainfall: in. 8" gauge | Rain <sup>(2)</sup> days |
|-----------|-----------------------|----------------------|-----------------|-------------------|------------------------------|--------------------------|
|           |                       | Air <sup>(1)</sup>   | In ground 1 ft. |                   |                              |                          |
| January   | 63                    | 37.6                 | 37.5            | 29.5              | 3.98                         | 21                       |
| February  | 66                    | 29.1                 | 33.6            | 22.1              | 0.54                         | 11                       |
| March     | 150                   | 42.6                 | 40.6            | 29.1              | 0.77                         | 7                        |
| April     | 149                   | 43.1                 | 45.0            | 29.8              | 1.35                         | 8                        |
| May       | 225                   | 53.4                 | 54.2            | 37.3              | 0.43                         | 5                        |
| June      | 139                   | 54.4                 | 57.1            | 43.7              | 2.48                         | 17                       |
| July      | 163                   | 60.3                 | 62.1            | 49.7              | 3.69                         | 13                       |
| August    | 146                   | 56.5                 | 58.1            | 46.6              | 4.19                         | 22                       |
| September | 99                    | 57.4                 | 56.9            | 47.5              | 2.16                         | 11                       |
| October   | 108                   | 48.0                 | 49.6            | 38.2              | 1.50                         | 15                       |
| November  | 67                    | 41.6                 | 41.9            | 32.7              | 0.75                         | 11                       |
| December  | 20                    | 38.4                 | 41.0            | 34.3              | 2.93                         | 21                       |
| Year*     | 1395                  | 46.9                 | 48.1            | 36.7              | 24.77                        | 162                      |

(1) Mean of maximum and minimum.

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

\*Mean or total.

ROTHAMSTED REPORT FOR 1977, PART 1

CONVERSION FACTORS

Factors for the Conversion of Imperial to Metric Units

|                                      |  |
|--------------------------------------|--|
| 1 inch (in.)                         | = 2.540 centimetres (cm)                   |
| 1 foot (ft) (=12 in.)                | = 30.48 cm                                 |
| 1 yard (yd) (=3 ft)                  | = 0.9144 metre (m)                         |
| 1 square yard (yd <sup>2</sup> )     | = 0.8361 m <sup>2</sup>                    |
| 1 acre (ac) (=4840 yd <sup>2</sup> ) | = 0.4047 hectare (ha)                      |
| 1 ounce (oz)                         | = 28.35 grams (g)                          |
| 1 pound (lb)                         | = 0.4536 kilogram (kg)                     |
| 1 hundredweight (cwt) (=112 lb)      | = 50.80 kg                                 |
| 1 ton (=2240 lb)                     | = 1016 kg = 1.016 metric tons (tonnes) (t) |
| 1 pint                               | = 0.5682 litre (l)                         |
| 1 gallon (gal) (=8 pints)            | = 4.546 litres                             |
| 1 fluid ounce = 1/20 pint            | = 0.02841 litre = 28.41 ml                 |
| 1 cubic foot                         | = 28.32 litres                             |

| <i>To convert</i>                           | <i>Multiply by</i> |
|---|--------------------|
| oz ac <sup>-1</sup> to g ha <sup>-1</sup>   | 70.06              |
| lb ac <sup>-1</sup> to kg ha <sup>-1</sup>  | 1.121              |
| cwt ac <sup>-1</sup> to kg ha <sup>-1</sup> | 125.5              |
| cwt ac <sup>-1</sup> to t ha <sup>-1</sup>  | 0.1255             |
| ton ac <sup>-1</sup> to kg ha <sup>-1</sup> | 2511               |
| ton ac <sup>-1</sup> to t ha <sup>-1</sup>  | 2.511              |
| gal ac <sup>-1</sup> to l ha <sup>-1</sup>  | 11.233             |

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

$$\begin{aligned}1 \text{ lb ac}^{-1} &= 1.1 \text{ kg ha}^{-1} \\1 \text{ gal ac}^{-1} &= 11 \text{ litres ha}^{-1} \\1 \text{ ton ac}^{-1} &= 2.5 \text{ t ha}^{-1}\end{aligned}$$

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

$$\begin{aligned}1 \text{ lb} &= 0.5 \text{ kg} \\1 \text{ lb ac}^{-1} &= 1 \text{ kg ha}^{-1}\end{aligned}$$

**Temperatures**

To convert °F into °C subtract 32 and multiply by  $\frac{5}{9}$  (0.556)  
To convert °C into °F multiply by  $\frac{9}{5}$  (1.8) and add 32



## CONVERSION FACTORS

### Factors for the Conversion of Metric to Imperial Units

|                                  |  |
|----------------------------------|--|
| 1 centimetre (cm)                | = 0.3937 inch (in.) = 0.03281 ft                             |
| 1 metre (m)                      | = 1.094 yards (yd)   |
| 1 square metre (m <sup>2</sup> ) | = 1.196 square yards (yd <sup>2</sup> )                      |
| 1 hectare (ha)                   | = 2.471 acres (ac)   |
| 1 gram (g)                       | = 0.03527 ounce (oz)   |
| 1 kilogram (kg)                  | = 2.205 pounds (lb)  |
| 1 kg                             | = 0.01968 hundredweight (cwt) = 0.0009842 ton                |
| 1 metric ton (tonne) (t)         | = 0.9842 ton   |
| 1 litre                          | = 1.760 pints = 0.2200 gallon (gal)                          |
| 1 litre = 1000 millilitres (ml)  | = 35.20 fluid ounces = 0.03531 cubic foot (ft <sup>3</sup> ) |

| <i>To convert</i>                            | <i>Multiply by</i> |
|--|--------------------|
| g ha <sup>-1</sup> to oz ac <sup>-1</sup>    | 0.01427            |
| kg ha <sup>-1</sup> to lb ac <sup>-1</sup>   | 0.8921             |
| kg ha <sup>-1</sup> to cwt ac <sup>-1</sup>  | 0.007966           |
| t ha <sup>-1</sup> to cwt ac <sup>-1</sup>   | 7.966              |
| kg ha <sup>-1</sup> to tons ac <sup>-1</sup> | 0.0003983          |
| t ha <sup>-1</sup> to tons ac <sup>-1</sup>  | 0.3983             |
| l ha <sup>-1</sup> to gal ac <sup>-1</sup>   | 0.08902            |

### Plant nutrients

Plant nutrients are best stated in terms of amounts of the elements (P, K, Na, Ca, Mg, S); the old 'oxide' terminology (P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, Na<sub>2</sub>O, CaO, MgO, SO<sub>3</sub>) is still used in work involving fertilisers and liming since Regulations require statements of P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, etc.

### For quick conversions

(accurate to within 2%) the following factors may be used:

|                                  |                                 |
|----------------------------------|---------------------------------|
| $2\frac{1}{2} \times P = P_2O_5$ | $\frac{3}{7} \times P_2O_5 = P$ |
| $1\frac{1}{2} \times K = K_2O$   | $\frac{5}{6} \times K_2O = K$   |
| $1\frac{3}{8} \times Ca = CaO$   | $\frac{7}{10} \times CaO = Ca$  |
| $1\frac{3}{4} \times Mg = MgO$   | $\frac{3}{5} \times MgO = Mg$   |

### For accurate conversions:

| <i>To convert</i>                  | <i>Multiply by</i> | <i>To convert</i>                  | <i>Multiply by</i> |
|------------------------------------|--------------------|------------------------------------|--------------------|
| P <sub>2</sub> O <sub>5</sub> to P | 0.4364             | P to P <sub>2</sub> O <sub>5</sub> | 2.2915             |
| K <sub>2</sub> O to K              | 0.8301             | K to K <sub>2</sub> O              | 1.2047             |
| CaO to Ca                          | 0.7146             | Ca to CaO                          | 1.3994             |
| MgO to Mg                          | 0.6031             | Mg to MgO                          | 1.6581             |