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# Yields of the Field Experiments 1948

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## Yields of the Field Experiments 1948 - Results

### Rothamsted Research

Rothamsted Research (1949) *Yields of the Field Experiments 1948 - Results* ; Yields Of The Field Experiments 1948, pp 1 - 98

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The summaries given in this report are similar to those contained in the appendices to the Annual Reports of the Station before the war. With one or two special exceptions only experiments conducted at Rothamsted and Woburn are included. The design and supervision of these experiments are the responsibility of the Field Plots Committee (present members: E.M.Crowther (Chairman) H.V.Garner (Secretary), H.H.Mann, J.R.Moffatt, D.J.R.Watson, F.Yates). The results of series of experiments conducted on commercial farms (such as the factory series of sugar beet fertilizer experiments) will be published elsewhere.

Reports covering the war years are being prepared.

Price: 5/-

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48/A/1.1

WHEAT - BROADBALK 1948

The 105th year

Treatments as listed in 1938 Report p.p. 115-6, except that since the year 1940-41 rape cake has been replaced by castor bean meal, at the same rate of application.

Cultivations, etc.:

Cropped sections. Dung applied: Sept. 24. Ploughed: Sept 22-  
Sept. 24. Artificial's applied: Oct. 13-15. Rolled and  
springtine harrowed: Oct. 22. Tooth harrowed: Oct. 23.  
Seed drilled: Oct. 24-25. Harrowed in: Oct. 25. Harrowed:  
Apr. 12. Ring rolled: Apr. 20. Nitrogeous fertilizers  
applied: Apr. 27-28. Second dressing of nitrate of soda  
applied to plot 16: May 7. Wild oats hand pulled: various  
days June 15 - July 30. Harvested: Aug. 19-20. Variety:  
Squareheads Master (13/4).  
Fallow section. Ploughed: Sept. 22-24. Rolled and springtine  
harrowed: Oct. 22. Tooth harrowed: Oct. 23 and 25.  
Springtine harrowed: Apr. 12. Thistles cut: Apr. 20.  
Ploughed: May 25-27. Ring rolled: June 9. Thistles cut:  
July 1. Ploughed: July 14-15. Rolled and springtine  
harrowed: Aug. 6.

| Section<br>Years after<br>Fallow | Total Grain: cwt. per acre |      |      |      |      | Total straw: % cwt. per acre |      |      |      |      |
|----------------------------------|----------------------------|------|------|------|------|------------------------------|------|------|------|------|
|                                  | II                         | I    | III  | IV   | Mean | II                           | I    | III  | IV   | Mean |
|                                  | 1                          | 2    | 3    | 4    |      | 1                            | 2    | 3    | 4    |      |
| Plot 2A                          | 32.4                       | 23.5 | 20.0 | 23.1 | 24.8 | 62.0                         | 47.5 | 29.5 | 50.0 | 47.2 |
| 2B                               | 36.0                       | 30.4 | 23.8 | 25.3 | 28.9 | 68.9                         | 58.5 | 47.8 | 51.8 | 56.8 |
| 3                                | 17.3                       | 17.2 | 10.9 | 9.8  | 13.8 | 31.3                         | 27.5 | 19.5 | 19.1 | 24.5 |
| 5                                | 20.9                       | 14.9 | 9.8  | 10.4 | 14.0 | 38.2                         | 28.5 | 21.8 | 22.4 | 27.7 |
| 6                                | 21.6                       | 20.5 | 14.3 | 14.5 | 17.7 | 42.0                         | 37.3 | 26.8 | 31.9 | 34.5 |
| 7                                | 26.1                       | 27.9 | 20.2 | 20.4 | 23.6 | 47.8                         | 48.3 | 41.7 | 44.0 | 45.4 |
| 8                                | 28.4                       | 31.8 | 25.6 | 27.5 | 28.3 | 55.2                         | 67.5 | 52.2 | 52.6 | 56.9 |
| 9                                | 22.2                       | 22.3 | 15.4 | 16.6 | 19.1 | 40.1                         | 40.8 | 31.2 | 29.6 | 35.4 |
| 10                               | 14.2                       | 24.2 | 17.6 | 12.8 | 17.2 | 32.2                         | 40.8 | 28.1 | 24.9 | 31.5 |
| 11                               | 16.3                       | 21.8 | 17.8 | 14.7 | 17.6 | 28.8                         | 38.1 | 30.7 | 26.8 | 31.1 |
| 12                               | 20.2                       | 24.4 | 19.7 | 19.7 | 21.0 | 33.2                         | 38.6 | 32.6 | 34.0 | 34.6 |
| 13                               | 26.2                       | 26.4 | 18.7 | 17.7 | 22.2 | 43.8                         | 46.2 | 33.5 | 35.1 | 39.6 |
| 14                               | 19.4                       | 28.3 | 20.2 | 20.6 | 22.1 | 34.7                         | 44.7 | 33.8 | 37.7 | 37.7 |
| 15                               | 21.6                       | 18.4 | 16.8 | 15.0 | 18.0 | 41.6                         | 41.5 | 31.1 | 33.1 | 36.8 |
| 16                               | 28.1                       | 26.6 | 22.6 | 23.1 | 25.1 | 49.5                         | 39.9 | 46.6 | 46.3 | 45.6 |
| 17                               | 20.5                       | 22.5 | 17.6 | 16.6 | 19.3 | 42.6                         | 39.2 | 33.0 | 34.6 | 37.4 |
| 18                               | 17.3                       | 12.9 | 8.8  | 8.2  | 11.8 | 30.9                         | 20.7 | 17.8 | 17.5 | 21.7 |
| 19                               | 19.6                       | 26.5 | 18.3 | 17.8 | 20.6 | 38.8                         | 43.6 | 34.1 | 36.8 | 38.3 |
| 20                               | 14.0                       | 25.1 | -    | -    | 19.6 | 29.4                         | 45.1 | -    | -    | 37.2 |

48/A/1.2

\* Incl des straw, cavings and chaff

48/A/2

BARLEY - HOOSFIELD 1948

Treatments as listed in 1938 Report, p. 117, except that since 1940-41 rape cake has been replaced by castor bean meal at the same rate of application.

Cultivations, etc.: Ploughed (shallow): Sept. 18-20. Springtime harrowed: Sept 30. Dung applied: Nov 24. Ploughed: Nov 22-28. Springtime harrowed: Mar 1-5. Artificials applied: Mar 10-11. Thistles cleared: Mar 27. Harrowed: Mar 30. Seed drilled: Mar. 31 Harrowed in: Apr 6. Rolled: Apr 10. Wild oats hand pulled: July 5-15 and July 30 - Aug 10, and scythed: Aug 9. Harvested: Aug 30.

Note: On plots 50, 5A and 3C, sections badly infected with wild oats were scythed out and discarded. On all other plots the full area was harvested.

| Plot  | Total Grain<br>cwt./acre | Total Straw <sup>*</sup><br>cwt./acre |
|-------|--------------------------|---------------------------------------|
| 1 O   | 7.6                      | 10.9                                  |
| 2 O   | 10.3                     | 11.9                                  |
| 3 O   | 8.9                      | 11.5                                  |
| 4 O   | 14.2                     | 18.3                                  |
| 5 O   | 16.3                     | 21.2                                  |
| 1 A   | 10.6                     | 16.5                                  |
| 2 A   | 16.0                     | 21.1                                  |
| 3 A   | 12.2                     | 20.2                                  |
| 4 A   | 21.6                     | 27.5                                  |
| 5 A   | 19.3                     | 23.2                                  |
| 1 AA  | 13.3                     | 25.9                                  |
| 2 AA  | 20.5                     | 27.1                                  |
| 3 AA  | 15.3                     | 23.2                                  |
| 4 AA  | 22.4                     | 27.1                                  |
| 1 AAS | 17.5                     | 27.8                                  |
| 2 AAS | 21.8                     | 31.5                                  |
| 3 AAS | 22.4                     | 30.0                                  |
| 4 AAS | 24.6                     | 30.1                                  |
| 1 C   | 15.2                     | 21.6                                  |
| 2 C   | 17.7                     | 23.2                                  |
| 3 C   | 17.3                     | 26.4                                  |
| 4 C   | 23.3                     | 18.9                                  |
| 7 - 1 | 12.6                     | 15.6                                  |
| 7 - 2 | 28.2                     | 40.2                                  |
| 6 - 1 | 6.6                      | 10.1                                  |
| 6 - 2 | 8.7                      | 11.4                                  |
| 1 N   | 12.8                     | 22.8                                  |
| 2 N   | 16.9                     | 27.4                                  |

\* Includes straw, cavings and chaff.

48/A/3

WHEAT AFTER FALLOW - HOOSFIELD 1948

Without manure 1851 and since.

For details of treatments see 1938 Report p.109.

Cultivations, etc.:

Cropped sections: Ploughed: Sept.15-16. Rolled, springtime harrowed and harrowed: Oct.24. Seed drilled and harrowed in: Oct.25. Ring rolled: Mar.31. Weeds hand pulled: July 29. Harvested: Aug.23.

Fallow sections: Ploughed: Sept.15-16. Rolled, springtime harrowed and harrowed: Sept.24. Springtime harrowed: Mar.10. Thistles cut: Apr.22. Ploughed: May 21. Ring rolled: June 9.

| No. of years of Fallow Section | Produce: cwt. per acre |         |         | Mean |
|--------------------------------|------------------------|---------|---------|------|
|                                | 1<br>A2                | 1<br>A3 | 3<br>A4 |      |
| Total Grain                    | 9.3                    | 11.1    | 10.6    | 10.3 |
| Total Straw                    | 16.6                   | 19.6    | 17.5    | 17.9 |

Note "CROPS IN ROTATION - AGDELL FIELD 1948"

Manures were applied as usual, but turnips were sown on plots 1 and 2 only. The crop was badly infected with "finger and toe", and was discarded.



MANGOLDS - BARNFIELD 1948.

48/A/4.1

Treatments as listed in 1938 Report, p.110, except that on cross dressings AC and C, rape cake has been replaced by castor bean meal at the same rate of application.

Note. Both the Mangold and Sugar Beet crops were almost destroyed by flea beetle, and only Mangolds were resown.

Cultivations, etc.: Dung applied: Nov.25. Ploughed various days: Nov. 26-Dec. 16. Cultivated: Mar. 25. Artificials applied: Apr.20 - 23. Thistles cut: Apr.24. Harrowed: Apr. 26. Rolled: Apr. 27. Seed drilled: Apr. 28. Dusted with flea beetle dust: May 14, 19 and 22. Plant almost destroyed by flea beetle by May 29, so decision made to resow mangolds only. Thistles cut: May 29. Springtine harrowed: June 8. Harrowed, rolled and seed redrilled June 9. Top dressings applied: June 10. Harrowed in seed and artificials: June 11. Dusted: June 19-22. Dung plot hoed: July 8. Hoed: July 12-15. Singled: July 12-21. Hoed: July 26-27, Aug. 16-25, Sept. 9-11, Sept 24-27 and Oct. 11. Lifted: Nov. 3-18. Variety: Yellow Globe.

Note: For leaf weights, two random rows were chosen from each plot. The weight of each of these samples was recorded separately.

|                       |       | Cross Dressings |       |       |       | 48/A/4.2 |
|-----------------------|-------|-----------------|-------|-------|-------|----------|
| Strip                 | O     | N               | A     | AC    | C     |          |
| Roots: tons per acre  |       |                 |       |       |       |          |
| 1                     | 9.52  | 18.19           | 15.49 | 18.35 | 12.61 |          |
| 2                     | 10.84 | 18.90           | 18.31 | 22.52 | 17.12 |          |
| 4                     | 2.19  | (a) 12.15       | 14.45 | 19.80 | 10.01 |          |
|                       |       | (b) 12.88       |       |       |       |          |
| 5                     | 1.54  | 9.27            | 6.34  | 8.38  | 3.90  |          |
| 6                     | 1.85  | 10.78           | 13.32 | 16.84 | 6.91  |          |
| 7                     | 1.47  | 8.28            | 11.12 | 12.83 | 5.57  |          |
| 8                     | 1.35  | 6.53            | 5.58  | 7.44  | 4.78  |          |
| 9                     | 11.73 |                 |       |       |       |          |
| Leaves: tons per acre |       |                 |       |       |       |          |
| 1                     | 3.34  | 4.82            | 4.16  | 5.75  | 6.02  |          |
| 2                     | 4.94  | 6.29            | 5.82  | 6.63  | 6.43  |          |
| 4                     | 1.96  | (a) 5.43        | 5.65  | 7.68  | 5.99  |          |
|                       |       | (b) 6.14        |       |       |       |          |
| 5                     | 1.10  | 4.21            | 2.94  | 3.84  | 2.76  |          |
| 6                     | 1.20  | 4.31            | 5.02  | 5.31  | 4.33  |          |
| 7                     | 0.91  | 4.62            | 5.46  | 7.68  | 4.65  |          |
| 8                     | 1.13  | 3.72            | 3.06  | 3.38  | 3.16  |          |
| 9                     | 5.19  |                 |       |       |       |          |

## HAY - THE PARK GRASS PLOTS, 1948.

48/A/5

For details of treatments and notes, see 1935 Report p.151 and 1938 Report p.111.

Cultivations etc.: Chain harrowed: Dec.10. Limed: Jan.3-7  
 Minerals applied: Jan.17-20. Ring rolled: Mar. 24.  
 Nitrogenous manures applied: 1st dressing Apr. 5; 2nd dressing May 4. 1st cut: June 16-18. 2nd cut: Oct.7-9

Yield of Hay: cwt. per acre.

| Plot | Not limed |             |       | Limed    |             |        |
|------|-----------|-------------|-------|----------|-------------|--------|
|      | 1st Crop  | 2nd Crop*** | Total | 1st Crop | 2nd Crop*** | Total  |
| 1    | 9.1       | 10.0        | 19.1  | 18.0     | 5.4         | 23.4   |
| 2    | 15.8      | 9.2         | 25.0  | 16.6     | 6.6         | 23.2   |
| 3    | 13.9      | 9.0         | 22.9  | 14.6     | 7.0         | 21.6   |
| 4-1  | 19.1      | 7.0         | 26.1  | 18.3     | 11.9        | 30.2   |
| 4-2  | 20.2      | 6.2         | 26.4  | 31.0     | 6.9         | 37.9   |
| 5-1  | 9.4       | 4.2         | 13.6  | -        | -           | -      |
| 5-2  | 16.0      | 12.1        | 28.1  | -        | -           | -      |
| 6    | 30.0      | 14.4        | 44.4  | -        | -           | -      |
| 7    | 31.5      | 17.9        | 49.4  | 32.4     | 17.4        | 49.8   |
| 8    | 25.5      | 10.6        | 36.1  | 12.2     | 6.9         | 19.1   |
| 9    | 34.6      | 11.2        | 45.8  | 41.0     | 7.6         | 48.6   |
| 10   | 18.7      | 11.6        | 30.3  | 32.5     | 7.0         | 39.5   |
| 11-1 | 46.2      | 23.9        | 70.1  | 51.5     | 10.0        | 61.5   |
| 11-2 | 42.3      | 10.4        | 52.7  | 63.3     | 9.1         | 72.4   |
| 12   | 13.7      | 9.5         | 23.2  | -        | -           | -      |
| 13   | 28.4      | 12.4        | 40.8  | 31.2     | 7.6         | 38.8   |
| 14   | 55.1      | 15.0        | 70.1  | 52.5*    | 11.2*       | 63.7*  |
|      |           |             |       | 47.2**   | 4.8**       | 52.0** |
| 15   | 21.6      | 22.2        | 43.8  | 19.4     | 7.8         | 27.2   |
| 16   | 39.7      | 15.8        | 55.5  | 42.9     | 8.1         | 51.0   |
| 17   | 22.4      | 8.8         | 31.2  | 24.1     | 8.5         | 32.6   |
| 18   | 3.5       | 8.1         | 11.6  | 35.1+    | 5.8+        | 40.9+  |
|      | -         | -           | -     | 29.2++   | 8.0++       | 37.2++ |
| 19   | 26.0      | 10.5        | 36.5  | 26.6+    | 6.2+        | 32.8+  |
|      | -         | -           | -     | 32.7++   | 0.4++       | 33.1++ |
| 20   | 39.7      | 12.0        | 51.7  | 41.6+    | 11.8+       | 53.4+  |
|      | -         | -           | -     | 40.4++   | 8.9++       | 49.3++ |

\* Sun

\*\* Shade

\*\*\* The figures for the second crop are estimated hay yields calculated from the dry matter.

+ Heavy liming

++ Light liming

48/Ba/1.1

## TWO COURSE ROTATION EXPERIMENT

### Cumulative Effects of Agricultural Salt

Rothamsted 1948

(For full details see 1942 Report)

#### Treatments:

All combinations of:

- (1) Agricultural salt: None,  $2\frac{1}{2}$ , 5 and  $7\frac{1}{2}$  cwt per acre applied to sugar beet or at half these rates to barley.
- (2) Muriate of potash: None, the equivalent of half the single dressing of salt (approximately 1 cwt.  $K_2O$  per acre), the equivalent of the single dressings of salt (approximately 2 cwt.  $K_2O$  per acre), applied to sugar beet at sowing.
- (3) Time of application of salt: In seed bed at sowing, before ploughing in winter.
- (4) Salt applied to sugar beet only, salt repeated at half rate on barley.

Note: treatment (3) applies to both sugar beet and barley crops; the barley receives no potash treatment. For ease of analysis  $K_2O$  of the muriate of potash dressings is made equivalent to  $Cl$  of agricultural salt dressings.

Basal dressings, applied to all plots at sowing:

Barley: 0.3 cwt. N per acre as sulphate of ammonia  
Sugar beet: 0.8 cwt. N per acre as sulphate of ammonia  
0.6 cwt.  $P_2O_5$  per acre as superphosphate.

Cultivations, etc:

Sugar Beet. Series I. Long Hoos VII

Agricultural salt applied: Oct. 21. Ploughed: Nov. 10-21. Cultivated: Mar. 16. Rolled and springtime harrowed, ring rolled: Mar. 27. Sulphate of ammonia applied: Mar. 30. Superphosphate, agricultural salt and muriate of potash applied: Apr. 12. Harrowed: Apr. 14. Seed drilled: Apr. 15. Seed harrowed in: Apr. 16. Rolled: Apr. 22. Dusted with Flea beetle dust: May 14. Plots 6, 12, 18, 24, 30, 36, 42, 48 damaged by herbicide spray from adjacent barley; May 14. Bare patches resown: late May. Hoed: May 20-21, 25. Weeds hand pulled: June 9-11. Singled: June 10-11. Hoed: June 21 - July 22. Lifted: Nov. 23-30. Variety: Klein E. Previous crop: Barley.

48/Ba/1.2

Barley. Series II. Long Hoos V.  
Agricultural salt applied: Dec 2. Ploughed: Dec 10-12.  
Springtime harrowed: Mar 1. Harrowed, seed drilled,  
sulphate of ammonia applied: Mar 8. Applied agricultural  
salt, harrowed in, ring rolled: Mar 9. Sprayed with  
"Denocate" to clear charlock, (plots 66, 65, 64, 63, 62,  
61 damaged by an overdose of spray): May 14. Hand weeded:  
June 30. Harvested: Aug. 14. Variety: Plumage Archer.  
Previous crop: Sugar Beet.

Standard errors per plot:

|                          |                       |       |
|--------------------------|-----------------------|-------|
| Sugar beet, total sugar, | 4.40 cwt. per acre or | 10.9% |
| tops,                    | 1.13 tons per acre or | 7.8%  |
| Barley, grain,           | 2.20 cwt. per acre or | 7.1%  |

All standard errors estimated from 22 d.f.

48/Ba/1.3

Series I: Sugar Beet

| Salt in<br>1948<br>(cwt. per<br>acre) | Muriate of potash<br>K <sub>2</sub> O cwt. per acre |                   |       | Salt applied |                   | Mean     |
|---------------------------------------|-----------------------------------------------------|-------------------|-------|--------------|-------------------|----------|
|                                       | 0.0                                                 | 1.0               | 2.0   | Winter       | In seed<br>bed    |          |
| Total Sugar: cwt. per acre            |                                                     |                   |       |              |                   |          |
|                                       |                                                     | (±2.20)           |       | (±1.68)      |                   | (±1.27)  |
| 0                                     | 33.4                                                | 34.2              | 35.7  | 41.6         | 39.6              | 34.4     |
| 2.5                                   | 43.7                                                | 37.9              | 40.2  | 41.6         | 39.6              | 40.6     |
| 5.0                                   | 41.8                                                | 44.6              | 42.0  | 42.2         | 43.5              | 42.8     |
| 7.5                                   | 41.9                                                | 44.6              | 46.1  | 43.4         | 45.1              | 44.2     |
| Mean                                  | 40.2                                                | 40.3<br>(±1.10)   | 41.0  | 42.4         | 42.7<br>(±1.02)   | 40.5     |
| Sugar percentage                      |                                                     |                   |       |              |                   |          |
| 0                                     | 16.24                                               | 16.34             | 16.57 |              |                   | 16.38    |
| 2.5                                   | 16.49                                               | 16.46             | 16.78 | 16.57        | 16.58             | 16.57    |
| 5.0                                   | 16.75                                               | 16.90             | 16.42 | 16.58        | 16.80             | 16.69    |
| 7.5                                   | 16.59                                               | 16.62             | 16.84 | 16.78        | 16.60             | 16.69    |
| Mean                                  | 16.51                                               | 16.58             | 16.65 | 16.64        | 16.66             | 16.58    |
| Roots (washed): tons per acre         |                                                     |                   |       |              |                   |          |
| 0                                     | 10.26                                               | 10.44             | 10.74 |              |                   | 10.48    |
| 2.5                                   | 13.27                                               | 11.50             | 11.97 | 12.56        | 11.93             | 12.25    |
| 5.0                                   | 12.49                                               | 13.20             | 12.74 | 12.69        | 12.93             | 12.81    |
| 7.5                                   | 12.63                                               | 13.42             | 13.71 | 12.92        | 13.59             | 13.25    |
| Mean                                  | 12.16                                               | 12.14             | 12.29 | 12.73        | 12.81             | 12.20    |
| Tops: tons per acre                   |                                                     |                   |       |              |                   |          |
|                                       |                                                     | (±0.566)          |       | (±0.433)     |                   | (±0.327) |
| 0                                     | 14.21                                               | 14.80             | 13.90 |              |                   | 14.30    |
| 2.5                                   | 14.57                                               | 14.27             | 14.68 | 13.05        | 15.97             | 14.51    |
| 5.0                                   | 13.28                                               | 13.75             | 15.36 | 14.86        | 13.40             | 14.13    |
| 7.5                                   | 14.90                                               | 17.08             | 13.56 | 13.79        | 16.57             | 15.18    |
| Mean                                  | 14.24                                               | 14.98<br>(±0.283) | 14.37 | 13.90        | 15.31<br>(±0.261) | 14.53    |

48/Bn/1.4

Series I: Sugar Beet (contd.)

| Salt in<br>1948<br>(cwt. per<br>acre) | Muriate of potash<br>K <sub>2</sub> O cwt. per acre |      |      | Salt applied |                | Mean |
|---------------------------------------|-----------------------------------------------------|------|------|--------------|----------------|------|
|                                       | 0.0                                                 | 1.0  | 2.0  | Winter       | In seed<br>bed |      |
|                                       | Plant No.: thousands per acre                       |      |      |              |                |      |
| 0                                     | 22.3                                                | 22.2 | 21.4 |              |                | 22.0 |
| 2.5                                   | 22.0                                                | 21.9 | 22.3 | 21.9         | 22.3           | 22.1 |
| 5.0                                   | 21.9                                                | 22.6 | 21.6 | 21.7         | 22.3           | 22.0 |
| 7.5                                   | 22.1                                                | 22.4 | 21.5 | 22.2         | 21.8           | 22.0 |
| Mean                                  | 22.1                                                | 22.3 | 21.7 | 21.9         | 22.1           | 22.0 |
|                                       | Noxious Nitrogen: m.g. per 100 grams.               |      |      |              |                |      |
| 0                                     | 30.2                                                | 31.5 | 31.2 |              |                | 31.0 |
| 2.5                                   | 28.5                                                | 30.2 | 28.8 | 28.7         | 29.7           | 29.2 |
| 5.0                                   | 29.8                                                | 28.6 | 28.0 | 29.3         | 28.3           | 28.8 |
| 7.5                                   | 31.0                                                | 29.5 | 30.8 | 31.2         | 29.7           | 30.4 |
| Mean                                  | 29.9                                                | 30.0 | 29.7 | 29.7         | 29.2           | 29.8 |

48/Ba/1.5

Series II: Barley

| Salt in 1947<br>(cwt. per acre) | Muriate of potash<br>K <sub>2</sub> O cwt. per acre<br>applied in 1947 |      |      | Salt applied<br>In seed<br>bed |      | Salt in 1948<br>None Half<br>Rate |      | Mean    |
|---------------------------------|------------------------------------------------------------------------|------|------|--------------------------------|------|-----------------------------------|------|---------|
|                                 | 0.0                                                                    | 1.0  | 2.0  | Winter                         |      |                                   |      |         |
|                                 | Grain: cwt. per acre                                                   |      |      | cwt. per acre                  |      |                                   |      |         |
|                                 | (±1.10)                                                                |      |      | (±0.84)                        |      |                                   |      | (±0.63) |
| 0                               | 31.3                                                                   | 33.6 | 30.6 |                                |      |                                   |      | 31.8    |
| 2.5                             | 32.6                                                                   | 30.8 | 31.2 | 31.6                           | 31.5 | 31.2                              | 31.9 | 31.5    |
| 5.0                             | 30.2                                                                   | 31.1 | 29.8 | 30.8                           | 30.0 | 29.1                              | 31.6 | 30.4    |
| 7.5                             | 29.6                                                                   | 30.0 | 29.6 | 30.5                           | 29.0 | 29.1                              | 30.3 | 29.7    |
| Mean                            | 30.9                                                                   | 31.4 | 30.3 | 31.0                           | 30.2 | 29.8                              | 31.3 | 30.9    |
|                                 | (±0.55)                                                                |      |      | (±0.51)                        |      |                                   |      |         |
|                                 | Straw: cwt. per acre                                                   |      |      | cwt. per acre                  |      |                                   |      |         |
| 0                               | 35.9                                                                   | 37.0 | 35.3 |                                |      |                                   |      | 36.1    |
| 2.5                             | 36.8                                                                   | 33.2 | 34.7 | 34.8                           | 34.9 | 35.6                              | 34.1 | 34.9    |
| 5.0                             | 32.7                                                                   | 33.4 | 32.0 | 31.9                           | 33.5 | 32.1                              | 33.3 | 32.7    |
| 7.5                             | 32.4                                                                   | 32.2 | 31.5 | 31.4                           | 32.7 | 30.7                              | 33.4 | 32.0    |
| Mean                            | 34.4                                                                   | 34.0 | 33.4 | 32.7                           | 33.7 | 32.8                              | 33.6 | 33.9    |



48/Ba/2.1

### THREE COURSE ROTATION EXPERIMENT

Long Hoos VI, 1948

Effect of ploughing in straw

Treatments as given in 1933 Report, pp. 118-9, except that no comparisons of winter green manuring crops are now made, and that commencing in 1942 a yearly dressing of  $2\frac{1}{2}$  cwt. per acre magnesium sulphate is applied to one of the replicate plots of each treatment, in each crop block.

Cultivations, etc.

Barley, Series I.

Applied Adco and straw with accompanying artificials, ploughed: Nov 10-21. Springtime harrowed: Mar 1. Artificials applied: Mar 3. Harrowed, seed drilled and harrowed in: Mar 4. Ring rolled: Mar 9. Weeded: June 8. Harvested: Aug 18. Variety: Plumage Archer. Previous crop: Potatoes.

Potatoes, Series II.

Applied Adco and straw with accompanying artificials, ploughed: Nov 10-21. Cultivated: Mar 16. Harrowed and rolled: Mar 22. Ridged: Mar 24. Artificials applied, potatoes planted and covered in: Mar 25. Ridges rolled down: Mar 27. Harrowed: Apr 30. Weeded: June 11. Grubbed: June 9, 16. Earthed up: June 17. Sprayed with "Perinox": Aug 9. Sprayed to kill haulm: Sept 13. Lifted: Sept 29. Variety: Majestic. Previous crop: Sugar Beet.

Sugar Beet, Series III.

Applied Adco and straw with accompanying artificials, ploughed: Nov 10-21. Cultivated: Mar 16. Harrowed and rolled: Mar 22. Artificials applied: Apr 13. Harrowed: Apr 14. Seed drilled: Apr 15. Harrowed in: Apr 16. Rolled: Apr 22. Dusted with Flea beetle dust: May 14. Plots 54, 60, 66 and 72 were damaged by herbicide spray from 2 Course Rotation Experiment, May 14, and bare patches (including the whole of plots 66 and 72) were redrilled May 20. Hoed: May 20. Late sown plants dusted with Flea beetle dust: June 9. Weeded: June 10-11. Singled: June 12. Hoed: June 21, July 20. Lifted: Nov 12, 15. Variety: Klein E. Previous crop: Barley.

48/Ba/2.2

Note: Considerable damage to sugar beet tops was caused by sheep on plots 49, 50, 51, 55, 56, 57, 61, 62, 67, 68.

Standard errors per plot:

|                             |                                  |
|-----------------------------|----------------------------------|
| Sugar beet, roots (washed), | ±0.573 tons per acre or 5.9%     |
| tops,                       | ±1.348 tons per acre or 18.8%    |
| total sugar,                | ±2.69 cwt. per acre or 7.7%      |
| sugar percent:              | ±0.437                           |
| plant number,               | ±1.66 thousands per acre or 7.6% |
| Barley, grain,              | ±3.47 cwt. per acre or 10.4%     |
| straw,                      | ±4.75 cwt. per acre or 12.6%     |
| Potatoes total tubers,      | ±0.661 tons per acre or 6.4%     |
| percentage ware             | ±0.581                           |

All standard errors are based on 8 d.f.

48/Ba/2.3

Summary of Results

|                                           | Treatments applied 1946/7 |                   |       |       |                   | Treatments applied 1947/8 |                   |       |       |                   |
|-------------------------------------------|---------------------------|-------------------|-------|-------|-------------------|---------------------------|-------------------|-------|-------|-------------------|
|                                           | Arts                      | Adco              | St 1  | St 2  | Mean              | Arts                      | Adco              | St 1  | St 2  | Mean              |
| <u>Series I</u>                           |                           |                   |       |       |                   |                           |                   |       |       |                   |
| Barley                                    |                           |                   |       |       |                   |                           |                   |       |       |                   |
| Grain<br>cwt./acre                        | 34.0                      | 32.1<br>(±2.00)   | 33.3  | 33.3  | 33.1<br>(±1.00)   | 36.8                      | 32.3<br>(±2.00)   | 31.0  | 35.2  | 33.9<br>(±1.00)   |
| Straw<br>cwt./acre                        | 36.8                      | 35.9<br>(±2.74)   | 36.8  | 36.5  | 36.5<br>(±1.37)   | 43.1                      | 36.5<br>(±2.74)   | 36.9  | 40.0  | 39.1<br>(±1.37)   |
| <u>Series II</u>                          |                           |                   |       |       |                   |                           |                   |       |       |                   |
| Potatoes<br>tons/acre                     | 8.47                      | 10.12<br>(±0.382) | 9.78  | 10.41 | 9.70<br>(±0.191)  | 10.40                     | 10.40<br>(±0.382) | 12.35 | 11.12 | 11.07<br>(±0.191) |
| Percentage<br>Ware                        | 92.0                      | 93.5<br>(±0.335)  | 93.6  | 93.6  | 93.2<br>(±0.168)  | 94.0                      | 93.7<br>(±0.335)  | 95.3  | 94.4  | 94.4<br>(±0.168)  |
| <u>Series III</u>                         |                           |                   |       |       |                   |                           |                   |       |       |                   |
| Sugar Beet<br>Roots (washed)<br>tons/acre | 9.30                      | 9.12<br>(±0.331)  | 8.95  | 9.63  | 9.25<br>(±0.166)  | 10.79                     | 9.04<br>(±0.331)  | 10.21 | 10.69 | 10.18<br>(±0.166) |
| Tops<br>tons/acre                         | 6.41                      | 6.24<br>(±0.778)  | 7.09  | 7.43  | 6.79<br>(±0.389)  | 9.49                      | 6.14<br>(±0.778)  | 7.28  | 7.40  | 7.58<br>(±0.389)  |
| Sugar<br>percentage                       | 17.32                     | 17.89<br>(±0.252) | 17.13 | 17.59 | 17.48<br>(±0.126) | 18.18                     | 18.18<br>(±0.252) | 18.12 | 17.88 | 18.09<br>(±0.126) |
| Total sugar<br>cwt./acre                  | 32.2                      | 32.6<br>(±1.55)   | 30.6  | 33.9  | 32.3<br>(±0.78)   | 39.3                      | 32.9<br>(±1.55)   | 37.0  | 38.3  | 36.9<br>(±0.78)   |
| Plant number<br>thous./acre               | 22.2                      | 22.6<br>(±0.96)   | 20.0  | 22.6  | 21.9<br>(±0.48)   | 21.8                      | 22.0<br>(±0.96)   | 22.3  | 22.2  | 22.1<br>(±0.48)   |

48/Ba/2.4

Responses to Magnesium Sulphate

|                                              | Treatments applied 1946/7 |                   |       |       |       | Treatments applied 1947/8 |                  |       |       |       |
|----------------------------------------------|---------------------------|-------------------|-------|-------|-------|---------------------------|------------------|-------|-------|-------|
|                                              | Arts                      | Adco              | St.1  | St.2  | Mean  | Arts                      | Adco             | St.1  | St.2  | Mean  |
| <u>Series I</u>                              |                           |                   |       |       |       |                           |                  |       |       |       |
| Barley Grain<br>cwt./acre                    | -4.3                      | -0.6<br>(±4.25)   | 2.8   | -5.0  | -1.8  | 0.2                       | -8.0<br>(±4.25)  | -5.9  | 1.9   | -3.0  |
| Straw<br>cwt./acre                           | -4.0                      | -4.2<br>(±5.82)   | 6.1   | -3.4  | -1.4  | -0.2                      | -5.4<br>(±5.82)  | -4.9  | 0.4   | -2.5  |
| <u>Series II</u>                             |                           |                   |       |       |       |                           |                  |       |       |       |
| Potatoes<br>tons/acre                        | -0.38                     | 0.22<br>(±0.810)  | 0.07  | -0.07 | -0.04 | 1.12                      | 0.44<br>(±0.810) | 0.82  | -1.14 | 0.31  |
| Percentage<br>Ware                           | -0.4                      | 0.3<br>(±0.71)    | -0.6  | -0.6  | -0.3  | 0.2                       | 0.3<br>(±0.71)   | 0.6   | 0.0   | 0.3   |
| <u>Series III</u>                            |                           |                   |       |       |       |                           |                  |       |       |       |
| Sugar Beet<br>Roots<br>(washed)<br>tons/acre | -0.34                     | -1.02<br>(±0.702) | -1.80 | -0.50 | -0.92 | 1.06                      | 1.28<br>(±0.702) | -1.21 | 0.01  | +0.28 |
| Tops<br>tons/acre                            | -1.77                     | -0.92<br>(±1.652) | 0.56  | 2.06  | -0.02 | 1.38                      | 1.21<br>(±1.652) | -2.44 | 0.52  | 0.17  |
| Total sugar<br>cwt/acre                      | 0.7                       | -2.7<br>(±3.30)   | -5.6  | -2.7  | -2.6  | 7.3                       | 4.8<br>(±3.30)   | -5.0  | 1.1   | 2.0   |
| Sugar<br>percentage                          | 1.02                      | 0.56<br>(±0.535)  | 0.36  | -0.46 | 0.37  | 1.54                      | 0.07<br>(±0.535) | -0.30 | 0.48  | 0.45  |
| Plant<br>number<br>thous./acre               | 0.6                       | -2.2<br>(±2.03)   | -7.1  | -3.8  | -3.1  | 0.6                       | 2.6<br>(±2.03)   | -4.6  | -1.2  | -0.6  |

48/Ba/3.1

FOUR COURSE ROTATION EXPERIMENT

Hoosfield, 1948

Residual values of organic and phosphatic fertilizers.

The scheme of the experiment is as given in the 1932 Report, pp.127-8, with the following alterations:-

1. From 1935 onwards, clover ryegrass ley has been replaced by ryegrass alone, sown in autumn after ploughing barley stubble, with fertilizers applied as on wheat.
2. From 1935 onwards, lime was applied every year at the rate of 10 cwt. per acre to the potato break after the crop had been lifted.
3. Each plot of the potato break has been split from 1942 onwards, a random half of each plot receiving an additional 2 cwt. per acre sulphate of ammonia.
4. Majestic potato seed has been used since 1942 in place of Ally.

Manures applied 1947-8

RESULTS OF FIELD EXPERIMENTS - 1948

ERRATUM

48/Ba/3.1, Table of manures applied 1947-8 should read:-

Manures applied 1947-8

| Treatment      | Organic fertilizers (cwt. per acre) |       |                               |                  | Additional artificial fertilizers (cwt. per acre) |                                        |                                    |
|----------------|-------------------------------------|-------|-------------------------------|------------------|---------------------------------------------------|----------------------------------------|------------------------------------|
|                | Organic matter                      | N     | P <sub>2</sub> O <sub>5</sub> | K <sub>2</sub> O | N as Sulph. of amm.                               | P <sub>2</sub> O <sub>5</sub> as Super | K <sub>2</sub> O as mur. of potash |
| Dung           | 50 (as FYM)                         | 1.404 | 0.709                         | 2.230            | 0.396                                             | 0.491                                  | 0.770                              |
| Adco           | 50 (as Adco)                        | 0.980 | 0.510                         | 0.419            | 0.820                                             | 0.690                                  | 2.581                              |
| Straw          | 77 (as Straw)                       | 1.392 | 0.104                         | 0.627            | 0.408                                             | 1.096                                  | 2.373                              |
| Super          |                                     |       | None                          |                  | 0.36                                              | 1.2                                    | 0.6                                |
| Rock phosphate |                                     |       | None                          |                  | 0.36                                              | 1.2*                                   | 0.6                                |

\* As mineral phosphate

48/Ba/3.2

Cultivations, etc.

Potatoes, Series I.

Ploughed: Sept. 8. Dung, Adco with accompanying artificials applied; straw with first dressing of artificials applied; ploughed in: Nov. 20, 21. Second dressing of artificials applied to straw plot: Jan. 22. Ploughed, harrowed, rolled: Mar. 16-23. Ridged: Mar. 30. Artificials, including third dressing to straw plot applied in the ridges; Apr. 2. Potatoes planted and covered in: Apr. 7. Ridges rolled: Apr. 10. Ridges harrowed: May 10. Grubbed: June 9-16. Weeded: June 11-13. Earthed up: June 26. Hoed: June 30. Weeded: July 29. Sprayed with "Perinox": Aug. 9. Sprayed to kill haulm: Sept. 13. Lifted: Sept. 27, 28. Variety: Majestic. Previous crop: Wheat.

Barley, Series II

Applied dung, Adco and supplementary artificials: Nov. 12. Straw with first dressing of artificials applied; ploughed: Nov. 12, 13. Ground chalk (22 cwt. per acre) applied: Nov. 13. Second dressing of artificials applied to straw plots: Jan. 22. Springtine harrowed: Mar. 1. Artificials applied, including third dressing to straw plots: Mar. 4. Harrowed, seed drilled and harrowed in: Mar. 5. Ring rolled: Mar. 10. Hand weeded to clear thistles: May 28. Hoed: June 4. Harvested: Aug. 19. Variety: Plumage Archer. Previous crop: Potatoes.  
Note: Ground chalk was used in place of ground lime.

Wheat, Series III

Applied dung and Adco with supplementary artificials, applied straw with first dressing of artificials, ploughed: Sept. 15-24. Flat rolled and harrowed: Sept. 25. Artificials applied excluding special dressing straw plots and sulphate of ammonia: Sept. 27. Harrowed: Oct. 2. Springtine harrowed, harrowed, seed (Squareheads Master 13/4) drilled and harrowed in: Oct. 3. Resown with Squareheads Master (13/4) as plant had failed, second dressing of artificials applied to straw

48/Ba/3.3

plot, harrowed in: Nov.29. Plant failed over winter, decided to resow, springtime harrowed, harrowed: Mar.8. Redrilled with Atle, applied sulphate of ammonia and third dressing of artificials to straw plots, harrowed in: Mar.9. Ring rolled: Mar.10. Weeded to clear thistles: May 28. Hoed: June 4. Harvested: Aug.28. Variety: Atle. Previous crop: Ryegrass.

#### Ryegrass, Series IV.

Dung, Adco with accompanying artificials applied: Sept.24. Straw with first dressing of artificials applied, ploughed: Sept.23-25. Harrowed and rolled: Sept.26. Autumn artificials applied not including sulphate of ammonia: Sept.27. Harrowed twice, ring rolled: Nov.10. Seed sown and harrowed in: Nov.13. Second dressing of artificials applied to straw plots: Nov.29. Applied sulphate of ammonia, third dressing of artificials applied to straw plot: Mar.17. Rolled: Mar.20. Hand weeded to clear thistles: June 12. Cut: June 15. Variety: Western Worths. Previous crop: Barley.

FOUR COURSE ROTATION  
Summary of Results 1948

| Manure           | Year of Cycle | Wheat |       | Barley |       | Ryegrass<br>cwt per acre<br>Dry matter | Total tubers tons per acre |                   | Resp. to N | Percentage Ware |      | Resp. to N |
|------------------|---------------|-------|-------|--------|-------|----------------------------------------|----------------------------|-------------------|------------|-----------------|------|------------|
|                  |               | Grain | Straw | Grain  | Straw |                                        | Additional N Without       | Additional N With |            | Mean            |      |            |
| Manure as F.Y.M. | I             | 16.3  | 37.6  | 32.1   | 46.3  | 6.5                                    | 5.94                       | 8.70              | 2.76       | 97.1            | 97.6 | 0.5        |
|                  | II            | 9.7   | 29.5  | 27.1   | 28.1  | 5.7                                    | 7.89                       | 10.09             | 2.20       | 97.2            | 97.7 | 0.5        |
|                  | III           | 9.9   | 28.0  | 22.9   | 27.4  | 5.6                                    | 7.75                       | 9.09              | 1.33       | 97.3            | 97.7 | 0.4        |
|                  | IV            | 8.6   | 25.7  | 24.0   | 31.7  | 4.9                                    | 8.05                       | 9.61              | 1.56       | 97.9            | 98.0 | 0.1        |
|                  | V             | 10.4  | 29.2  | 21.4   | 29.0  | 4.4                                    | 7.62                       | 9.42              | 1.80       | 97.2            | 98.4 | 1.2        |
| Manure as Adoo   | I             | 20.2  | 47.8  | 35.7   | 26.6  | 16.7                                   | 9.09                       | 10.72             | 1.63       | 98.1            | 98.4 | 0.3        |
|                  | II            | 10.7  | 32.5  | 24.4   | 30.4  | 3.7                                    | 6.37                       | 9.69              | 3.32       | 97.9            | 98.8 | 0.9        |
|                  | III           | 8.9   | 23.0  | 25.1   | 30.4  | 3.5                                    | 6.04                       | 9.71              | 3.67       | 97.4            | 98.2 | 0.8        |
|                  | IV            | 9.0   | 21.2  | 23.6   | 30.6  | 4.4                                    | 7.94                       | 9.46              | 1.52       | 98.1            | 98.2 | 0.1        |
|                  | V             | 9.7   | 24.6  | 22.6   | 31.9  | 2.8                                    | 5.85                       | 9.28              | 3.43       | 97.0            | 98.3 | 1.3        |
| Manure as Straw  | I             | 21.6  | 47.8  | 36.5   | 47.1  | 19.2                                   | 10.19                      | 12.30             | 2.11       | 97.6            | 98.1 | 0.5        |
|                  | II            | 11.0  | 33.0  | 28.3   | 33.6  | 6.6                                    | 6.54                       | 8.55              | 2.01       | 96.1            | 97.3 | 1.2        |
|                  | III           | 13.1  | 32.0  | 23.9   | 25.0  | 6.5                                    | 6.79                       | 10.56             | 3.77       | 97.2            | 98.2 | 1.0        |
|                  | IV            | 10.6  | 29.0  | 26.4   | 32.0  | 4.8                                    | 7.39                       | 9.67              | 2.28       | 97.2            | 98.4 | 1.2        |
|                  | V             | 9.7   | 25.8  | 24.7   | 28.7  | 2.9                                    | 8.29                       | 10.65             | 2.56       | 97.5            | 97.6 | 0.1        |
| Super phosphate  | I             | 15.1  | 32.4  | 32.1   | 34.2  | 9.3                                    | 10.69                      | 11.65             | 0.96       | 97.5            | 97.2 | -0.3       |
|                  | II            | 14.1  | 32.0  | 27.6   | 32.5  | 5.5                                    | 9.20                       | 9.81              | 0.61       | 98.1            | 98.8 | 0.7        |
|                  | III           | 12.7  | 30.4  | 30.2   | 33.0  | 9.4                                    | 7.69                       | 11.38             | 3.49       | 98.5            | 98.8 | 0.3        |
|                  | IV            | 11.6  | 23.8  | 27.5   | 32.1  | 6.1                                    | 7.59                       | 8.59              | 0.80       | 97.7            | 98.0 | 0.3        |
|                  | V             | 11.7  | 28.4  | 29.0   | 31.8  | 2.9                                    | 7.32                       | 8.90              | 1.58       | 97.6            | 98.7 | 1.1        |
| Rock phosphate   | I             | 16.6  | 33.5  | 26.8   | 33.8  | 4.6                                    | 9.25                       | 9.95              | 0.70       | 97.3            | 98.1 | 0.8        |
|                  | II            | 12.1  | 27.1  | 26.2   | 31.2  | 4.0                                    | 7.03                       | 7.82              | 0.79       | 97.3            | 97.8 | 0.5        |
|                  | III           | 11.9  | 27.8  | 28.4   | 31.9  | 4.0                                    | 6.13                       | 7.80              | 1.67       | 96.6            | 98.0 | 1.4        |
|                  | IV            | 13.5  | 26.2  | 27.5   | 35.2  | 2.4                                    | 6.31                       | 5.82              | -0.49      | 97.2            | 95.9 | -1.3       |
|                  | V             | 10.3  | 21.8  | 29.0   | 45.6  | 4.6                                    | 6.74                       | 6.22              | -0.52      | 97.7            | 97.5 | -0.2       |

48/Ba/3.4



48/Ba/4.1

## SIX COURSE ROTATION EXPERIMENT

1947-8

Seasonal effects of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O

Rotation and treatments as given in 1932 Report, p. 131, with the exceptions that since 1934 the forage crop has been replaced by rye, harvested as a mature crop, and that the green manure crops are now omitted. Since 1934 lime has been applied at the rate of 10 cwt. per acre at two stages in the rotation: immediately after the removal of the potato crop and before sowing barley.

Cultivations, etc.:

Rothamsted, Long Hoos IV

Sugar beet. Series 3.

Ploughed: Sept 11, 12. Harrowed: Mar 22. Ploughed, harrowed and ring rolled: Apr 15, 16. Artificials applied, seed drilled and harrowed in: Apr 16. Ring rolled: Apr 22. Applied Agroxide ( $\frac{1}{2}$  cwt. per acre) against wireworm: Apr 29. Dusted with Flea beetle dust: May 8, 14, 15. Applied Agroxide ( $1\frac{1}{2}$  cwt. per acre): May 10. Hoed: June 8 - July 22. Singled: June 9. Lifted: Nov 10. Variety: Klein E. Previous crop: Rye.

Barley. Series 4.

Sugar beet tops remaining from 1947 crop ploughed in: Nov 7. Ground chalk applied (22 cwt. per acre); Nov 14. Springtime harrowed: Mar 1. Artificials applied: Mar 4. Harrowed, seed drilled and harrowed in: Mar 5. Ring rolled: Mar 9. Clover seed undersown: Apr 15. Harrowed and ring rolled: Apr 16. Harvested: Aug 18. Variety: Plumage Archer. Previous crop: Sugar beet.

Clover. Series 1.

Seed undersown in barley, harrowed in: Apr 12. Ring rolled: Apr 14. Phosphate and potash fertilizer applied: Dec 10. Rolled: Mar 10. Sulphate of ammonia applied: Mar 16. Self sown barley cut: Apr 26. Cut: July 6. Variety: Late flowering Montgomery Red. Previous crop: Barley.

Wheat. Series 5.

Ploughed: June 30. Twice harrowed: Oct 1. Autumn artificials applied, seed drilled and harrowed in: Oct 2. Seed resown (owing to plant failure) and harrowed in: Nov 12. Rolled: Mar 16. Sulphate of ammonia applied: Apr 15. Harvested: Aug 18. Variety: Yeoman. Previous crop: Clover.

48/Ba/4.2

Potatoes. Series 6.

Ploughed: Sept. 9, 10. Harrowed: Mar. 10. Ploughed and harrowed: Mar. 10, 11. Harrowed and rolled: Mar. 22. Ridged: Mar. 23. Artificials applied, potatoes planted and covered in: Mar. 24. Ridges rolled down: Mar. 27. Harrowed: Mar. 30. Hoed: June 4-10. Grubbed: June 7, 18. Earthed up: June 19. Sprayed with "Perinox": Aug. 9. Sprayed to kill haulm: Sept. 13. Lifted: Sept. 29. Variety: Majestic. Previous crop: Wheat.

Rye. Series 2.

Ploughed: Sept. 30 - Oct. 1. Harrowed twice, ring rolled, harrowed: Oct. 1. Autumn artificials applied, seed drilled and harrowed in: Oct. 3. Ground chalk (22 cwt. per acre) applied: Nov. 14. Ring rolled: Mar. 31. Sulphate of ammonia applied: Apr. 16. Cut: July 30. Previous crop: Potatoes.

Woburn, Stackyard Field, Series B.

Sugar beet. Series 4.

Ploughed: Sept. 16, Oct. 1, Feb. 25-28. Springtime harrowed: Mar. 17. Harrowed: Mar. 19. Rolled: Mar. 27. Seed drilled: Apr. 2. Artificials applied and harrowed in: Apr. 5. Rolled: Apr. 6. Hoed: May 19. Singled, and weeded to clear thistles, hoed: May 25 - June 1. Hoed: June 5 - July 21. Lifted: Oct. 4. Variety: Klein E. Previous crop: Rye.

Barley. Series 6.

Sugar beet tops from 1947 crop ploughed in: Oct. 29-30. Ground chalk applied (96.5%  $\text{CaCO}_3$ , at rate of  $1\frac{1}{2}$  tons per acre of  $\text{CaCO}_3$ ). Springtime harrowed: Mar. 1. Artificials applied, harrowed: Mar. 4. Seed drilled and harrowed in: Mar. 10. Rolled, Clover seed undersown: Mar. 12. Harrowed: Mar. 13. Harvested: Aug. 14. Variety: Plumage Archer. Previous crop: Sugar beet.

Clover. Series 3.

Clover seed (late flowering Montgomery Red) undersown in barley, Apr. 17, 1947. Failed owing to drought. Ploughed: Sept. 26, 27, Feb. 26-28. Harrowed, all artificials including sulphate of ammonia applied: Mar. 4. Rolled, seed sown by hand and harrowed in: May 12. Harrowed and rolled: Mar. 13. Cut: July 1. Variety: Early red Trifolium. Previous crop: Barley.

48/Ba/4.3

Wheat. Series 1.

Ploughed: July 9. Cultivated: Aug. 21, Sept. 1. Rolled three times, cultivated three times, harrowed: Oct. 9. Autumn artificials applied: Oct. 14. Seed drilled and harrowed in: Oct. 14-15. Sowing destroyed by birds. Harrowed, seed drilled and harrowed in: Nov. 14. Harrowed: Apr. 14. Sulphate of ammonia applied: Apr. 22. Rolled: Apr. 26. Harvested: Aug. 28. Variety: Squareheads Master (13/4). Previous crop: Clover.

Potatoes. Series 2.

Ploughed: Sept. 30, Oct. 6, Feb. 27-28. Springtine harrowed: Mar. 17. Harrowed: Mar. 19. Rolled: Mar. 27. Ridged: Apr. 6-7. Artificials applied, potatoes planted and covered in: Apr. 9. Ridges harrowed down: May 8. Grubbed: May 28. June 8. Hoed, earthed up: June 21. Sprayed with "Perinox": Early Aug. Sprayed to kill haulm: Sept. 22. Lifted: Sept. 30. Variety: Majestic. Previous crop: Wheat.

Rye. Series 5.

Ploughed: Oct. 6, 7. Harrowed: Oct. 9. Ground chalk spread (14 cwt. per acre): Oct. 13. Autumn artificials applied: Nov. 14. Seed drilled and harrowed in: Nov. 15. Harrowed: Apr. 14. Sulphate of ammonia applied: Apr. 22. Cut: July 30. Previous crop: Potatoes.

48/Ba/4.4

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

|                                                | Rothamsted |       | Woburn       |       | Rothamsted                                 |       | Woburn       |       |  |
|------------------------------------------------|------------|-------|--------------|-------|--------------------------------------------|-------|--------------|-------|--|
|                                                | Response   | S.E.  | Response     | S.E.  | Response                                   | S.E.  | Response     | S.E.  |  |
| <b>Sugar Beet: Roots (washed)</b><br>tons/acre |            |       |              |       | <b>Clover Hay: Dry Matter</b><br>cwt/acre  |       |              |       |  |
| Yield                                          | 11.51      |       | 8.52         |       | 36.3                                       |       | 32.6         |       |  |
| N                                              | 0.84       | 1.263 | <u>9.11</u>  | 1.237 | -1.2                                       | 5.15  | -1.3         | 6.54  |  |
| P                                              | -1.23      | 1.263 | <u>-0.85</u> | 1.237 | -8.1                                       | 5.15  | -1.9         | 6.54  |  |
| K                                              | 0.19       | 0.758 | -1.35        | 0.742 | 6.3                                        | 3.09  | 1.1          | 3.92  |  |
| <b>Tops: tons/acre</b>                         |            |       |              |       | <b>Wheat grain: cwt/acre</b>               |       |              |       |  |
| Yield                                          | 10.72      |       | 6.92         |       | 26.6                                       |       | 20.8         |       |  |
| N                                              | 3.45       | 2.191 | <u>13.31</u> | 1.510 | 7.5                                        | 2.15  | <u>23.1</u>  | 5.79  |  |
| P                                              | -3.17      | 2.191 | <u>-2.02</u> | 1.510 | -0.3                                       | 2.15  | <u>-13.2</u> | 5.79  |  |
| K                                              | 0.70       | 1.315 | <u>-2.28</u> | 0.906 | 3.3                                        | 1.29  | <u>-11.8</u> | 3.47  |  |
| <b>Sugar Percentage</b>                        |            |       |              |       | <b>Wheat straw: cwt/acre</b>               |       |              |       |  |
| Yield                                          | 17.87      |       | 17.57        |       | 47.8                                       |       | 40.2         |       |  |
| N                                              | 0.09       | 0.696 | 0.76         | 0.727 | 18.5                                       |       | 36.9         |       |  |
| P                                              | -0.43      | 0.696 | 0.47         | 0.727 | -1.5                                       |       | -13.3        |       |  |
| K                                              | -0.39      | 0.418 | 0.56         | 0.436 | 7.4                                        |       | -19.9        |       |  |
| <b>Total Sugar: cwt/acre</b>                   |            |       |              |       | <b>Potatoes:</b><br>total tubers tons/acre |       |              |       |  |
| Yield                                          | 41.2       |       | 30.0         |       | 9.52                                       |       | 8.94         |       |  |
| N                                              | 3.1        | 4.38  | <u>32.9</u>  | 4.02  | 6.09                                       | 1.541 | 7.62         | 1.326 |  |
| P                                              | -5.5       | 4.38  | <u>-2.1</u>  | 4.02  | -1.08                                      | 1.541 | <u>0.55</u>  | 1.326 |  |
| K                                              | -0.3       | 2.63  | <u>-3.8</u>  | 2.41  | <u>2.41</u>                                | 0.924 | -0.57        | 0.795 |  |
| <b>Plant Number: thous/acre</b>                |            |       |              |       | <b>Potatoes: Percentage Ware</b>           |       |              |       |  |
| Yield                                          | 20.9       |       |              |       | 97.1                                       |       | 93.2         |       |  |
| N                                              | -1.3       | 2.77  |              |       | 1.7                                        | 1.36  | -0.7         | 2.30  |  |
| P                                              | 2.9        | 2.77  |              |       | -2.5                                       | 1.36  | -4.8         | 2.30  |  |
| K                                              | 0.8        | 1.66  |              |       | 1.8                                        | 0.82  | <u>-3.5</u>  | 1.38  |  |

Note: The underlined values are significant at 5% level.

48/Ba/4.5

|                        | Rothamsted<br>Response S.E. | Woburn<br>Response S.E. | Rothamsted<br>Response S.E. | Woburn<br>Response S.E. |
|------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|
| Barley Grain: cwt/acre |                             |                         | Rye Grain: cwt/acre         |                         |
| Yield                  | <u>36.2</u>                 | <u>27.5</u>             | <u>25.8</u>                 | <u>21.2</u>             |
| N                      | <u>10.7</u> 3.71            | <u>17.6</u> 5.33        | <u>18.4</u> 3.50            | <u>15.0</u> 4.39        |
| P                      | <u>-2.3</u> 3.71            | <u>3.5</u> 5.33         | <u>2.6</u> 3.50             | <u>-5.3</u> 4.39        |
| K                      | <u>-1.2</u> 2.23            | <u>1.7</u> 3.20         | <u>2.3</u> 2.10             | <u>7.8</u> 2.64         |
| Barley Straw: cwt/acre |                             |                         | Rye Straw: cwt/acre         |                         |
| Yield                  | <u>39.6</u>                 | <u>26.4</u>             | <u>47.3</u>                 | <u>42.8</u>             |
| N                      | <u>24.7</u>                 | <u>20.9</u>             | <u>14.7</u>                 | <u>4.5</u>              |
| P                      | <u>-1.6</u>                 | <u>-6.5</u>             | <u>0.7</u>                  | <u>-3.8</u>             |
| K                      | <u>-3.7</u>                 | <u>3.7</u>              | <u>4.6</u>                  | <u>10.6</u>             |

Note: The underlined values are significant at 5% level.

48/Bb/1

## DEEP CULTIVATION ROTATION EXPERIMENT

Long Hoos I and III, 1948

### Objects:

- (1) To compare deep ploughing (about 12 inches) with shallow (about 6 inches)
- (2) To compare the effects of ploughing in the mineral fertilizers at different depths with applying them in the seedbed.
- (3) To compare the effects of ploughing in dung at different depths.

Rotation: Sugar beet, barley, clover-ryegrass ley, wheat, potatoes, spring oats. (Ley ploughed in (not deeper than 6 inches) soon after first cut. Sugar beet tops carted off).

### Treatments:

Whole plots. All combinations of:

1. Shallow ploughing (6 inches) v. deep ploughing (12 inches). (This is done before potatoes and sugar beet, and after ley before wheat, at the same time in autumn for all three).
2. Farmyard manure: None v. 20 tons per acre for potatoes and 10 tons per acre for sugar beet, applied before ploughing.
3. Superphosphate: None v. 0.8 cwt.  $P_2O_5$  per acre for potatoes and 0.6 cwt.  $P_2O_5$  per acre for sugar beet.
4. Muriate of potash: None v. 1.0 cwt.  $K_2O$  per acre for potatoes and 0.6 cwt.  $K_2O$  per acre for sugar beet.

Treatments 2, 3 and 4 are applied only to potatoes and sugar beet.

Half plots (potatoes and sugar beet):

Phosphate and potash (where given) ploughed in v. applied in the seedbed.

Basal manuring: Applied in the ridges for potatoes, as a top dressing for wheat, and in the seed bed for other crops.

Sulphate of ammonia, for potatoes 0.6 cwt. N per acre, for sugar beet 0.8 cwt. N per acre, for spring oats 0.2 cwt. N per acre, for wheat 0.5 cwt. N per acre, for barley 0.3 cwt. N per acre.

Basic slag, for barley 0.6 cwt.  $P_2O_5$  per acre.

Area of each whole plot: 0.03125 acre (before rejecting edge rows).

Cultivations, etc.:

Ley. Series 1-KS.

Seeds undersown in barley: Apr 12, 1947. Rolled: Mar 10, 1948. Cut: June 14, 15. Seeds mixture per acre: 18 lb. ryegrass (Aberystwyth S2.4), 8 lb. late flowering red clover (Cert. N.Z. Mother seed), 2 lb. Alsike clover. Previous crop: Barley.

48/Bb/1.2

Potatoes. Series 2 - KP.

Artificially applied: Sept 29. Dung applied (before deep ploughing), ploughed deep (about 12 inches): Sept 30. Dung applied (before shallow ploughing), ploughed shallow (about 6 inches): Oct 1,2. Cultivated: Mar 11, 20. Rolled and springtime harrowed: Mar 22. Harrowed twice, ring rolled: Mar 23. Ridged: Mar 31. Spring artificials applied, potatoes planted and covered in: Apr 7. Rolled down ridges: Apr 12. Ridges harrowed: May 10. Grubbed: June 9, 18. Earthed up: June 19, 21. Hand weeded: June 10-11, July 28. Sprayed with "Perinox": Aug 9. Sprayed to kill haulm: Sept 13. Lifted: Sept 30. Variety: Majestic (Scotch seed A). Previous crop: Wheat.

Spring oats. Series 3 - KO.

Ploughed: Oct 15-20. Springtime harrowed: Mar 1. Sulphate of ammonia applied; seed drilled and harrowed in: Mar 5. Ring rolled: Mar 9. Weeded: May 28 - June 7. Harvested: Aug 16. Variety: Star. Previous crop: Potatoes.

Sugar beet. Series 4 - KS.

Artificially applied (before ploughing): Sept 29. Dung applied (before deep ploughing), ploughed deep (about 12 inches): Sept 30. Dung applied (before shallow ploughing); ploughed shallow (about 6 inches): Oct 1,2. Cultivated: Mar 11, 20. Rolled and springtime harrowed: Mar 22. Harrowed twice, ring rolled: Mar 23. Spring artificials applied: Apr 13. Harrowed: Apr 14. Seed drilled: Apr 15. Harrowed in: Apr 16. Ring rolled: Apr 22. Dusted with Flea beetle dust: May 8, 14, 15. Thistles hand weeded: June 5. Hoed: June 7 - July 21. Singled: June 8. Hand weeded for thistles: July 28. Lifted: Dec 2-4. Variety: Klein E. Previous crop: Oats.

Barley. Series 5 - KB.

Ploughed: Nov 22-25. Springtime harrowed: Mar 1. Artificially applied, seed drilled and harrowed in: Mar 5. Ring rolled: Mar 9. Seeds mixture undersown: Apr 15. Harrowed and ring rolled: Apr 16. Weeded: May 28 - June 7. Harvested: Aug 16. Variety: Plumage Archer. Previous crop: Sugar beet.

Wheat. Series 6 - KW.

Ploughed: June 17-18, 1947. Ring rolled: June 19. Ploughed deep (about 12 inches): Sept 1. Ploughed shallow (about 6 inches) Sept 2. Cultivated (deep ploughed plots twice, shallow ploughed plots once), ring rolled deep ploughed plots, all plots cultivated: Oct 2. Rolled twice and springtime harrowed: Nov 1. Rolled and springtime harrowed twice: Nov 3. Seed drilled and harrowed in: Nov 4. Rolled: Mar 16. Sulphate of ammonia applied: May 5. Weeded: May 28-June 7. Harvested: Aug 16. Variety: Yeoman. Previous crop: Seeds

Standard errors per plot:

Ley. 1.58 cwt. per acre or 2.4% (4 d.f.)

Potatoes. Ware yield, whole plot, 2.058 tons per acre or 13.9% (4 d.f.)  
sub-plot, 2.506 tons per acre or 16.9% (7 d.f.)

Spring oats. Grain, 4.46 cwt. per acre or 14.5% (4 d.f.)

48/Bb/1.3

Sugar beet. Total sugar, whole plot, 3.19 cwt. per acre or 6.0% (4 d.f.)  
sub-plot, 5.87 cwt. per acre or 11.1% (7 d.f.)  
Tops, whole plot, 0.651 tons per acre or 3.5% (4 d.f.)  
sub-plot, 1.849 tons per acre or 9.9% (7 d.f.)  
Barley. Grain, 0.846 cwt. per acre or 2.1% (4 d.f.)  
Wheat. Grain, 2.69 cwt. per acre or 7.1% (4 d.f.)



48/Bb/1.4

Series I, Ley  
Residual Effects

|                                                                      | Mean | Ploughing |      | Dung |       | Super |       | Potash |       |
|----------------------------------------------------------------------|------|-----------|------|------|-------|-------|-------|--------|-------|
|                                                                      |      | Shallow   | Deep | Abs. | Pres. | Abs.  | Pres. | Abs.   | Pres. |
| Hay: Mean yield 66.5 cwt. per acre ( $\pm 1.12$ , Means $\pm 0.79$ ) |      |           |      |      |       |       |       |        |       |
| Ploughing deep                                                       |      |           |      |      |       |       |       |        |       |
| -shallow                                                             | -1.1 | -         | -    | -1.6 | -0.6  | -1.7  | -0.5  | -1.1   | -1.1  |
| Dung                                                                 | 3.3  | 2.8       | 3.8  | -    | -     | 0.9   | 5.7   | 2.2    | 4.4   |
| Superphosphate                                                       | 1.0  | 0.4       | 1.6  | -1.4 | 3.4   | -     | -     | 4.2    | -2.2  |
| Potash                                                               | 5.8  | 5.8       | 5.8  | 4.7  | 6.9   | 9.0   | 2.6   | -      | -     |

Series 2, Potatoes

|                                                                               | Mean | Ploughing |      | Dung |       | Super |       | Potash |       |
|-------------------------------------------------------------------------------|------|-----------|------|------|-------|-------|-------|--------|-------|
|                                                                               |      | Shallow   | Deep | Abs. | Pres. | Abs.  | Pres. | Abs.   | Pres. |
| Ware tubers: Mean yield 14.85 tons per acre ( $\pm 1.46$ , Means $\pm 1.03$ ) |      |           |      |      |       |       |       |        |       |
| Ploughing deep                                                                |      |           |      |      |       |       |       |        |       |
| -shallow                                                                      | 0.23 | -         | -    | 0.63 | -0.17 | 0.98  | -0.52 | -1.62  | 2.08  |
| Dung                                                                          | 4.64 | 5.04      | 4.24 | -    | -     | 4.23  | 5.05  | 6.29   | 2.99  |
| Superphosphate                                                                | 1.57 | 2.32      | 0.82 | 1.16 | 1.98  | -     | -     | 0.56   | 2.58  |
| Potash                                                                        | 2.37 | 0.52      | 4.22 | 4.02 | 0.72  | 1.36  | 3.38  | -      | -     |

Percentage ware: Mean 98.7

|                |     |     |      |      |     |     |     |     |      |
|----------------|-----|-----|------|------|-----|-----|-----|-----|------|
| Ploughing deep |     |     |      |      |     |     |     |     |      |
| -shallow       | 0.3 | -   | -    | 0.2  | 0.4 | 0.4 | 0.2 | 0.2 | 0.4  |
| Dung           | 0.4 | 0.3 | 0.5  | -    | -   | 0.3 | 0.5 | 0.6 | 0.2  |
| Superphosphate | 0.0 | 0.1 | -0.1 | -0.1 | 0.1 | -   | -   | 0.1 | -0.1 |
| Potash         | 0.5 | 0.4 | 0.6  | 0.7  | 0.3 | 0.6 | 0.4 | -   | -    |

48/Bb/1.5

Series 2, Potatoes

|                            | Superphosphate |             |           | Potash |             |           | Mean  |
|----------------------------|----------------|-------------|-----------|--------|-------------|-----------|-------|
|                            | None           | Ploughed in | In ridges | None   | Ploughed in | In ridges |       |
| Ware tubers: tons per acre |                |             |           |        |             |           |       |
|                            | (a)            | (b) and (c) |           | (a)    | (b) and (c) |           |       |
| Shallow                    | 13.57          | 14.77       | 17.02     | 14.47  | 14.58       | 15.41     | 14.74 |
| Deep                       | 14.55          | 14.51       | 16.24     | 12.85  | 15.82       | 18.34     | 14.97 |
| No Dung                    | 11.95          | 11.40       | 14.82     | 10.52  | 13.39       | 15.70     | 12.53 |
| Dung                       | 16.18          | 17.88       | 18.44     | 16.81  | 17.02       | 18.05     | 17.17 |
| Mean                       | 14.06          | 14.64       | 16.63     | 13.66  | 15.20       | 16.87     | 14.84 |
| Percentage ware            |                |             |           |        |             |           |       |
| Shallow                    | 98.5           | 98.4        | 98.8      | 98.3   | 98.6        | 99.0      | 98.5  |
| Deep                       | 98.8           | 98.6        | 98.8      | 98.5   | 99.0        | 99.2      | 98.8  |
| No Dung                    | 98.5           | 98.2        | 98.7      | 98.1   | 98.6        | 99.0      | 98.5  |
| Dung                       | 98.8           | 98.8        | 98.9      | 98.7   | 99.0        | 99.1      | 98.9  |
| Mean                       | 98.7           | 98.5        | 98.8      | 98.4   | 98.8        | 99.1      | 98.7  |

Standard errors (a)  $\pm 1.03$  (b)  $\pm 1.25$  (c)  $\pm 1.36$

Standard error (b) is for use in horizontal comparisons only; standard errors (a) and (c) for use in all other comparisons.

Series 3, Spring Oats

Residual Effects

|  | Mean | Responses to treatments |      |      |       |       |       |        |       |
|--|------|-------------------------|------|------|-------|-------|-------|--------|-------|
|  |      | Ploughing               |      | Dung |       | Super |       | Potash |       |
|  |      | Shallow                 | Deep | Abs. | Pres. | Abs.  | Pres. | Abs.   | Pres. |

Grain: Mean yield 30.8 cwt. per acre ( $\pm 3.16$ , Means  $\pm 2.23$ )

|                          |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|
| Ploughing deep - shallow | 0.9  | -    | -    | 2.4  | -0.6 | -1.8 | 3.6  | -0.1 | 1.9  |
| Dung                     | -0.2 | 1.3  | -1.7 | -    | -    | -0.2 | -0.2 | -2.1 | 1.7  |
| Superphosphate           | -1.0 | -3.7 | 1.7  | -1.0 | -1.0 | -    | -    | 0.8  | -2.8 |
| Potash                   | -1.3 | -2.3 | -0.3 | -3.2 | 0.6  | -0.5 | -3.1 | -    | -    |

Straw: Mean yield 49.8 cwt. per acre

|                          |      |      |      |      |      |      |      |      |      |
|--------------------------|------|------|------|------|------|------|------|------|------|
| Ploughing deep - shallow | 2.5  | -    | -    | 4.1  | 0.9  | 0.4  | 4.6  | 1.8  | 3.2  |
| Dung                     | 1.8  | 3.4  | 0.2  | -    | -    | 3.0  | 0.6  | 1.0  | 2.6  |
| Superphosphate           | -3.0 | -5.1 | -0.9 | -1.8 | -4.2 | -    | -    | -1.4 | -4.6 |
| Potash                   | -1.9 | -2.6 | -1.2 | -2.7 | -1.1 | -0.3 | -3.5 | -    | -    |

48/Bb/1.6

Series 4: Sugar Beet

|                                                                              | Mean | Responses to treatments |      |      |       |       |       |        |       |
|------------------------------------------------------------------------------|------|-------------------------|------|------|-------|-------|-------|--------|-------|
|                                                                              |      | Ploughing               |      | Dung |       | Super |       | Potash |       |
|                                                                              |      | Shallow                 | Deep | Abs. | Pres. | Abs.  | Pres. | Abs.   | Pres. |
| Total Sugar: Mean yield 52.9 cwt. per acre ( $\pm 2.25$ , Means $\pm 1.59$ ) |      |                         |      |      |       |       |       |        |       |
| Ploughing deep                                                               |      |                         |      |      |       |       |       |        |       |
| -shallow                                                                     | -4.5 | -                       | -    | -0.8 | -8.2  | -4.9  | -4.1  | -1.3   | -7.7  |
| Dung                                                                         | 2.6  | 6.3                     | -1.1 | -    | -     | 3.7   | 1.5   | 5.5    | -0.3  |
| Superphosphate                                                               | -0.4 | -0.8                    | 0.0  | 0.7  | -1.5  | -     | -     | -0.3   | -0.5  |
| Potash                                                                       | 0.6  | 3.8                     | -2.6 | 3.5  | -2.3  | 0.7   | 0.5   | -      | -     |

| Roots (washed): Mean yield 15.75 tons per acre |       |         |       |       |       |       |       |       |       |
|------------------------------------------------|-------|---------|-------|-------|-------|-------|-------|-------|-------|
|                                                | Mean  | Shallow | Deep  | Abs.  | Pres. | Abs.  | Pres. | Abs.  | Pres. |
| Ploughing deep                                 |       |         |       |       |       |       |       |       |       |
| -shallow                                       | -1.13 | -       | -     | -0.15 | -2.11 | -1.22 | -1.04 | -0.35 | -1.91 |
| Dung                                           | 0.91  | 1.89    | -0.07 | -     | -     | 1.09  | 0.73  | 1.48  | 0.34  |
| Superphosphate                                 | -0.06 | -0.15   | 0.03  | 0.12  | -0.24 | -     | -     | -0.24 | 0.12  |
| Potash                                         | 0.25  | 1.03    | -0.53 | 0.32  | -0.32 | 0.07  | 0.43  | -     | -     |

Sugar Percentage: Mean 16.79

|                | Mean  | Shallow | Deep  | Abs.  | Pres. | Abs.  | Pres. | Abs. | Pres. |
|----------------|-------|---------|-------|-------|-------|-------|-------|------|-------|
| Ploughing deep |       |         |       |       |       |       |       |      |       |
| -shallow       | -0.19 | -       | -     | -0.06 | -0.32 | -0.22 | -0.16 | 0.01 | -0.39 |
| Dung           | -0.15 | -0.02   | -0.28 | -     | -     | 0.00  | -0.30 | 0.14 | -0.44 |
| Superphosphate | -0.02 | -0.05   | 0.01  | 0.13  | -0.17 | -     | -     | 0.19 | -0.23 |
| Potash         | -0.08 | 0.12    | -0.28 | 0.21  | -0.37 | 0.13  | -0.29 | -    | -     |

Tops: Mean yield 13.62 tons per acre ( $\pm 0.461$ , Means  $\pm 0.326$ )

|                | Mean  | Shallow | Deep | Abs.  | Pres. | Abs. | Pres. | Abs.  | Pres. |
|----------------|-------|---------|------|-------|-------|------|-------|-------|-------|
| Ploughing deep |       |         |      |       |       |      |       |       |       |
| -shallow       | 2.60  | -       | -    | 2.54  | 2.66  | 1.52 | 3.68  | 2.13  | 3.07  |
| Dung           | 1.65  | 1.59    | 1.71 | -     | -     | 0.94 | 2.36  | 0.64  | 2.66  |
| Superphosphate | -0.01 | -1.09   | 1.07 | -0.72 | 0.70  | -    | -     | -0.96 | 0.94  |
| Potash         | 1.44  | 0.97    | 1.91 | 0.43  | 2.45  | 0.49 | 2.39  | -     | -     |

Plant Number: Mean 18.3 thousands per acre

|                | Mean | Shallow | Deep | Abs. | Pres. | Abs. | Pres. | Abs. | Pres. |
|----------------|------|---------|------|------|-------|------|-------|------|-------|
| Ploughing deep |      |         |      |      |       |      |       |      |       |
| -shallow       | -0.7 | -       | -    | -0.4 | -1.0  | -0.5 | -0.9  | -0.3 | -1.1  |
| Dung           | 0.4  | -0.7    | 0.1  | -    | -     | 0.6  | 0.2   | 0.4  | 0.4   |
| Superphosphate | -0.3 | -0.1    | -0.5 | -0.1 | -0.5  | -    | -     | -0.1 | -0.5  |
| Potash         | -0.1 | 0.3     | -0.5 | -0.1 | -0.1  | 0.1  | -0.3  | -    | -     |

Noxious Nitrogen: Mean 43.9

|                | Mean | Shallow | Deep | Abs. | Pres. | Abs. | Pres. | Abs. | Pres. |
|----------------|------|---------|------|------|-------|------|-------|------|-------|
| Ploughing deep |      |         |      |      |       |      |       |      |       |
| -shallow       | 4.9  | -       | -    | 5.8  | 4.0   | 4.1  | 5.7   | 4.9  | 4.9   |
| Dung           | 1.8  | 2.7     | 0.9  | -    | -     | 2.4  | 1.2   | -0.1 | 3.7   |
| Superphosphate | -0.9 | -1.7    | -0.1 | -0.3 | -1.5  | -    | -     | 0.6  | -2.4  |
| Potash         | 2.4  | 2.4     | 2.4  | 0.5  | 4.3   | 3.9  | 0.9   | -    | -     |

48/Bb/1.7

Series 4. Sugar Beet

|                           | Superphosphate |             |             | Potash |             |             | Mean |
|---------------------------|----------------|-------------|-------------|--------|-------------|-------------|------|
|                           | None           | Ploughed in | In seed bed | None   | Ploughed in | In seed bed |      |
| Total Sugar: cwt per acre |                |             |             |        |             |             |      |
|                           | (a)            | (b) and (c) |             | (a)    | (b) and (c) |             |      |
| Shallow                   | 55.5           | 57.0        | 52.5        | 53.2   | 60.1        | 54.0        | 55.1 |
| Deep                      | 50.6           | 53.0        | 48.4        | 52.0   | 54.3        | 44.3        | 50.7 |
| No dung                   | 51.2           | 53.4        | 50.6        | 49.9   | 57.8        | 48.9        | 51.6 |
| Dung                      | 54.9           | 56.6        | 50.3        | 55.3   | 56.6        | 49.4        | 54.2 |
| Mean                      | 53.1           | 55.0        | 50.5        | 52.6   | 57.2        | 49.2        | 52.9 |

| Roots (washed): tons per acre |       |       |       |       |       |       |       |
|-------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Shallow                       | 16.40 | 16.83 | 15.66 | 15.80 | 17.75 | 15.93 | 16.32 |
| Deep                          | 15.17 | 16.02 | 14.39 | 15.45 | 16.55 | 13.30 | 15.19 |
| No dung                       | 15.23 | 15.69 | 15.04 | 14.89 | 17.01 | 14.41 | 15.30 |
| Dung                          | 16.33 | 17.17 | 15.01 | 16.37 | 17.29 | 14.82 | 16.21 |
| Mean                          | 15.78 | 16.43 | 15.02 | 15.63 | 17.15 | 14.61 | 15.75 |

| Sugar Percentage |       |       |       |       |       |       |       |
|------------------|-------|-------|-------|-------|-------|-------|-------|
| Shallow          | 16.91 | 16.93 | 16.78 | 16.83 | 16.94 | 16.95 | 16.88 |
| Deep             | 16.69 | 16.59 | 16.82 | 16.84 | 16.44 | 16.68 | 16.70 |
| No dung          | 16.80 | 17.04 | 16.84 | 16.76 | 16.98 | 16.96 | 16.87 |
| Dung             | 16.80 | 16.49 | 16.78 | 16.90 | 16.49 | 16.67 | 16.72 |
| Mean             | 16.80 | 16.76 | 16.80 | 16.83 | 16.69 | 16.81 | 16.79 |

Standard errors (b) are for use in horizontal comparisons only, (a) and (c) for use in all other comparisons

|                 |       |       |       |
|-----------------|-------|-------|-------|
| Standard errors | (a)   | (b)   | (c)   |
| Total sugar     | ±1.59 | ±2.93 | ±2.62 |

48/Bb/1.8

Series 4. Sugar Beet

|                     | Superphosphate |             |             | Potash      |             |             | Mean |
|---------------------|----------------|-------------|-------------|-------------|-------------|-------------|------|
|                     | None           | Ploughed in | In seed bed | None        | Ploughed in | In seed bed |      |
| Tops: tons per acre |                |             |             |             |             |             |      |
|                     | (a)            | (b) and (c) | (a)         | (b) and (c) | (a)         | (b) and (c) |      |
| Shallow             | 17.86          | 17.14 16.40 | 15.83       | 18.21 17.40 | 17.32       |             |      |
| Deep                | 19.39          | 21.51 19.39 | 18.97       | 21.84 19.91 | 19.92       |             |      |
| No dung             | 18.15          | 17.65 17.21 | 17.58       | 18.62 17.39 | 17.79       |             |      |
| Dung                | 19.10          | 21.00 18.58 | 16.22       | 21.43 19.92 | 19.44       |             |      |
| Mean                | 18.62          | 19.33 17.90 | 17.90       | 20.02 18.65 | 18.62       |             |      |

| Plant Number: thous. per acre |      |           |      |           |      |  |  |
|-------------------------------|------|-----------|------|-----------|------|--|--|
| Shallow                       | 18.7 | 18.3 18.9 | 18.5 | 18.9 18.7 | 18.7 |  |  |
| Deep                          | 18.2 | 17.4 18.0 | 16.2 | 17.7 17.7 | 17.9 |  |  |
| No dung                       | 18.1 | 18.0 18.1 | 18.1 | 18.1 18.0 | 18.1 |  |  |
| Dung                          | 18.7 | 17.7 18.8 | 18.5 | 18.5 18.4 | 18.5 |  |  |
| Mean                          | 18.4 | 17.9 18.4 | 18.3 | 18.3 18.2 | 18.3 |  |  |

| Noxious Nitrogen |      |           |      |           |      |  |  |
|------------------|------|-----------|------|-----------|------|--|--|
| Shallow          | 42.2 | 40.2 41.0 | 40.2 | 44.0 41.2 | 41.4 |  |  |
| Deep             | 46.4 | 46.2 46.2 | 45.1 | 48.0 47.0 | 46.3 |  |  |
| No dung          | 43.1 | 41.8 44.0 | 42.8 | 43.5 43.0 | 43.0 |  |  |
| Dung             | 45.5 | 44.6 43.2 | 42.6 | 48.5 45.2 | 44.8 |  |  |
| Mean             | 44.3 | 43.2 43.6 | 42.7 | 46.0 44.1 | 43.9 |  |  |

Standard errors (b) are for use in horizontal comparisons only, (a) and (c) for use in all other comparisons.

|                  |        |        |        |
|------------------|--------|--------|--------|
| Standard errors: | (a)    | (b)    | (c)    |
| Tops             | ±0.326 | ±0.925 | ±0.730 |

48/Bb/1.9

Series 5. Barley

Residual effects

Responses to treatments.

|                                                                        | Mean | Ploughing |      | Dung |       | Super |       | Potash |       |
|------------------------------------------------------------------------|------|-----------|------|------|-------|-------|-------|--------|-------|
|                                                                        |      | Shallow   | Deep | Abs. | Pres. | Abs.  | Pres. | Abs.   | Pres. |
| Grain: Mean yield 40.9 cwt. per acre ( $\pm 0.60$ , Means $\pm 0.42$ ) |      |           |      |      |       |       |       |        |       |
| Ploughing deep                                                         |      |           |      |      |       |       |       |        |       |
| -shallow                                                               | 0.2  | -         | -    | 1.4  | -1.0  | 0.0   | 0.4   | 0.4    | 0.0   |
| Dung                                                                   | 1.6  | 2.8       | 0.4  | -    | -     | 3.1   | 0.1   | 2.4    | 0.8   |
| Superphosphate                                                         | 1.3  | 1.1       | 1.5  | 2.8  | -0.2  | -     | -     | 2.4    | 0.2   |
| Potash                                                                 | -1.0 | -0.6      | -1.2 | -0.2 | -1.8  | 0.1   | -2.1  | -      | -     |

Straw: Mean yield 44.8 cwt. per acre

|                |     |      |      |     |      |      |      |      |      |
|----------------|-----|------|------|-----|------|------|------|------|------|
| Ploughing deep |     |      |      |     |      |      |      |      |      |
| -shallow       | 0.1 | -    | -    | 0.0 | 0.2  | 1.0  | -0.8 | -0.5 | 0.7  |
| Dung           | 2.3 | 2.2  | 2.4  | -   | -    | 3.6  | 1.0  | 4.9  | -0.3 |
| Superphosphate | 0.2 | 1.1  | -0.7 | 1.5 | -1.1 | -    | -    | -1.0 | 1.4  |
| Potash         | 0.2 | -0.4 | 0.8  | 2.3 | -2.4 | -1.0 | 1.4  | -    | -    |

Series 6. Wheat

Residual effects

Responses to treatments

|                                                                        | Mean | Ploughing |      | Dung |       | Super |       | Potash |       |
|------------------------------------------------------------------------|------|-----------|------|------|-------|-------|-------|--------|-------|
|                                                                        |      | Shallow   | Deep | Abs. | Pres. | Abs.  | Pres. | Abs.   | Pres. |
| Grain: Mean yield 40.7 cwt. per acre ( $\pm 2.04$ , Means $\pm 1.45$ ) |      |           |      |      |       |       |       |        |       |
| Ploughing deep                                                         |      |           |      |      |       |       |       |        |       |
| -shallow                                                               | -3.5 | -         | -    | -4.5 | -2.5  | -2.5  | -4.5  | -2.3   | -4.7  |
| Dung                                                                   | 2.2  | 1.2       | 3.2  | -    | -     | 2.3   | 2.1   | 4.5    | -0.1  |
| Superphosphate                                                         | 0.7  | 1.7       | -0.3 | 0.8  | 0.6   | -     | -     | 1.0    | 0.4   |
| Potash                                                                 | 0.9  | 2.1       | -0.3 | 3.2  | -1.4  | 1.2   | 0.6   | -      | -     |

Straw: Mean yield 60.6 cwt. per acre

|                |      |     |      |      |      |      |      |      |      |
|----------------|------|-----|------|------|------|------|------|------|------|
| Ploughing deep |      |     |      |      |      |      |      |      |      |
| -shallow       | -3.4 | -   | -    | -3.2 | -3.6 | -1.2 | -5.6 | -1.6 | -5.2 |
| Dung           | 2.7  | 2.9 | 2.5  | -    | -    | 3.3  | 2.1  | 5.3  | -0.9 |
| Superphosphate | 0.2  | 2.4 | -2.0 | 0.8  | -0.4 | -    | -    | -0.6 | 1.0  |
| Potash         | 0.2  | 2.0 | -1.6 | 3.8  | -3.4 | -0.6 | 1.0  | -    | -    |

48/Bc/1.1

### GREEN MANURING EXPERIMENT

LB and LU - Woburn Stackyard, Series A, 1948

Treatments as given in 1936 Report, p. 203, with the exceptions that from 1946 onwards lupins replace tares, and rape replaces mustard as green manuring crops, while kale is replaced by winter cabbages as a testing crop. From 1944 onwards a top dressing of sulphate of ammonia has been applied to half the plots under barley, and in 1946 this top dressing was applied to the green manuring crops. The experiment is now in half replicate, according to the identity  $I \equiv (R + C - M - F - T)DSNA$ , A representing the top dressing of sulphate of ammonia.

#### Cultivations, etc.:

##### Upper Half. Cabbages

Red Clover and Italian Ryegrass undersown in barley: Apr 25, 1947. Failed owing to drought. Whole area ploughed : Nov 24 - Dec 8. Springtine harrowed: Feb 18-19, Mar 9. Harrowed: Mar 17. Rolloed: Mar 22. Rape sown, ryegrass and clover resown, sulphate of ammonia applied, harrowed in: Mar 24. Lupins drilled: Apr 2, 6. Rape plots dusted with Flea beetle dust: Apr 27. Lupin plots hoed: May 11. All plots hoed: May 20-24. Lupin plots hoed: June 8. Fallow plots cultivated: June 25. Dung and straw applied on appropriate plots, green manure rolled: June 28. Whole area ploughed: June 30. Harrowed: July 1. Basal manures and sulphate of ammonia applied, harrowed: July 2. Rolloed: July 3. Cabbages transplanted: July 5-8. Gaps filled in: July 14-15, July 31 - Aug 7. Hoed: Aug 16-20, Sept. 6-7, Oct 8. Harvested: Jan 24, Feb 11, 23, Mar 3. Variety: January King. Previous Crop: Barley.

##### Lower Half. Barley

Ploughed: Mar 3-9. Harrowed: Mar 9. Lime at 3 cwt. CaO per acre applied: Mar 10. Harrowed: Mar 11. Sulphate of ammonia applied to appropriate plots, seed drilled: Mar 12. Harrowed in: Mar 17. Rolloed: Mar 22. Dorset Mail Clover and Italian Ryegrass undersown on appropriate plots: Apr 16. Harrowed in: Apr 23. Whole area rolled: Apr 26. Hand weeded: June 15. Harvested: Aug 14. Variety: Plumage Archer. Previous Crop: Cabbages.

#### Standard errors per plot:

|           |               |                                          |
|-----------|---------------|------------------------------------------|
| Cabbages: | total yield,  | 1.175 tons per acre or 15.7% (9 d.f.)    |
|           | plant number, | 0.27 thousands per acre or 1.5% (9 d.f.) |
| Barley:   | grain,        | 2.78 cwt. per acre or 12.4% (9 d.f.)     |
|           | straw,        | 3.26 cwt. per acre or 11.9% (9 d.f.)     |

48/Bc/1.2

Upper Half - Cabbages

| Green manure crop     | None                                             | Lupins | Clover | Rape | Ryegrass | Mean            |
|-----------------------|--------------------------------------------------|--------|--------|------|----------|-----------------|
|                       | Total Weight: tons per acre ( $\pm 0.588$ )      |        |        |      |          | ( $\pm 0.263$ ) |
| No Dung               | 6.02                                             | 7.61   | 7.41   | 4.76 | 5.98     | 6.36            |
| Dung                  | 8.12                                             | 9.37   | 9.67   | 7.89 | 8.18     | 8.65            |
| No Straw              | 6.47                                             | 8.83   | 8.37   | 6.94 | 7.31     | 7.58            |
| Straw                 | 7.68                                             | 8.15   | 8.72   | 5.70 | 6.86     | 7.42            |
| Sulph. amm.           |                                                  |        |        |      |          |                 |
| 2 cwt./acre           | 6.47                                             | 6.56   | 7.80   | 5.21 | 6.44     | 6.50            |
| 4 cwt./acre           | 7.68                                             | 10.42  | 9.29   | 7.43 | 7.73     | 8.51            |
| Sulph. amm. to barley |                                                  |        |        |      |          |                 |
| absent                | 6.20                                             | 8.44   | 9.26   | 6.16 | 7.24     | 7.46            |
| Present               | 7.95                                             | 8.54   | 7.82   | 6.48 | 6.93     | 7.54            |
| Mean ( $\pm 0.415$ )  | 7.07                                             | 8.49   | 8.54   | 6.32 | 7.08     | 7.50            |
|                       | Total number: thousands per acre ( $\pm 0.136$ ) |        |        |      |          | ( $\pm 0.061$ ) |
| No Dung               | 17.4                                             | 17.6   | 17.6   | 17.3 | 17.6     | 17.5            |
| Dung                  | 17.5                                             | 17.7   | 18.0   | 17.7 | 17.7     | 17.7            |
| No Straw              | 17.2                                             | 17.7   | 17.7   | 17.4 | 17.7     | 17.5            |
| Straw                 | 17.6                                             | 17.6   | 17.9   | 17.6 | 17.5     | 17.6            |
| Sulph. amm.           |                                                  |        |        |      |          |                 |
| 2 cwt./acre           | 17.4                                             | 17.7   | 17.8   | 17.5 | 17.7     | 17.6            |
| 4 cwt./acre           | 17.4                                             | 17.7   | 17.8   | 17.6 | 17.6     | 17.6            |
| Sulph. amm. to barley |                                                  |        |        |      |          |                 |
| absent                | 17.5                                             | 17.7   | 17.9   | 17.5 | 17.6     | 17.6            |
| Present               | 17.4                                             | 17.6   | 17.8   | 17.5 | 17.6     | 17.6            |
| Mean ( $\pm 0.096$ )  | 17.4                                             | 17.7   | 17.8   | 17.5 | 17.6     | 17.6            |



48/Bc/1.3

Upper Half - Cabbages

Differential Responses

|                                                               | Mean  | Dung  |       | Straw |       | Sulph. amm. |       | Sulph. amm. to barley |       |
|---------------------------------------------------------------|-------|-------|-------|-------|-------|-------------|-------|-----------------------|-------|
|                                                               |       | Abs.  | Pres. | Abs.  | Pres. | Abs.        | Pres. | Abs.                  | Pres. |
| Total Weight: tons per acre ( $\pm 0.531$ Means $\pm 0.372$ ) |       |       |       |       |       |             |       |                       |       |
| Dung                                                          | 2.29  | -     | -     | 2.30  | 2.27  | 2.33        | 2.24  | 2.36                  | 2.21  |
| Straw                                                         | -0.16 | -0.14 | -0.17 | -     | -     | -0.01       | -0.30 | -0.28                 | -0.03 |
| Sulph. amm.                                                   | 2.01  | 2.05  | 1.96  | 2.15  | 1.86  | -           | -     | 2.11                  | 1.90  |
| Sulph. amm. to barley                                         | 0.08  | 0.15  | 0.00  | -0.04 | 0.20  | 0.18        | -0.02 | -                     | -     |

Total number: thousands per acre ( $\pm 0.12$ ) Means ( $\pm 0.09$ )

|                       |     |     |     |     |     |     |     |     |     |
|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Dung                  | 0.2 | -   | -   | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 | 0.2 |
| Straw                 | 0.1 | 0.1 | 0.0 | -   | -   | 0.1 | 0.0 | 0.1 | 0.0 |
| Sulph. amm.           | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -   | -   | 0.0 | 0.0 |
| Sulph. amm. to barley | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -   | -   |

48/Bc/1.4

Lower Half - Barley

| Green Manure Crop                   | Lupins | Rape | Clover | Ryegrass | Fallow | Mean           |
|-------------------------------------|--------|------|--------|----------|--------|----------------|
| Grain: cwt. per acre ( $\pm 1.39$ ) |        |      |        |          |        | ( $\pm 0.62$ ) |
| No Dung to Cabbages                 | 21.7   | 20.7 | 23.3   | 16.9     | 22.9   | 21.1           |
| Dung                                | 25.6   | 21.9 | 26.6   | 22.1     | 22.6   | 23.8           |
| No Straw to Cabbages                | 22.6   | 21.6 | 25.0   | 19.8     | 21.7   | 22.1           |
| Straw                               | 24.7   | 21.0 | 24.9   | 19.2     | 24.1   | 22.8           |
| Sulph. amm. to Cabbages             |        |      |        |          |        |                |
| 2 cwt./acre                         | 23.0   | 22.1 | 24.9   | 17.3     | 21.5   | 21.6           |
| 4 cwt./acre                         | 24.3   | 20.6 | 25.0   | 21.6     | 24.3   | 23.2           |
| Sulph. amm. to Barley               |        |      |        |          |        |                |
| Absent                              | 19.9   | 18.2 | 20.9   | 15.0     | 18.9   | 18.6           |
| Present                             | 27.4   | 24.5 | 29.0   | 23.9     | 26.8   | 26.3           |
| Mean ( $\pm 0.98$ )                 | 23.7   | 21.3 | 24.9   | 19.5     | 22.9   | 22.4           |
| Straw: cwt. per acre ( $\pm 1.63$ ) |        |      |        |          |        | ( $\pm 0.73$ ) |
| No Dung to Cabbages                 | 26.8   | 24.5 | 26.5   | 19.0     | 26.8   | 24.7           |
| Dung                                | 31.5   | 28.8 | 32.7   | 26.2     | 31.2   | 30.1           |
| No Straw to Cabbages                | 28.2   | 26.4 | 28.0   | 23.0     | 28.1   | 26.7           |
| Straw                               | 30.1   | 26.9 | 31.2   | 22.2     | 30.0   | 28.1           |
| Sulph. amm. to Cabbages             |        |      |        |          |        |                |
| 2 cwt./acre                         | 27.7   | 24.4 | 29.1   | 21.3     | 27.7   | 26.0           |
| 4 cwt./acre                         | 30.6   | 28.9 | 30.1   | 23.8     | 30.3   | 28.7           |
| Sulph. amm. to Barley               |        |      |        |          |        |                |
| Absent                              | 25.6   | 22.8 | 25.0   | 19.3     | 24.4   | 23.4           |
| Present                             | 32.7   | 30.4 | 34.2   | 25.6     | 33.6   | 31.3           |
| Mean ( $\pm 1.15$ )                 | 29.2   | 26.6 | 29.6   | 22.6     | 29.0   | 27.4           |

48/Bc/1.5

Lower Half - Barley

|                                                      | Mean | Dung |       | Differential Responses |       |      |       | Sulph. amm. to barley |       |
|------------------------------------------------------|------|------|-------|------------------------|-------|------|-------|-----------------------|-------|
|                                                      |      | Abs. | Pres. | Abs.                   | Pres. | Abs. | Pres. | Abs.                  | Pres. |
| Grain: cwt. per acre ( $\pm 1.26$ Means $\pm 0.88$ ) |      |      |       |                        |       |      |       |                       |       |
| Dung to Cabbages                                     | 2.7  | -    | -     | 1.4                    | 3.9   | 4.3  | 1.0   | 3.3                   | 2.0   |
| Straw to Cabbages                                    | 0.6  | -0.6 | 1.8   | -                      | -     | -0.6 | 1.8   | 1.3                   | -0.1  |
| Sulph. amm. to Cabbages                              | 1.4  | 3.0  | -0.2  | 0.1                    | 2.6   | -    | -     | 1.8                   | 0.9   |
| Sulph. amm. to Barley                                | 7.8  | 8.4  | 7.1   | 8.5                    | 7.0   | 8.2  | 7.3   | -                     | -     |
| Straw: cwt. per acre ( $\pm 1.47$ Means $\pm 1.03$ ) |      |      |       |                        |       |      |       |                       |       |
| Dung to Cabbages                                     | 5.4  | -    | -     | 5.3                    | 5.4   | 7.1  | 3.6   | 5.5                   | 5.2   |
| Straw to Cabbages                                    | 1.3  | 1.2  | 1.3   | -                      | -     | 1.0  | 1.5   | 2.6                   | 0.0   |
| Sulph. amm. to Cabbages                              | 2.7  | 4.4  | 0.9   | 2.4                    | 2.9   | -    | -     | 2.6                   | 2.7   |
| Sulph. amm. to Barley                                | 7.9  | 8.0  | 7.7   | 9.2                    | 6.5   | 7.8  | 7.9   | -                     | -     |

48/Bd/1.1

## LEY AND ARABLE ROTATIONS

Woburn - Stackyard Series D, 1948

Details as given in 1938 Report, pp. 135-137, except that owing to the unsatisfactory crops obtained on kale plots in the years 1938-44 sugar beet has been substituted for kale from 1945 onwards.

### Cultivations, etc.:

Block I. Ley. Second year. Grazed by sheep: May 3-21, June 13-17, July 9-13, Aug 17-25, Sept 7-11, Nov 4-10.

Lucerne. Second year. Harrowed three times: Nov 1. Hoed: Nov 3. First cut: July 9. Second cut: Sept 6. Third cut: Nov 12.

Wheat. Ploughed: Oct 7-8. Harrowed: Oct 9. Seed (Squarheads Master) drilled, harrowed: Oct 14, 15. Failure due to birds. Harrowed, seed redrilled: Oct 21. Plant failure due to damage by birds. Harrowed, sulphate of ammonia applied, seed (Atle) drilled, harrowed: Mar 10. Rolled: Mar 13. Harrowed: Apr 23. Rolled: Apr 26. Harvested: Sept 4. Variety: Atle. Previous crop: Potatoes.

Block II. Ley. Third year. Grazed by sheep: May 14-20, June 17-21, July 13-17, Aug 25-Sept 2, Sept 11-15, Nov 10-14.

Lucerne. Third year. Hoed: June 14-18. First cut: July 9. Second cut: Sept 6. Third cut (small crop only): Nov 12.

May. Grass and clover mixture under sown in wheat: Apr 17, 1947. Total failure due to drought. All wheat plots ploughed: Sept 30. Springtime harrowed:

Mar 1. Sulphate of ammonia applied, harrowed: Mar 10. Harrowed twice: Mar 18. Rolled: Mar 22. Seed sown:

Mar 23. Harrowed and rolled: Mar 25. Rolled: Mar 27. First cut: June 9. Second cut (small): Sept 6. Seeds

mixture: Giant Italian Ryegrass: (22 lb per acre) and Trifolium (27 lb per acre). Previous crop: Wheat.

Sugar beet. Ploughed: Sept 30, Mar 18. Harrowed: Mar 19. Rolled: Mar 27. Seed drilled: Apr 2. Nitrate

of soda applied: Apr 5. Rolled: Apr 6. Hoed: Apr 19, June 1-3. Singled: June 1-3. Hoed: June 8-July 2.

Lifted: Oct 5, 6. Variety: Klein E. Previous crop: Wheat.

Block III. Ley. First year. Ploughed: Sept 27-29. Springtime harrowed, harrowed: Mar 10. Rolled, harrowed, rolled: Mar 20. Artificials applied: Mar 23. Seed sown and harrowed in: Mar 25. Topped, toppings left on ground: July 9. Grazed by sheep: June 9-13, July 1-9,

48/Ba/1.2

July 17-22, Aug 9-17, Sept 2-7, Sept 15-16 (Plot 44 only),  
Nov 29-Dec 4. Seeds mixture: S.23 Perennial Ryegrass  
(21 lb per acre), S.143 Cocksfoot (12 lb per acre), late  
flowering Montgomery Red Clover (6 lb per acre), S.100  
White Clover (3 lb per acre). Previous crop: Barley.

Lucerne. First year. Ploughed: Sept 27-29.  
Springtime harrowed, harrowed: Mar 10. Rolled, harrowed,  
rolled: Mar 20. Artificials applied: Mar 23. Rolled,  
seed sown: Mar 24. Failed, probably due to Flea beetle  
attack. Harrowed and rolled: Mar 25. Cultivated:  
May 15. Seed drilled: May 18. Dusted with Flea beetle  
dust: June 11. Cleaned: June 13, 23. Hoed: June 22-  
Sept 22. First cut: Sept 6. Second cut: Nov 12.

Variety: Provence. Previous crop: Barley.  
Potatoes. Ploughed: Sept 27-29. Springtime  
harrowed: Mar 10. Rolled, harrowed, rolled: Mar 20.  
Rolled: Mar 27. Ridged: Apr 6-7. Artificials applied,  
potatoes planted and covered in: Apr 9. Ridges harrowed:  
May 8. Grubbed: May 28. Earthed up: June 21. Sprayed  
with "Perinox": Aug 11. Sprayed to kill haulm: Sept 20.  
Lifted: Sept 30. Variety: Majestic. Previous crop:  
Barley.

Block IV. Potatoes. Ploughed: Oct 30-Nov 4. Springtime  
harrowed: Mar 1, 18. Harrowed: Mar 20. Rolled: Mar 27.  
Ridged: Apr 6-7. Dung applied: Apr 8. Potatoes planted,  
artificials applied, covered in: Apr 9. Ridges harrowed  
down: May 8. Grubbed: May 28. Earthed up: June 21.  
Sprayed with "Perinox": Aug 11. Lifted: Oct 1, 2.  
Variety: Majestic. Previous crop: Ley, lucerne, hay,  
sugar beet.

Block V. Barley. Ploughed: Oct 9-10. Springtime harrowed:  
Feb 27. Lime applied (14 cwt per acre, 82% Cao),  
harrowed, sulphate of ammonia applied: Mar 4. Harrowed,  
seed drilled: Mar 10. Rolled: Mar 13. Harvested:  
Aug 16. Variety: Plumage Archer. Previous crop:  
Potatoes.

Standard errors per plot:

Block V.

Barley, grain: whole plot, 1.61 cwt. per acre or 5.3%  
sub-plot, 1.49 cwt. per acre or 4.9%  
straw: whole plot, 2.68 cwt. per acre or 6.5%  
sub-plot, 1.50 cwt. per acre or 3.6%

Block IV

Potatoes, total produce: whole plot, 0.626 tons per acre or  
sub-plot, 0.903 tons per acre or  
percentage ware: whole plot, 0.380  
sub-plot, 0.435

All standard errors are estimated from 4 d.f.

48/Ba/1.3

Note: For the ley plots of blocks I, II, III, only the mean number of sheep days of grazing per acre and the mean number of sheep carried per acre for the year are given for each block in the summary tables. Each plot was grazed separately, but the number of grazing days is not sufficiently accurately determined for each plot to justify treatment comparisons.

48/Bd/1.4

Block I

| <u>Ley.</u> | 2nd Year. | Sheep days<br>of grazing<br>per acre | No. of sheep<br>carried per acre<br>for the year |
|-------------|-----------|--------------------------------------|--------------------------------------------------|
| Mean        | 1986      |                                      | 5.4                                              |

Lucerne. 2nd Year.

Yield of Lucerne Hay (85% dry matter): tons per acre

|                           | 1st crop | 2nd crop | 3rd crop | Total |
|---------------------------|----------|----------|----------|-------|
| No dung                   | 2.10     | 1.74     | 0.47     | 4.32  |
| Dung in 1945              | 2.01     | 1.77     | 0.52     | 4.30  |
| Mean                      | 2.06     | 1.76     | 0.49     | 4.30  |
| Increase                  | -0.09    | 0.03     | 0.05     | -0.02 |
| <u>Previous Rotation</u>  |          |          |          |       |
| Lucerne                   | 1.94     | 1.64     | 0.48     | 4.04  |
| Arable with<br>sugar beet | 2.18     | 1.88     | 0.51     | 4.56  |

Wheat

|                          | Grain: cwt. per acre | Straw: cwt. per acre |
|--------------------------|----------------------|----------------------|
| No dung                  | 14.7                 | 30.2                 |
| Dung in 1945             | 14.1                 | 31.4                 |
| Mean                     | 14.4                 | 30.8                 |
| Increase                 | -0.6                 | 1.2                  |
| <u>Previous Rotation</u> |                      |                      |
| Ley                      | 18.6                 | 37.2                 |
| Lucerne                  | 14.2                 | 29.8                 |
| Arable with hay          | 12.7                 | 27.0                 |
| Arable with sugar beet   | 12.1                 | 29.0                 |

48/Ba/1.5

Block II

Ley. 3rd Year.

|      | Sheep days<br>of grazing<br>per acre | No. of sheep<br>carried per acre<br>for the year |
|------|--------------------------------------|--------------------------------------------------|
| Mean | 1551                                 | 4.3                                              |

Lucerne 3rd year.

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

|                    | 1st Crop | 2nd Crop | 3rd Crop | Total |
|--------------------|----------|----------|----------|-------|
| No Dung            | 1.38     | 1.41     | 0.04     | 2.84  |
| Dung in 1944       | 1.84     | 1.68     | 0.08     | 3.61  |
| Mean               | 1.62     | 1.54     | 0.06     | 3.22  |
| Increase           | 0.46     | 0.27     | 0.04     | 0.77  |
| Previous Rotation  |          |          |          |       |
| Lucerne            | 1.40     | 1.30     | 0.06     | 2.75  |
| Arable with<br>hay | 1.83     | 1.80     | 0.08     | 3.70  |

| <u>Hay</u>         | 1st Crop | 2nd Crop | Total |
|--------------------|----------|----------|-------|
| No Dung            | 1.04     | 0.20     | 1.24  |
| Dung in 1944       | 1.34     | 0.24     | 1.58  |
| Mean               | 1.19     | 0.22     | 1.41  |
| Increase           | 0.30     | 0.04     | 0.34  |
| Previous Rotation  |          |          |       |
| Lucerne            | 1.38     | 0.16     | 1.54  |
| Arable with<br>hay | 1.00     | 0.28     | 1.28  |

Sugar Beet

|                           | Clean Beet<br>tons per acre | Tops<br>tons per acre | Total Sugar<br>cwt per acre | Sugar % |
|---------------------------|-----------------------------|-----------------------|-----------------------------|---------|
| No Dung                   | 10.40                       | 10.54                 | 35.8                        | 17.21   |
| Dung in 1944              | 9.64                        | 9.00                  | 34.7                        | 18.02   |
| Mean                      | 10.02                       | 9.78                  | 35.2                        | 17.62   |
| Increase                  | -0.76                       | -1.54                 | -1.1                        | 0.81    |
| Previous Rotation         |                             |                       |                             |         |
| Ley                       | 10.41                       | 9.54                  | 36.6                        | 17.62   |
| Arable with<br>sugar beet | 9.63                        | 10.01                 | 33.8                        | 17.62   |



48/Ba/1.6

Block III

Ley. 1st Year.

|      | Sheep days<br>of grazing<br>per acre | No. of sheep<br>carried per acre<br>for the year |
|------|--------------------------------------|--------------------------------------------------|
| Mean | 1986                                 | 5.4                                              |

Potatoes

|                        | Total tubers<br>tons per acre | Percentage<br>Ware |
|------------------------|-------------------------------|--------------------|
| No Dung                | 14.90                         | 96.7               |
| Dung in 1946           | 17.13                         | 97.4               |
| Mean                   | 16.01                         | 97.0               |
| Increase               | 2.23                          | 0.7                |
| Previous Rotation      |                               |                    |
| Ley                    | 17.08                         | 97.35              |
| Lucerne                | 15.35                         | 96.45              |
| Arable with hay        | 15.22                         | 97.30              |
| Arable with Sugar beet | 16.42                         | 97.00              |

Lucerne 1st Year.

Yield of Lucerne Hay (85% dry matter): Tons per acre

|                   |      |
|-------------------|------|
| No Dung           | 0.32 |
| Dung in 1946      | 0.66 |
| Mean              | 0.49 |
| Increase          | 0.34 |
| Previous Rotation |      |
| Lucerne           | 0.46 |
| Arable with hay   | 0.53 |

48/Ed/1.7

Block IV

Potatoes

Previous Crop Rotation

|                                             | Ley   | Lucerne | Arable with hay | Arable with sugar beet | Mean                 |
|---------------------------------------------|-------|---------|-----------------|------------------------|----------------------|
| <b>Total tubers: tons per acre</b>          |       |         |                 |                        |                      |
| No Dung                                     | 15.86 | 16.37   | 14.19           | 13.63                  | 15.01                |
| Dung in 1948 ( $\pm 0.632$ ) <sup>(1)</sup> | 19.02 | 21.35   | 19.00           | 17.44                  | 19.20                |
| Mean ( $\pm 0.443$ )                        | 17.44 | 18.86   | 16.59           | 15.54                  | 17.11                |
| Increase ( $\pm 0.903$ )                    | 3.16  | 4.98    | 4.81            | 3.81                   | 4.19 ( $\pm 0.452$ ) |
| <b>Percentage Warc</b>                      |       |         |                 |                        |                      |
| No Dung                                     | 97.8  | 97.4    | 96.6            | 96.5                   | 97.1                 |
| Dung in 1948 ( $\pm 0.35$ ) <sup>(1)</sup>  | 97.8  | 97.7    | 97.1            | 97.2                   | 97.5                 |
| Mean ( $\pm 0.27$ )                         | 97.8  | 97.6    | 96.8            | 96.9                   | 97.3                 |
| Increase ( $\pm 0.44$ )                     | 0.0   | 0.3     | 0.5             | 0.7                    | 0.4 ( $\pm 0.22$ )   |

Block V

Barley

|                                            | Ley  | Lucerne | Arable with hay | Arable with sugar beet | Mean               |
|--------------------------------------------|------|---------|-----------------|------------------------|--------------------|
| <b>Grain: cwt per acre</b>                 |      |         |                 |                        |                    |
| No Dung                                    | 30.6 | 31.6    | 29.2            | 28.1                   | 29.9               |
| Dung in 1947 ( $\pm 1.36$ ) <sup>(1)</sup> | 32.5 | 28.3    | 33.1            | 31.3                   | 31.3               |
| Mean ( $\pm 1.14$ )                        | 31.5 | 30.0    | 31.1            | 29.7                   | 30.6               |
| Increase ( $\pm 1.49$ )                    | 1.9  | -3.3    | 3.9             | 3.2                    | 1.4 ( $\pm 0.75$ ) |

Standard error (1) for comparisons other than vertical ones.

Block V

48/Da/1.8

Barley

|                            | Ley  | Lucerne | Arable<br>with<br>hay | Arable<br>with<br>sugar<br>beet | Mean               |
|----------------------------|------|---------|-----------------------|---------------------------------|--------------------|
| Straw: cwt. per acre       |      |         |                       |                                 |                    |
| No Dung ( $\pm 2.03$ ) (1) | 42.3 | 41.3    | 36.2                  | 34.6                            | 38.6               |
| Dung in 1947               | 46.3 | 42.3    | 44.1                  | 41.2                            | 43.5               |
| Mean ( $\pm 1.89$ )        | 44.3 | 41.8    | 40.2                  | 37.9                            | 41.0               |
| Increase ( $\pm 1.50$ )    | 4.0  | 1.0     | 7.9                   | 6.6                             | 4.9 ( $\pm 0.75$ ) |

Standard error (1) for comparisons other than vertical ones

48/Be/1.1

## WOBURN MARKET GARDEN EXPERIMENT

Globe Beet and Peas. First crops of 7th year.

The use of heavy dressings of organic manures for making a market garden soil, and the effect of sulphate of ammonia.

JRB and JPE - Lansome, 1948.

System of replication: 2 series, one of each crop, each consisting of 4 randomized blocks of 10 plots each, certain interactions being confounded with block differences.

Area of each plot:  $1/80$  acre.

### Treatments:

Organic manures: Dung, sewage sludge compost, sewage sludge (West Middlesex), and vegetable compost, each at 15 and 30 tons per acre.

Sulphate of ammonia: None, 0.2 cwt. N per acre on organic manure plots. None, 0.2, 0.4, 0.6 cwt. N per acre on plots without organic manure.

Basal manuring: Superphosphate, 0.4 cwt.  $P_2O_5$  per acre.  
Muriate of potash, 0.5 cwt  $K_2O$  per acre.

### Cultivations, etc.:

#### Series A. Globe Beet.

Organic manures applied: Mar 31. Ploughed: Apr 1.  
Harrowed: Apr 2. Ground lime applied to all plots receiving sulphate of ammonia (plots 1,7 at 33 cwt per acre, plots 24, 27 at 22 cwt per acre, other plots at 11 cwt per acre). Harrowed in: Apr 5. Rolled, basal manures and sulphate of ammonia dressings applied, seed drilled and harrowed in: Apr 6. Ring rolled: Apr 10. Dusted with Flea beetle dust: Apr 27. Hoed: May 6-10. Hoed and hand weeded: May 13-28. Harvested: July 6,12-13. Variety: Crimson Globe. Previous crop: Leeks.

#### Series B. Peas.

Organic manures applied: Jan 16-19. Ploughed: Jan 19-20. Springtime harrowed: Feb 17-19. Harrowed: Mar 15. Rolled, basal manures and sulphate of ammonia applied, peas drilled: Mar 16. Ring rolled: Mar 23. Hoed: Apr 29, May 10. Harvested: July 14-26. Variety: Kelvedon Wonder. Previous crop: Winter cabbage\*.

Note: The winter cabbage crop failed owing to drought.

### Standard errors per plot:

Peas, marketable produce, 11.88 cwt. per acre or 18.3%  
Globe beet, weight of marketable produce, 1.272 tons per acre or 24.0%  
total plant number, 4.01 thousands per acre or 12.3%  
weight of bulbs, 0.719 cwt per acre or 26.4%

48/3e/1.2

Summary of Results

| Organic manures | Level of manuring (tons/acre) | Sulphate of ammonia, cwt. N per acre |     |     |     | Mean |
|-----------------|-------------------------------|--------------------------------------|-----|-----|-----|------|
|                 |                               | None                                 | 0.2 | 0.4 | 0.6 |      |

Green peas, marketable produce: cwt. per acre  
( $\pm 8.40$ , means  $\pm 5.94$ )

|               |    |      |      |      |      |       |
|---------------|----|------|------|------|------|-------|
| None          |    | 66.1 | 61.8 | 45.0 | 71.1 | 63.9* |
| Dung          | 15 | 96.1 | 75.0 |      |      | 85.5  |
| Dung          | 30 | 79.3 | 41.3 |      |      | 61.8  |
| Composted     | 15 | 75.7 | 85.0 |      |      | 80.4  |
| sewage sludge | 30 | 80.4 | 73.9 |      |      | 77.1  |
| Sewage        | 15 | 47.1 | 46.8 |      |      | 47.0  |
| sludge        | 30 | 35.7 | 38.2 |      |      | 37.0  |
| Vegetable     | 15 | 85.4 | 84.3 |      |      | 84.8  |
| compost       | 30 | 52.1 | 57.1 |      |      | 54.6  |

Globe beet, total produce: tons per acre  
( $\pm 0.900$ , means  $\pm 0.636$ )

|               |    |      |      |      |      |       |
|---------------|----|------|------|------|------|-------|
| None          |    | 1.30 | 2.92 | 3.86 | 2.37 | 2.11* |
| Dung          | 15 | 4.50 | 6.02 |      |      | 5.26  |
| Dung          | 30 | 9.34 | 7.58 |      |      | 8.46  |
| Composted     | 15 | 3.07 | 3.68 |      |      | 3.38  |
| sewage sludge | 30 | 4.72 | 6.19 |      |      | 5.45  |
| Sewage        | 15 | 6.37 | 5.94 |      |      | 6.15  |
| sludge        | 30 | 6.74 | 6.35 |      |      | 6.54  |
| Vegetable     | 15 | 4.32 | 5.02 |      |      | 4.67  |
| compost       | 30 | 6.85 | 8.78 |      |      | 7.82  |

Globe beet, weight of bulbs: tons per acre  
( $\pm 0.508$ , means  $\pm 0.360$ )

|               |    |      |      |      |      |       |
|---------------|----|------|------|------|------|-------|
| None          |    | 0.47 | 1.37 | 2.04 | 1.20 | 0.92* |
| Dung          | 15 | 2.04 | 3.20 |      |      | 2.62  |
| Dung          | 30 | 5.01 | 4.12 |      |      | 4.56  |
| Composted     | 15 | 1.39 | 1.77 |      |      | 1.58  |
| sewage sludge | 30 | 2.46 | 3.26 |      |      | 2.86  |
| Sewage        | 15 | 3.25 | 3.08 |      |      | 3.17  |
| sludge        | 30 | 3.50 | 3.30 |      |      | 3.40  |
| Vegetable     | 15 | 2.10 | 2.62 |      |      | 2.36  |
| compost       | 30 | 3.53 | 4.74 |      |      | 4.14  |

\* These means are for 0.0 and 0.2 cwt. N per acre only

48/Be/1.3

| Organic manures                                                                      | Level of manuring (tons/acre) | Sulphate of ammonia, cwt. N per acre |      |      |      | Mean  |
|--------------------------------------------------------------------------------------|-------------------------------|--------------------------------------|------|------|------|-------|
|                                                                                      |                               | None                                 | 0.2  | 0.4  | 0.6  |       |
| Globe beet, total plant number: thous. per acre<br>( $\pm 2.87$ , means $\pm 2.01$ ) |                               |                                      |      |      |      |       |
| None                                                                                 |                               | 27.1                                 | 32.4 | 33.4 | 25.2 | 29.8* |
| Dung                                                                                 | 15                            | 32.8                                 | 31.6 |      |      | 32.2  |
| Dung                                                                                 | 30                            | 42.8                                 | 29.4 |      |      | 36.1  |
| Composted                                                                            | 15                            | 29.6                                 | 35.0 |      |      | 32.4  |
| sewage sludge                                                                        | 30                            | 33.5                                 | 34.2 |      |      | 33.9  |
| Sewage                                                                               | 15                            | 37.6                                 | 29.9 |      |      | 33.8  |
| sludge                                                                               | 30                            | 28.8                                 | 27.2 |      |      | 28.0  |
| Vegetable                                                                            | 15                            | 37.0                                 | 39.0 |      |      | 38.0  |
| compost                                                                              | 30                            | 31.8                                 | 34.9 |      |      | 33.4  |

\*These means are for 0.0 and 0.2 cwt. N per acre only

48/Be/2.1

WOBURN MARKET GARDEN EXPERIMENT

Leeks and Winter Cabbage. 2nd crops for 7th year

The use of heavy dressings of organic manures for making garden soil, and the effect of sulphate of ammonia.

JLE and JU - Lancaster 1948 - 9

System of replication: 2 series, one for each crop, each consisting of 4 randomized blocks of 10 plots each, certain interactions being confounded with block differences.

Area of each plot:  $\frac{1}{80}$  acre.

Treatments:

Organic manures (applied to previous crops): Dung, sewage, sludge compost, sewage sludge (West Middlesex), and vegetable compost, each at 15 and 30 tons per acre.

Sulphate of ammonia: None, 0.4 cwt. N per acre on organic manure plots. None, 0.4, 0.8, 1.2 cwt. N per acre on plots without organic manure.

Basal manuring: None.

Cultivations, etc:

Series A. Winter Cabbage.

Ploughed and harrowed: July 15, 16. Rolled, sulphate of ammonia applied, cabbages planted: July 19, 20. Cabbages replanted where necessary: Aug 3 - 7. Hoed: Aug 24 - Sept 29. Cut: Jan 11, Feb 8, 15, 22. Variety: January King. Previous crop: Globe beet.

Series B. Leeks.

Ploughed: July 26, 27. Harrowed, rolled: July 27. Sulphate of ammonia applied, plots 48, 51, 72, 78 receiving only half dressings: July 30. Leeks planted: Aug 3 - 5. Hoed: Aug 24 - Sept 29. Second dressing of sulphate of ammonia to plots 48, 51, 72, 78: Sept 27. Harvested: Mar 16 - 29. Variety: Musselburgh. Previous crop: Peas.

Standard errors per plot:

Winter cabbages, marketable weight, 40.828 tons per acre or 11.8% total number, 0.372 thousands per acre or 2.1%

Leeks, total weight 14.40 cwt. per acre or 12.0% total number, 0.879 thousands per acre or 2.1%

48/Be/2.2

Summary of Results

| Organic manures                            | Level of manuring<br>tons per acre | Sulphate of Ammonia<br>cwt N per acre |      |      |      | Mean  |
|--------------------------------------------|------------------------------------|---------------------------------------|------|------|------|-------|
|                                            |                                    | None                                  | 0.4  | 0.8  | 1.2  |       |
| Cabbages, Marketable Weight: tons per acre |                                    |                                       |      |      |      |       |
| ( $\pm 0.586$ Means $\pm 0.414$ )          |                                    |                                       |      |      |      |       |
| None                                       |                                    | 2.41                                  | 5.98 | 7.59 | 7.49 | 4.20* |
| Dung                                       | 15                                 | 3.36                                  | 6.66 |      |      | 5.01  |
| Dung                                       | 30                                 | 8.14                                  | 7.86 |      |      | 8.00  |
| Composted                                  | 15                                 | 4.98                                  | 6.91 |      |      | 5.94  |
| sewage sludge                              | 30                                 | 5.88                                  | 8.05 |      |      | 6.96  |
| Sewage                                     | 15                                 | 8.34                                  | 9.66 |      |      | 9.00  |
| sludge                                     | 30                                 | 9.77                                  | 9.88 |      |      | 9.82  |
| Vegetable                                  | 15                                 | 5.68                                  | 6.99 |      |      | 6.33  |
| compost                                    | 30                                 | 6.95                                  | 8.26 |      |      | 7.61  |
| Cabbages, Total Number: thous. per acre    |                                    |                                       |      |      |      |       |
| ( $\pm 0.263$ Means $\pm 0.166$ )          |                                    |                                       |      |      |      |       |
| None                                       |                                    | 17.6                                  | 17.9 | 18.0 | 18.2 | 17.8* |
| Dung                                       | 15                                 | 16.7                                  | 18.3 |      |      | 17.5  |
| Dung                                       | 30                                 | 18.3                                  | 18.0 |      |      | 18.1  |
| Composted                                  | 15                                 | 17.8                                  | 18.2 |      |      | 18.0  |
| sewage sludge                              | 30                                 | 18.1                                  | 17.8 |      |      | 17.9  |
| Sewage                                     | 15                                 | 17.8                                  | 17.8 |      |      | 17.8  |
| sludge                                     | 30                                 | 17.4                                  | 18.0 |      |      | 17.7  |
| Vegetable                                  | 15                                 | 17.9                                  | 17.5 |      |      | 17.7  |
| compost                                    | 30                                 | 18.0                                  | 18.3 |      |      | 18.2  |

\* These means are for 0.0 and 0.4 cwt N. per acre only.



48/Be/2.3

| Organic Manures | Level of manuring tons per acre | Sulphate of Ammonia cwt. N per acre |     |     | Mean |
|-----------------|---------------------------------|-------------------------------------|-----|-----|------|
|                 |                                 | None                                | 0.4 | 0.8 |      |

Leeks, Total Weight: cwt per acre

( $\pm 10.2$  Means  $\pm 7.20$ )

|               |    |       |       |       |       |       |
|---------------|----|-------|-------|-------|-------|-------|
| None          |    | 66.3  | 113.7 | 107.3 | 116.2 | 90.0* |
| Dung          | 15 | 114.4 | 113.6 |       |       | 114.0 |
| Dung          | 30 | 139.6 | 143.7 |       |       | 141.6 |
| Composted     | 15 | 103.8 | 124.1 |       |       | 114.0 |
| sewage sludge | 30 | 120.5 | 113.2 |       |       | 116.8 |
| Sewage        | 15 | 127.6 | 125.5 |       |       | 126.5 |
| sludge        | 30 | 131.8 | 163.5 |       |       | 147.6 |
| Vegetable     | 15 | 109.0 | 106.2 |       |       | 107.6 |
| compost       | 30 | 124.4 | 126.8 |       |       | 125.6 |

Leeks, Total Number: thous. per acre

( $\pm 0.622$  Means  $\pm 0.440$ )

|                   |    |      |      |      |      |       |
|-------------------|----|------|------|------|------|-------|
| None              |    | 40.9 | 42.6 | 38.7 | 41.1 | 41.8* |
| Dung              | 15 | 41.8 | 41.9 |      |      | 41.9  |
| Dung              | 30 | 42.8 | 40.6 |      |      | 41.7  |
| Composted         | 15 | 41.5 | 41.9 |      |      | 41.7  |
| sewage sludge     | 30 | 41.1 | 40.6 |      |      | 40.8  |
| Sewage Sludge     | 15 | 40.9 | 39.9 |      |      | 40.4  |
| "  "              | 30 | 41.5 | 42.4 |      |      | 41.9  |
| Vegetable compost | 15 | 43.5 | 40.5 |      |      | 42.0  |
| "  "              | 30 | 42.3 | 42.1 |      |      | 42.2  |

\* These means are for 0.0 and 0.4 cwt N per acre only.

48/Bf/1

GRAZING EXPERIMENT

Highfield - 1948

The effects of cake feeding and equivalent manures on the nutritive value of the herbage.

For details see 1937 Report, pp. 24-26

Area of each plot: Plots 4, 5, 6: 4.93 acres

Cultivations: All plots topped to cut off thistles: June 17-18

Grazing periods: Cattle: May 4 - June 30, and Nov. 4 - Dec. 3  
 Sheep: June 8 - Sept. 22

Block II

| Plot   | 5                                  | 4                        | 6                     |
|--------|------------------------------------|--------------------------|-----------------------|
|        | No<br>Manure                       | Cake<br>1938, 40, 43, 46 | Equivalent<br>Manures |
|        | Live weight increases: lb per acre |                          |                       |
| Cattle | 631                                | 480                      | 566                   |
| Sheep  | 116                                | 134                      | 128                   |
|        | Grazing days per acre              |                          |                       |
| Cattle | 144                                | 104                      | 160                   |
| Sheep  | 327                                | 289                      | 336                   |
|        | Starch equivalent: lb per acre     |                          |                       |
| Cattle | 2285                               | 1720                     | 2236                  |
| Sheep  | 889                                | 911                      | 922                   |

48/Ca/1.1

WHEAT

Control of "Eyespot"

The effects of sulphate of ammonia, of rate and depth of sowing and of spraying, on the sixth successive Wheat crop.

RW - Little Knott 1948

System of replication: 3 x 3 x 3 design in 6 blocks of 9 plots each, certain three-factor interactions and the effect of spraying being confounded with block differences.

Area of each plot 0.0151 acre.

Treatments:

Sulphate of ammonia: ~~None~~. 0.4, 0.8 cwt N per acre applied as a top-dressing in March ( $N_0, N_1, N_2$ ).  
 Depth of sowing: Shallow ( $\frac{1}{2}$ "<sup>0</sup>), normal ( $1\frac{1}{2}$ "<sup>1</sup>), deep (3"<sup>2</sup>) ( $D_0, D_1, D_2$ ).  
 Rate of sowing:  $1\frac{1}{2}$ ,  $2\frac{1}{2}$  or  $3\frac{1}{2}$  bushels per acre ( $R_0, R_1, R_2$ ).  
 Spraying: 3 Blocks sprayed with sulphuric acid ( $12\frac{1}{2}$ % by volume B.O.V. at 100 gallons per acre) before germination and again in spring.

Basal Manuring: 3 cwt per acre superphosphate and 1 cwt per acre muriate of potash drilled across the plots.

Cultivations etc:

Ploughed: Sept 8 - 13. Basal Manures applied: Oct 8. Cultivated: Oct 17. Ring-rolled: Oct 18. Springtined, rolled and springtined and ring-rolled: Oct 21. Seed drilled: Oct 22. Harrowed in: Oct 23. Sprayed with B.O.V.: Nov 1 and again Mar 8. Sulphate of Ammonia applied: Mar 15. Ring-rolled: Apr 28. Sprayed against weeds: May 14. Hand pulled rye: May 21. Hand pulled wild oats and other weeds: June 15 - 16. Hand pulled wild oats: various days: June 20 - 30. Harvested: Aug 21. Variety: Squareheads Master ( $13/4$ ).  
 Previous crop: Wheat.

Standard errors per plot:

|                                      |           |
|--------------------------------------|-----------|
| Grain: 2.02 cwt per acre or 10.4%    | (24 d.f.) |
| Straw: 5.19 cwt per acre or 7.9%     | (24 d.f.) |
| % Eyespot, (transformed values).     |           |
| Sprayed blocks - 2.57                | 6 d.f.)   |
| Unsprayed. 6.48                      | 6 d.f.)   |
| % Take All (transformed values) 8.68 | 24 d.f.)  |

Note: The analysis of diseased wheat has been carried out on percentages transformed to degrees and all tests of significance should be applied to the transformed values.

Grain: cwt per acre ( $\pm 1.17$  Means  $\pm 0.67$ )

48/Ca/1.2

|                                      | Unsprayed      |                |                |      | Sprayed        |                |                |      | Effect of Spraying ( $\pm 0.95$ )(1) |
|--------------------------------------|----------------|----------------|----------------|------|----------------|----------------|----------------|------|--------------------------------------|
|                                      | R <sub>0</sub> | R <sub>1</sub> | R <sub>2</sub> | Mean | R <sub>0</sub> | R <sub>1</sub> | R <sub>2</sub> | Mean |                                      |
| D <sub>0</sub>                       | 15.0           | 17.8           | 16.0           | 16.3 | 25.8           | 22.9           | 23.4           | 24.0 | 7.7                                  |
| D <sub>1</sub>                       | 16.4           | 15.6           | 13.5           | 15.2 | 23.5           | 21.2           | 22.6           | 22.4 | 7.2                                  |
| D <sub>2</sub>                       | 17.2           | 17.2           | 12.9           | 15.8 | 24.9           | 22.8           | 20.9           | 20.9 | 7.1                                  |
|                                      | N <sub>0</sub> | N <sub>1</sub> | N <sub>2</sub> |      | N <sub>0</sub> | N <sub>1</sub> | N <sub>2</sub> |      |                                      |
| D <sub>0</sub>                       | 17.0           | 14.2           | 17.7           |      | 20.4           | 25.6           | 26.1           |      |                                      |
| D <sub>1</sub>                       | 14.4           | 15.8           | 15.4           |      | 17.0           | 23.7           | 26.7           |      |                                      |
| D <sub>2</sub>                       | 15.2           | 15.7           | 16.5           |      | 15.7           | 25.1           | 27.9           |      |                                      |
| R <sub>0</sub>                       | 17.7           | 13.6           | 17.3           | 16.2 | 18.9           | 26.2           | 29.1           | 24.7 | 8.5                                  |
| R <sub>1</sub>                       | 17.0           | 16.1           | 17.6           | 16.9 | 19.1           | 23.5           | 24.3           | 22.3 | 5.4                                  |
| R <sub>2</sub>                       | 11.7           | 16.1           | 14.7           | 14.2 | 15.0           | 24.7           | 27.2           | 22.3 | 8.1                                  |
| Mean                                 | 15.5           | 15.2           | 16.5           | 15.8 | 17.7           | 24.8           | 26.9           | 23.1 |                                      |
| Effect of spraying ( $\pm 0.95$ )(1) |                |                |                |      | 2.2            | 9.6            | 10.4           |      |                                      |

Straw: cwt per acre ( $\pm 3.13$  Means  $\pm 1.81$ )

|                                      | Unsprayed      |                |                |      | Sprayed        |                |                |      | Effect of Spraying ( $\pm 2.45$ )(1) |
|--------------------------------------|----------------|----------------|----------------|------|----------------|----------------|----------------|------|--------------------------------------|
|                                      | R <sub>0</sub> | R <sub>1</sub> | R <sub>2</sub> | Mean | R <sub>0</sub> | R <sub>1</sub> | R <sub>2</sub> | Mean |                                      |
| D <sub>0</sub>                       | 55.3           | 62.6           | 55.4           | 57.7 | 81.1           | 74.9           | 78.2           | 78.1 | 20.4                                 |
| D <sub>1</sub>                       | 59.3           | 58.3           | 52.1           | 56.6 | 75.0           | 69.9           | 72.7           | 72.5 | 15.9                                 |
| D <sub>2</sub>                       | 56.5           | 63.7           | 48.6           | 56.3 | 76.2           | 72.2           | 70.0           | 72.8 | 16.5                                 |
|                                      | N <sub>0</sub> | N <sub>1</sub> | N <sub>2</sub> |      | N <sub>0</sub> | N <sub>1</sub> | N <sub>2</sub> |      |                                      |
| D <sub>0</sub>                       | 55.4           | 54.6           | 63.3           |      | 71.0           | 80.3           | 83.0           |      |                                      |
| D <sub>1</sub>                       | 49.4           | 56.8           | 63.5           |      | 57.8           | 74.5           | 85.3           |      |                                      |
| D <sub>2</sub>                       | 51.9           | 55.8           | 61.1           |      | 54.5           | 78.5           | 85.4           |      |                                      |
| R <sub>0</sub>                       | 56.7           | 51.7           | 62.7           | 57.0 | 64.3           | 79.2           | 88.8           | 77.4 | 20.4                                 |
| R <sub>1</sub>                       | 57.0           | 59.3           | 68.3           | 61.5 | 61.1           | 76.2           | 79.7           | 72.3 | 10.8                                 |
| R <sub>2</sub>                       | 42.9           | 56.2           | 56.9           | 52.0 | 57.9           | 77.9           | 85.1           | 73.6 | 21.6                                 |
| Mean                                 | 52.2           | 55.7           | 62.6           | 56.9 | 61.1           | 77.8           | 84.5           | 74.5 |                                      |
| Effect of spraying ( $\pm 2.45$ )(1) |                |                |                |      | 8.9            | 22.1           | 21.9           |      |                                      |

(1) Standard error for comparison between main effects only.

Percentage Straws showing Severe Eyespot at Harvest  
(means from transformed values)

48/0a/1.0

|                | Unsprayed          |                |                |      | Sprayed        |                |                |      | Effect of Spraying |
|----------------|--------------------|----------------|----------------|------|----------------|----------------|----------------|------|--------------------|
|                | R <sub>0</sub>     | R <sub>1</sub> | R <sub>2</sub> | Mean | R <sub>0</sub> | R <sub>1</sub> | R <sub>2</sub> | Mean |                    |
| D <sub>0</sub> | 51.6               | 57.5           | 42.5           | 50.5 | 10.3           | 15.0           | 9.7            | 11.4 | -39.1              |
| D <sub>1</sub> | 62.3               | 38.6           | 66.5           | 56.0 | 11.4           | 12.1           | 11.3           | 11.7 | -44.3              |
| D <sub>2</sub> | 35.3               | 58.0           | 52.2           | 48.4 | 10.9           | 15.0           | 9.1            | 12.2 | -36.2              |
|                | N <sub>0</sub>     | N <sub>1</sub> | N <sub>2</sub> |      | N <sub>0</sub> | N <sub>1</sub> | N <sub>2</sub> |      |                    |
| D <sub>0</sub> | 37.2               | 62.8           | 51.8           |      | 12.3           | 12.8           | 9.7            |      |                    |
| D <sub>1</sub> | 35.7               | 58.8           | 72.3           |      | 6.4            | 13.3           | 16.2           |      |                    |
| D <sub>2</sub> | 37.5               | 55.4           | 52.8           |      | 10.3           | 16.1           | 10.7           |      |                    |
| R <sub>0</sub> | 41.3               | 56.0           | 51.8           | 49.7 | 9.1            | 13.8           | 11.8           | 11.4 | -38.3              |
| R <sub>1</sub> | 36.8               | 52.8           | 64.3           | 51.4 | 14.4           | 14.8           | 13.0           | 14.0 | -37.4              |
| R <sub>2</sub> | 32.3               | 68.0           | 61.0           | 53.8 | 5.8            | 13.7           | 11.4           | 10.1 | -43.7              |
| Mean           | 36.8               | 59.0           | 59.0           | 51.6 | 9.4            | 14.0           | 12.1           | 11.8 |                    |
|                | Effect of Spraying |                |                |      | -27.4          | -45.0          | -46.9          |      |                    |

(Transformed values)

|                | Unsprayed<br>(± 3.74 Means ± 2.16)            |                |                |      | Sprayed<br>(± 1.48 Means ± 0.86) |                |                |      | Effect of Spraying<br>(± 2.32) <sup>(1)</sup> |
|----------------|-----------------------------------------------|----------------|----------------|------|----------------------------------|----------------|----------------|------|-----------------------------------------------|
|                | R <sub>0</sub>                                | R <sub>1</sub> | R <sub>2</sub> | Mean | R <sub>0</sub>                   | R <sub>1</sub> | R <sub>2</sub> | Mean |                                               |
| D <sub>0</sub> | 45.9                                          | 49.3           | 40.7           | 45.3 | 18.7                             | 22.8           | 18.1           | 19.8 | -25.5                                         |
| D <sub>1</sub> | 52.1                                          | 38.4           | 54.6           | 48.4 | 19.8                             | 20.4           | 19.7           | 20.0 | -28.4                                         |
| D <sub>2</sub> | 36.5                                          | 49.6           | 46.2           | 44.1 | 21.0                             | 22.8           | 17.6           | 20.5 | -23.6                                         |
|                | N <sub>0</sub>                                | N <sub>1</sub> | N <sub>2</sub> |      | N <sub>0</sub>                   | N <sub>1</sub> | N <sub>2</sub> |      |                                               |
| D <sub>0</sub> | 37.6                                          | 52.4           | 46.0           |      | 20.5                             | 20.9           | 18.1           |      |                                               |
| D <sub>1</sub> | 36.7                                          | 50.1           | 58.3           |      | 14.6                             | 21.4           | 23.8           |      |                                               |
| D <sub>2</sub> | 37.8                                          | 48.1           | 46.5           |      | 18.7                             | 23.7           | 19.1           |      |                                               |
| R <sub>0</sub> | 40.0                                          | 48.4           | 46.0           | 44.8 | 17.6                             | 21.8           | 20.1           | 19.8 | -25.0                                         |
| R <sub>1</sub> | 37.4                                          | 46.6           | 53.3           | 45.8 | 22.3                             | 22.6           | 21.1           | 22.0 | -23.8                                         |
| R <sub>2</sub> | 34.6                                          | 55.6           | 51.4           | 47.2 | 13.9                             | 21.7           | 19.8           | 18.5 | -28.7                                         |
| Mean           | 37.4                                          | 50.2           | 50.2           | 45.9 | 17.9                             | 22.0           | 20.4           | 20.1 |                                               |
|                | Effect of Spraying<br>(± 2.32) <sup>(1)</sup> |                |                |      | -19.5                            | -28.2          | -29.8          |      |                                               |

(1) Standard error for comparison between main effects only.

Percentage Straws showing "take-all" at Harvest 48/Ca/1.4  
(means from transformed values)

| Unsprayed          |                |                |                |      | Sprayed        |                |                |      | Effect of Spraying |
|--------------------|----------------|----------------|----------------|------|----------------|----------------|----------------|------|--------------------|
|                    | R <sub>0</sub> | R <sub>1</sub> | R <sub>2</sub> | Mean | R <sub>0</sub> | R <sub>1</sub> | R <sub>2</sub> | Mean |                    |
| D <sub>0</sub>     | 17.9           | 23.3           | 19.8           | 20.3 | 28.9           | 28.1           | 27.0           | 28.0 | 7.7                |
| D <sub>1</sub>     | 6.6            | 23.3           | 30.8           | 19.0 | 29.8           | 18.7           | 36.3           | 28.0 | 9.0                |
| D <sub>2</sub>     | 14.5           | 20.6           | 16.6           | 17.1 | 20.6           | 34.7           | 41.3           | 32.0 | 14.9               |
|                    | N <sub>0</sub> | N <sub>1</sub> | N <sub>2</sub> |      | N <sub>0</sub> | N <sub>1</sub> | N <sub>2</sub> |      |                    |
| D <sub>0</sub>     | 35.5           | 17.1           | 10.8           |      | 37.5           | 26.5           | 20.6           |      |                    |
| D <sub>1</sub>     | 37.3           | 9.0            | 14.4           |      | 50.2           | 19.1           | 17.6           |      |                    |
| D <sub>2</sub>     | 39.2           | 15.0           | 4.4            |      | 42.2           | 37.7           | 17.4           |      |                    |
| R <sub>0</sub>     | 23.2           | 20.4           | 1.3            | 12.5 | 41.2           | 24.0           | 15.8           | 26.3 | 13.8               |
| R <sub>1</sub>     | 34.2           | 17.0           | 17.4           | 22.4 | 30.2           | 27.2           | 23.5           | 26.8 | 4.4                |
| R <sub>2</sub>     | 55.8           | 5.5            | 14.4           | 22.0 | 59.0           | 31.5           | 16.6           | 34.7 | 12.7               |
| Mean               | 37.3           | 13.6           | 9.3            | 18.9 | 43.2           | 27.5           | 18.6           | 29.2 |                    |
| Effect of Spraying |                |                |                |      | 5.9            | 13.9           | 9.3            |      |                    |

(Transformed values)  
( $\pm 5.01$  Means  $\pm 2.89$ )

| Unsprayed          |                |                |                |      | Sprayed        |                |                |      | Effect of Spraying<br>( $\pm 4.09$ ) <sup>(1)</sup> |
|--------------------|----------------|----------------|----------------|------|----------------|----------------|----------------|------|-----------------------------------------------------|
|                    | R <sub>0</sub> | R <sub>1</sub> | R <sub>2</sub> | Mean | R <sub>0</sub> | R <sub>1</sub> | R <sub>2</sub> | Mean |                                                     |
| D <sub>0</sub>     | 25.0           | 28.9           | 26.4           | 26.3 | 32.5           | 32.0           | 31.3           | 31.9 | 5.1                                                 |
| D <sub>1</sub>     | 14.9           | 28.9           | 33.7           | 25.8 | 33.1           | 25.6           | 37.1           | 31.9 | 6.1                                                 |
| D <sub>2</sub>     | 22.4           | 27.0           | 24.1           | 24.5 | 27.0           | 36.1           | 40.0           | 34.4 | 9.9                                                 |
|                    | N <sub>0</sub> | N <sub>1</sub> | N <sub>2</sub> |      | N <sub>0</sub> | N <sub>1</sub> | N <sub>2</sub> |      |                                                     |
| D <sub>0</sub>     | 36.6           | 24.5           | 19.2           |      | 37.8           | 31.0           | 27.0           |      |                                                     |
| D <sub>1</sub>     | 37.7           | 17.5           | 22.3           |      | 45.1           | 25.9           | 24.8           |      |                                                     |
| D <sub>2</sub>     | 38.7           | 22.8           | 12.0           |      | 40.5           | 37.9           | 24.7           |      |                                                     |
| R <sub>0</sub>     | 28.8           | 26.9           | 6.5            | 20.7 | 39.9           | 29.3           | 23.4           | 30.9 | 10.2                                                |
| R <sub>1</sub>     | 35.8           | 24.4           | 24.7           | 28.3 | 33.3           | 31.4           | 29.0           | 31.2 | 2.9                                                 |
| R <sub>2</sub>     | 48.3           | 13.5           | 22.3           | 28.0 | 50.2           | 34.1           | 24.1           | 36.1 | 8.1                                                 |
| Mean               | 37.7           | 21.6           | 17.8           | 25.7 | 41.1           | 31.6           | 25.5           | 32.7 |                                                     |
| Effect of Spraying |                |                |                |      | 3.4            | 10.0           | 7.7            |      |                                                     |

(1) Standard error for comparison between main effects only.

48/Ca/2.1

WHEAT

Residual effects of various dungs, of additional straw to dungs, of rotted bracken and of straw with sulphate of ammonia added.

RW - Great Harpenden II 1948

System of replication: The design was intended to be a 5 x 5 lattice square in 3 replicates, but owing to the interchange of a pair of treatments in two of the three blocks, the lattice design was not attained, and it was impracticable to treat the experiment as other than 3 randomized blocks of 25 plots.

Area of each plot: 0.0171 acre.

Treatments: Applied in 1947 to potatoes. Of the 25 plots in each replicate, 3 received no organic manures, and the remaining 22 were treated with the following organic manures, applied at two rates: rotted bracken (B) straw with sulphate of ammonia added (A), and nine dungs:- from boxes:- stored (2 months) made with normal and heavy litter (W and X); from straw balo yards:- fresh, made with normal and heavy litter (Y and Z), stored (12 months), made with normal and heavy litter (R and S) and fresh (low ration and low ration plus sulphate of ammonia to straw) (T and V); from sunken yards:- stored (12 months) commercial dung (L).

Rates of application: The commercial dung (L) and rotted bracken (B) at 8 and 16 tons per acre, the straw with sulphate of ammonia (A) at 2 and 4 tons of chaffed straw per acre plus 0.3 and 0.6 N per acre as sulphate of ammonia, the stored normal dung from boxes (W) at the equivalent of 8 and 16 tons per acre weighed before storing, dung X, Y, Z, R and S, at weights produced by the same quantity of feeding stuffs as 8 and 16 tons of fresh normal dung from bullock boxes, and dungs T and V at the same rates as Z.

| Dungs | Actual rates of application<br>Tons per acre |         | Litter straw<br>lbs/head/day |
|-------|----------------------------------------------|---------|------------------------------|
|       | Level 1                                      | Level 2 |                              |
| W     | 5.37                                         | 10.74   |                              |
| X     | 4.79                                         | 9.58    | 9.0                          |
| Y     | 8.66                                         | 17.32   | 18.0                         |
| Z     | 10.78                                        | 21.55   | 9.2                          |
| R     | 6.79                                         | 13.57   | 17.1                         |
| S     | 7.76                                         | 15.51   | 9.8                          |
| TV    | 10.78                                        | 21.55   | 19.7                         |
|       |                                              |         | 16.1                         |

48/Ca/2.2

Basal Manuring: 2 cwt. Sulphate of Ammonia per acre

Cultivations etc: Ploughed: Oct. 31 -- Nov. 4. Rolled and  
springtime harrowed: Nov. 4 and again Nov. 5. Seed drilled:  
Nov. 6. Harrowed in: Nov. 7. Ring rolled: Apr. 23.  
Sulphate of ammonia drilled: early May. Cut and shocked:  
Aug. 10-12. Reset shocks: Aug. 18. Raked and carted in:  
Aug. 19-20. Threshed Sept. 6-10. Variety: Bersee.  
Previous crop: Potatoes.

Standard error per plot: Grain 2.52 cwt. per acre or 5.75%  
(50a.f.)



48/Oa/2.3

| Organic Manure                          | Grain: cwt. per acre<br>Level of organic |         | Straw: cwt. per acre<br>Level of organic | Mean |
|-----------------------------------------|------------------------------------------|---------|------------------------------------------|------|
|                                         | 1                                        | 2       |                                          |      |
|                                         | (±1.45)                                  | (±1.03) |                                          |      |
| None                                    | 42.5                                     | 41.9(1) | 54.1                                     | 54.1 |
| Stored (bullock boxes) normal litter    | 45.2                                     | 43.9    | 56.5                                     | 56.5 |
| Stored (bullock boxes) heavy litter     | 44.9                                     | 43.2    | 57.5                                     | 57.5 |
| Fresh (straw bala yards) normal litter  | 42.6                                     | 42.5    | 56.7                                     | 56.7 |
| Fresh (straw bala yards) heavy litter   | 46.9                                     | 45.3    | 61.1                                     | 61.1 |
| Stored (straw bala yards) normal litter | 45.2                                     | 44.0    | 55.5                                     | 55.5 |
| Stored (straw bala yards) heavy litter  | 44.1                                     | 43.3    | 55.5                                     | 55.5 |
| Fresh (straw bala yards low feeding)    | 43.6                                     | 42.6    | 56.2                                     | 56.2 |
| As above with Sulphate of Ammonia       | 44.6                                     | 44.7    | 58.4                                     | 58.4 |
| Stored (Sunken yard)                    | 44.8                                     | 45.1    | 59.0                                     | 59.0 |
| Rotted Bracken                          | 44.4                                     | 43.1    | 61.9                                     | 60.5 |
| Straw with Sulphate of Ammonia          | 49.1                                     | 46.8    | 56.5                                     | 55.3 |
| Mean                                    | 43.0                                     | 43.8    | 56.3                                     | 57.4 |

Standard error (1): ± 0.84

WHEAT

Wireworm Experiment (1)

The effect of various insecticides, and their methods of application.

RW - Little Hoos 1948

System of replication: 3 randomized blocks of 9 plots each

Area of each plot: 0.0289 acre

Treatments:

None

D.D. injected 400 lbs per acre.

Ethylene Dibromide 4.1% solution injected 15 gallons per acre.

D.D.T. dust combine drilled  $\frac{5}{4}$  cwt per acre.

Gammexane; broadcast 2 cwt per acre, combine drilled  $\frac{3}{4}$  cwt per acre, or applied as seed dressing.

Basal manuring:  $2\frac{3}{4}$  cwt per acre sulphate of ammonia.

Cultivations etc.: Floughed: Sept 16-27. Harrowed and rolled: Oct 7.

DD and Ethylene Dibromide injected: Oct 10. Seed drilled, and remaining

treatments applied: Oct 29-30. Harrowed in: Oct 30. Harrowed: Mar 30.

Ring rolled: Apr 1. Sulphate of ammonia drilled: May 5. Hand weeded:

June 5, 7-8, 22-23, and various days June 28 - July 23. Harvested:

Aug 17. Variety: Bersee. Previous crop: Linseed.

Standard errors per plot:

Grain, 2.62 cwt per acre or 12.6% (18 d.f.)

Straw, 6.37 cwt per acre or 13.5% (18 d.f.)

|                              | Un-<br>treated      | DD In-<br>jected | Ethylene<br>Dibromide<br>Injected | DDT<br>Dust<br>Drilled | Gammexane<br>Broad-<br>cast | Gammexane<br>Drilled | Treated<br>seed | Mean |
|------------------------------|---------------------|------------------|-----------------------------------|------------------------|-----------------------------|----------------------|-----------------|------|
| Grain: cwt. per acre         |                     |                  |                                   |                        |                             |                      |                 |      |
| Mean Yield<br>( $\pm 1.51$ ) | 8.9 <sup>(1)</sup>  | 28.3             | 32.1                              | 20.7                   | 30.6                        | 24.8                 | 24.0            | 20.8 |
| Increase<br>( $\pm 1.74$ )   |                     | 19.4             | 23.2                              | 11.8                   | 21.7                        | 15.9                 | 15.1            |      |
| Straw: cwt. per acre         |                     |                  |                                   |                        |                             |                      |                 |      |
| Mean Yield<br>( $\pm 3.68$ ) | 22.8 <sup>(2)</sup> | 64.1             | 71.6                              | 46.0                   | 65.9                        | 54.2                 | 54.6            | 47.2 |
| Increase<br>( $\pm 4.25$ )   |                     | 41.3             | 48.8                              | 23.2                   | 43.1                        | 31.4                 | 31.8            |      |

Standard errors (1)  $\pm 0.87$   
 (2)  $\pm 2.12$

48/Ca/4.1

## WHEAT

### Wireworm Experiment (2)

The effect of treatment of seed with gammexane and of three strengths of gammexane dust.

RW - Little Hoos 1948

System of replication: 3 replicates of 3 incomplete randomized blocks of 3 plots each.

Area of each plot: 0,0289 acre

#### Treatments:

None.

Seed treated with gammexane dressing.

Gammexane dust,  $\frac{1}{4}$ ,  $\frac{1}{2}$  and 1 cwt per acre; combine drilled with seed (filler added where necessary to make total dressing of 1 cwt per acre)

Basal Manuring:  $2\frac{3}{4}$  cwt per acre sulphate of ammonia.

#### Cultivations etc:

Ploughed: Sept 16-27. Harrowed and rolled: Oct 7. Seed and gammexane dust drilled: Oct 29-30. Harrowed in: Oct 30.

Harrowed: Mar 30. Ring rolled: Apr 1. Sulphate of ammonia drilled: May 5. Hand weeded: June 5, 7-8, 22-23, and various days June 23-July 23. Harvested: Aug 17.

Variety: Barsee. Previous crop: Linseed.

#### Standard errors per plot:

Grain: Block error, 1.61 cwt per acre or 7.15% (4d.f.)  
Plot error, 2.28 cwt per acre or 10.1% (16d.f.)

Straw: Block error, 2.29 cwt per acre or 4.63% (4d.f.)  
Plot error, 4.88 cwt per acre or 9.86% (16d.f.)

4.8/Ca/4.2

|                    | Mean Yields   |                  |                                          |                                          | 0 v S v D                    | Standard errors                                  |       | 0, S v D <sub>1</sub> , D <sub>2</sub> , D <sub>3</sub> |
|--------------------|---------------|------------------|------------------------------------------|------------------------------------------|------------------------------|--------------------------------------------------|-------|---------------------------------------------------------|
|                    | Untreated (0) | Treated Seed (S) | Gammexane Dust (D)                       |                                          |                              | D <sub>1</sub> v D <sub>2</sub> v D <sub>3</sub> |       |                                                         |
|                    |               |                  | $\frac{1}{4}$ cwt/acre (D <sub>1</sub> ) | $\frac{1}{2}$ cwt/acre (D <sub>2</sub> ) | 1 cwt/acre (D <sub>3</sub> ) |                                                  |       |                                                         |
| Grain:<br>cwt/acre | 13.6          | 26.3             | 28.4                                     | 27.7                                     | 27.1                         | ±0.76                                            | ±1.42 | ±1.12                                                   |
| Straw:<br>cwt/acre | 32.8          | 56.2             | 60.2                                     | 59.6                                     | 58.0                         | ±1.63                                            | ±2.65 | ±2.23                                                   |

48/Ca/5.1

## SPRING WHEAT

The effects of inoculation and wetting of seed, and of sulphate of ammonia.

RW - Long Hoos 1948

System of replication: 3 randomized blocks of 6 plots each.

Area of each plot: 0.0158 acre.

### Treatments:

Seed: untreated, inoculated by wet method, wetted but not inoculated.

Sulphate of ammonia: None, 0.3 cwt. N per acre.

Note: The inoculum was a bacterial culture of French origin.

Basal manuring: 3 cwt. Superphosphate and 1 cwt. muriate of potash per acre.

Cultivations, etc.: Ploughed: Sept. 30 - Oct. 2. Rolled and springtine harrowed: Mar. 10. Sulphate of ammonia applied and basal manuring broadcast by machine: Mar. 12. Harrowed and seed drilled: Mar. 13. Harrowed in: Mar. 15. Rolled: Mar. 20. Weeds hand pulled: June 8. Harvested: Aug. 24. Variety: Bersee.

Standard errors per plot (10 d.f.): Grain, 3.35 cwt. per acre  
or 17.1%  
Straw, 3.00 cwt. per acre  
or 7.20%

48/0a/5.2

|                         | Seed<br>Untreated | Seed<br>inoculated<br>(wet<br>method) | Seed<br>wetted<br>not<br>inoculated | Mean               |
|-------------------------|-------------------|---------------------------------------|-------------------------------------|--------------------|
| Grain: cwt. per acre    |                   |                                       |                                     |                    |
| Mean ( $\pm 1.37$ )     | 19.8              | 18.5                                  | 20.5                                | 19.6               |
| Sulphate of Ammonia:    |                   |                                       |                                     |                    |
| Absent ( $\pm 1.93$ )   | 16.5              | 17.2                                  | 17.8                                | 17.2               |
| Present                 | 23.2              | 19.8                                  | 23.1                                | 22.0               |
| Response ( $\pm 2.74$ ) | 6.7               | 2.6                                   | 5.3                                 | 4.8 ( $\pm 1.58$ ) |
| Straw: cwt. per acre    |                   |                                       |                                     |                    |
| Mean ( $\pm 1.22$ )     | 41.3              | 41.3                                  | 42.3                                | 41.6               |
| Sulphate of Ammonia:    |                   |                                       |                                     |                    |
| Absent ( $\pm 1.73$ )   | 38.4              | 38.6                                  | 38.7                                | 38.6               |
| Present                 | 44.2              | 44.1                                  | 45.8                                | 44.7               |
| Response ( $\pm 2.45$ ) | 5.8               | 5.5                                   | 7.1                                 | 6.1 ( $\pm 1.41$ ) |

48/Oa/6.1

### SPRING-WHEAT VARIETY TRIAL

The comparison of eight varieties of spring wheat, and the effect on them of three levels of sulphate of ammonia.

RW - Little Knott 1948.

System of replication: 2 randomized blocks of 8 plots, plots split into 3 for the application of sulphate of ammonia.

Area of each sub-plot: 0.022 acre.

#### Treatments.

Whole plots: Varieties: Atle, Meteor, Fylgia, Extra Kolben II Bersee, Vilmorin 27, April Bearded, Vilmorin 29  
Sub-plots: Sulphate of ammonia; none, 0.4, 0.8 cwt N per acre.

Basal dressing: None.

Cultivations, etc.: Ploughed: various days Dec. to Jan.  
Springtime harrowed: Mar. 4, and again Mar. 11. Tooth harrowed: Mar. 15 and again Mar. 16. Sulphate of Ammonia applied: Mar. 16. Seed drilled: Mar. 18. Harrowed in: Mar. 19. Rolled: Mar. 23. Sprayed against weeds: May 19. Weeds pulled: June 7. Wild oats pulled: June 20-30. Harvested North block except Vilmorins by binder: Sept 7. Harvested Vilmorins North block: Sept. 22. Harvested South block by combine: Sept. 27. Previous crop: Kale

Standard Errors per plot: Grain

Whole plot: 1.99 cwt. per acre or 7.53%

Sub-plot: 1.88 cwt. per acre or 7.14%

Grain: cwt. per acre

| Sulphate of ammonia | II   |        |        |                 |        |             | Mean<br>(±0.47) |
|---------------------|------|--------|--------|-----------------|--------|-------------|-----------------|
|                     | Atle | Meteor | Fylgia | Kolben          | Bersee | Vilmorin 27 |                 |
| None                | 30.6 | 24.3   | 21.6   | 27.0            | 29.2   | 24.5        | 24.5            |
| 0.4 cwt. N per acre | 31.4 | 25.2   | 24.6   | 27.7            | 30.0   | 24.0        | 25.9            |
| 0.8 cwt. N per acre | 31.5 | 24.8   | 25.5   | 25.5            | 33.4   | 28.2        | 23.3            |
| Mean                | 31.2 | 24.8   | 23.9   | 26.7<br>(±1.41) | 30.8   | 25.6        | 24.5            |

Standard errors for body of table: ±1.33 for vertical comparisons only  
±1.78 for all other comparisons

Straw: cwt. per acre<sup>#</sup>

| Sulphate of ammonia | II   |        |        |        |        |             | Mean |
|---------------------|------|--------|--------|--------|--------|-------------|------|
|                     | Atle | Meteor | Fylgia | Kolben | Bersee | Vilmorin 27 |      |
| None                | 51.5 | 54.1   | 55.3   | 52.8   | 43.8   | 80.0        | 60.6 |
| 0.4 cwt. N per acre | 55.6 | 53.4   | 52.5   | 56.8   | 53.5   | 72.2        | 61.1 |
| 0.8 cwt. N per acre | 58.2 | 54.9   | 54.3   | 58.4   | 59.3   | 81.8        | 63.9 |
| Mean                | 55.1 | 54.1   | 54.1   | 56.0   | 52.2   | 78.0        | 61.9 |

# 1 Block (North) only



48/Cb/1.1

### SPRING SOWN CEREAL EXPERIMENT

Comparison of barley, oats and two varieties of wheat, and of the effects on them of four levels of sulphate of ammonia, of superphosphate, and of muriate of potash.

RV - Long Hoos III, 1948

System of replication: 4 randomized blocks of four plots each, each plot being split into 4, certain first-order interactions of artificials being confounded with whole plots.

Area of each sub-plot: 0.0191 acre.

#### Treatments:

Whole plots: Crops:- Oats (S.84), wheat (Atle and Bersce) and barley (Plumage Arthur)

Sub-plots: Sulphate of ammonia: None, 0.3, 0.6, 0.9, cwt N per acre  
Superphosphate: None, 0.6 cwt.  $P_2O_5$  per acre  
Muriate of potash: None 0.6 cwt.  $K_2O$  per acre

Basal manuring: None.

Cultivations, etc.: Ploughed Sept.30 - Oct.2. Rolled and Springtime harrowed: Mar.10. Artificials applied: Mar.13.  
Harrowed: Mar.15. All seed drilled and harrowed in: Mar.17.  
Rolled: Mar.20. Hand weeded: June 7-8. All crops harvested: Aug. 23-24. Previous crop: Barley.

#### Standard errors: (grain):

per whole plot, 1.49 cwt. per acre or 6.9% (6.d.f.)  
per sub-plot, 2.82 cwt. per acre or 13.0% (24 d.f.)

48/Cb/1.2

|                     | Grain: cwt. per acre |                      |                | Straw: cwt. per acre |              |                |        |
|---------------------|----------------------|----------------------|----------------|----------------------|--------------|----------------|--------|
|                     | Oats                 | Wheat (Atle)         | Wheat (Bersee) | Oats                 | Wheat (Atle) | Wheat (Bersee) | Barley |
| Mean                | 19.0                 | 21.6<br>(±0.75)      | 19.1           | 46.1                 | 46.0         | 43.8           | 36.4   |
| Sulphate of ammonia |                      | (a) and (b)          |                |                      |              |                |        |
| None                | 14.6                 | 18.2                 | 13.4           | 44.2                 | 37.4         | 33.5           | 27.4   |
| 0.3 cwt. N per acre | 19.6                 | 20.8                 | 20.0           | 48.6                 | 44.0         | 41.2           | 35.2   |
| 0.6 cwt. N per acre | 20.9                 | 23.4                 | 20.8           | 47.3                 | 50.3         | 50.6           | 40.6   |
| 0.9 cwt. N per acre | 20.9                 | 24.1                 | 22.2           | 44.4                 | 52.5         | 49.9           | 42.6   |
| Superphosphate      |                      | (±1.03) <sup>‡</sup> |                |                      |              |                |        |
| Absent              | 18.3                 | 22.3                 | 19.1           | 46.5                 | 46.1         | 42.9           | 35.7   |
| Present             | 19.7                 | 20.9                 | 19.1           | 45.8                 | 46.0         | 44.7           | 37.1   |
| Response            | 1.4                  | -1.4                 | 0.0            | -0.7                 | -0.1         | 1.8            | 1.4    |
| Muriate of Potash   |                      | (±1.03) <sup>‡</sup> |                |                      |              |                |        |
| Absent              | 19.5                 | 21.8                 | 17.8           | 46.7                 | 45.2         | 43.9           | 35.8   |
| Present             | 18.5                 | 21.4                 | 20.4           | 45.6                 | 46.9         | 43.7           | 37.1   |
| Response            | -1.0                 | -0.4                 | 2.6            | -1.1                 | 1.7          | -0.2           | 1.3    |

Standard errors: (a) ± 1.41 (for vertical comparisons only)  
 (b) ± 1.43 (for all other comparisons)

<sup>‡</sup> Standard error for use in horizontal comparisons only

48/Cc/1.1

## BEANS

The comparison of four varieties of beans and the effects on them of two methods of placement, two rates and two times of sowing.

RE - Great Field I 1948

System of replication: 4 randomized blocks of 8 plots each, the effect of time of sowing and certain high order interactions being confounded with block differences.

Area of each plot: 0.0286 acre.

### Treatments:

Varieties: Giant, Essex, Lines and Wilts.

Methods of placement: Seed broadcast before ploughing, dropped in furrow during ploughing.

Rate of sowing: 2 cwt, 3 cwt seed per acre.

Time of sowing: Early, Oct 28th. Late, Nov 18th.

Basal dressings: Dung: 10 tons per acre

Superphosphate 2 cwt per acre drilled across the plots

Muriate of potash: 2 cwt per acre

Nitrochalk: 2 cwt per acre.

Cultivations etc: Superphosphate and Muriate of Potash applied: Oct 20.

Dung applied, ploughed in, beans placed in furrows, 1st sowing "Early":

Oct 27-29. Tractor rolled and disced each way after ploughing: Oct 29.

Chalk 45 cwt per acre applied: Nov 6. Dung spread, ploughed in beans

placed in furrows, 2nd sowing "Late": Nov 17-18. Harrowed "Early"

plots: Mar 16. Ring rolled all plots: Mar 30. Harrowed late plots:

Mar 31. Nitrochalk applied: May 4. Harvested: Aug 25. Previous

crop: Linseed.

Standard errors per plot :

Grain: 2.62 cwt per acre or 10.7% (11 d.f.)

Straw: 4.40 cwt per acre or 11.2% (11 d.f.)

4.8/Cc/1.2

Grain: cwt per acre

|                                        | Giant | Essex | Lincoln<br>-shire | Wilts | Mean        |
|----------------------------------------|-------|-------|-------------------|-------|-------------|
| (±0.92) Mean                           | 23.8  | 26.5  | 24.4              | 23.2  | 24.5        |
| (±1.31) Broadcast                      | 23.2  | 25.3  | 24.4              | 24.1  | 24.3        |
| Ploughed In                            | 24.3  | 27.7  | 24.3              | 22.3  | 24.6(±0.65) |
| (±1.85) Ploughed In<br>-Broadcast      | 1.1   | 2.4   | -0.1              | -1.8  | 0.3(±0.92)  |
| Seed rate per acre                     |       |       |                   |       |             |
| (±1.31) 2 cwt                          | 21.5  | 24.1  | 22.8              | 22.1  | 22.6(±0.65) |
| 3 cwt                                  | 26.1  | 28.9  | 26.0              | 24.3  | 26.3        |
| (±1.85) 3 cwt - 2 cwt                  | 4.6   | 4.8   | 3.2               | 2.2   | 3.7(±0.92)  |
| (±1.85) <sup>x</sup> Early-Late Sowing | 4.1   | 8.0   | 7.2               | 6.0   |             |

|                    | Seed rate per acre |       | Difference | Early-<br>Late Sowing |
|--------------------|--------------------|-------|------------|-----------------------|
|                    | 2 cwt              | 3 cwt |            |                       |
| (±0.92) Broadcast  | 22.4               | 26.1  | 3.7(1)     | 7.1                   |
| Ploughed in        | 22.8               | 26.5  | 3.7(1)     | 5.5                   |
| (±1.31) Difference | 0.4                | 0.4   | 0.0(2)     | -1.6(2)               |
| Early-Late Sowing  | 7.3                | 5.3   | -2.0(2)    |                       |

Standard errors (1) ±1.31

(2) ±1.85

<sup>x</sup> Standard error for comparison between main effects only

48/Cc/1.3

Straw: cwt per acre

|                                           | Giant | Essex | Lincoln<br>-shire | Wilts | Mean         |
|-------------------------------------------|-------|-------|-------------------|-------|--------------|
| (±1.56) Mean                              | 39.6  | 38.5  | 38.7              | 40.3  | 39.3         |
| (±2.20) Broadcast                         | 39.3  | 36.8  | 39.8              | 40.2  | 39.0 (±1.10) |
| Ploughed In                               | 39.9  | 40.3  | 37.7              | 40.4  |              |
| (±3.11) Ploughed In<br>-Broadcast         | 0.6   | 3.5   | -2.1              | 0.2   | 0.6 (±1.56)  |
| Seed rate per acre                        |       |       |                   |       |              |
| (±2.20) 2 cwt                             | 36.4  | 34.9  | 36.9              | 37.3  | 36.4 (±1.10) |
| 3 cwt                                     | 42.8  | 42.1  | 40.6              | 43.3  |              |
| (±3.11) 3 cwt - 2 cwt                     | 6.4   | 7.2   | 3.7               | 6.0   | 5.8 (±1.56)  |
| (±3.11) <sup>#</sup> Early-Late<br>Sowing | 7.5   | 8.2   | 9.2               | 11.6  |              |

|                                   | Seed rate per acre<br>2 cwt | 3 cwt | Difference | Early-<br>Late<br>Sowing |
|-----------------------------------|-----------------------------|-------|------------|--------------------------|
| (±1.56) Broadcast                 | 36.7                        | 41.3  | 4.6(1)     | 10.8                     |
| Ploughed In                       | 36.0                        | 43.1  | 7.1(1)     | 7.4                      |
| (±2.20) Ploughed In<br>-Broadcast | -0.7                        | 1.8   | 2.5(2)     | -3.4(2)                  |
| Early-Late<br>Sowing              | 8.9                         | 9.3   | 0.4(2)     |                          |

Standard Errors (1) (±2.20)

(2) (±3.11)

<sup>#</sup> Standard error for comparison between main effects only

48/Ca/1.1

## POTATOES.

Effects of various dungs, of additional straw to dung, of rotted bracken, and of sulphate of ammonia and muriate of potash.

RP - Sawyers II, 1948

System of replication: 5 x 5 lattice square in 3 replicates, plots split into two for application of nitrogen and potash, the interaction of these being confounded with whole plots.

Area of each sub-plot 0.0126 acre.

### Treatments:

Of the 25 whole plots in each replicate, 3 received no organic manures, and the remaining 22 were treated with the following organic manures, applied at two rates: rotted bracken (B) and ten dungs: from bullock boxes:- fresh, made with normal and heavy litter (W and X), and stored (12 months under cover) made with normal and heavy litter (R and S): from straw bale yards:- fresh made with normal and heavy litter (Y and Z), stored (12 months in open) made with normal and heavy litter (A and K) and stored (12 months in open) low ration, and low ration plus sulphate of ammonia to straw (T and V).

Rates of application: The rotted bracken (B) and the fresh normal dung from boxes (W) at 8 and 16 tons per acre, dungs X, Y, Z, R, S, A and K at weights produced by the same quantity of feeding stuffs as 8 and 16 tons of fresh normal dung from boxes, and dungs T and V at the same rates as Z.

48/Ca/1.2

|       |         | Actual rates of application |         | Litter Straw |
|-------|---------|-----------------------------|---------|--------------|
|       |         | Tons per acre               |         | lbs/head/day |
|       |         | Level 1                     | Level 2 |              |
| Dungs | W       | 8.00                        | 16.00   | 10.6         |
|       | X       | 6.90                        | 13.81   | 20.3         |
|       | Y       | 8.74                        | 17.49   | 10.4         |
|       | Z       | 8.21                        | 16.42   | 20.9         |
|       | R       | 2.65                        | 5.31    | 9.1          |
|       | S       | 2.74                        | 5.49    | 18.3         |
|       | A       | 3.04                        | 6.09    | 9.3          |
|       | K       | 3.66                        | 7.33    | 17.3         |
|       | T and V | 3.66                        | 7.33    | 16.2         |

Sulphate of ammonia: None, 0.6 cwt N per acre  
 Muriate of potash: None, 1.0 cwt K<sub>2</sub>O per acre

Basal Manuring: 3.75 cwt. Superphosphate per acre

Cultivations, etc: Ploughed: during Jan. Cultivated: Mar.16  
 Harrowed: Mar. 25. Ridged: Apr.23-24. Superphosphate  
 drilled, sulphate of ammonia and muriate of potash applied  
 Apr.26. Organics applied: Apr.29-30. Potatoes planted  
 and covered in: Apr. 30-May 1. Rolled down ridges: May 6  
 Harrowed: May 25. Grubbed: June 15. Weeded and earthed  
 up: July 2-3. Sprayed with "Perinox": Aug.10. Sprayed  
 to kill off haulm: Sept.15. Lifted: Oct.1-4. Variety:  
 Majestic (Scotch A). Previous crop: Barley.

Standard errors per plot:

Total tubers, per whole plot, 0.661 tons per acre or 5.28%  
 (24 d.f.)  
 per sub-plot, 0.983 tons per acre or 7.84%  
 (29 d.f.)

Total tubers: tons per acre

| Organic Manure                    | Mean Yield |          | Response to N |          | Response to K |       | Mean Yield | Response to N |          | Response to K | Averaging over two levels of organic<br>Response to K |       |
|-----------------------------------|------------|----------|---------------|----------|---------------|-------|------------|---------------|----------|---------------|-------------------------------------------------------|-------|
|                                   | 1          | 2        | 1             | 2        | 1             | 2     |            | (±0.310)      | (±0.602) |               |                                                       |       |
|                                   |            | (±0.438) |               | (±0.851) |               |       |            |               |          |               |                                                       |       |
| None                              |            |          |               |          |               |       |            |               |          |               |                                                       |       |
| Lung:                             |            | (1)      |               | (2)      |               | (2)   |            | (1)           | (2)      |               | (2)                                                   |       |
| Fresh (boxes) normal litter       | 10.44      | 12.16    | 1.40          | -0.21    | 3.81          | 1.73  | 10.44      | -0.21         | 3.81     | 0.82          | 3.81                                                  | 0.82  |
| Fresh (boxes) heavy litter        | 12.16      | 12.85    | 2.50          | 0.04     | -0.08         | 1.73  | 12.51      | 0.72          | 0.82     | 0.82          | 0.82                                                  | 0.82  |
| Fresh (yards) normal litter       | 12.44      | 13.05    | 1.14          | 1.42     | 1.66          | 0.96  | 12.75      | 1.96          | 1.31     | 1.31          | 1.31                                                  | 1.31  |
| Fresh (yards) heavy litter        | 12.03      | 12.55    | 0.66          | -0.02    | 0.35          | -0.56 | 12.29      | 0.56          | -0.11    | -0.11         | -0.11                                                 | -0.11 |
| Stored (boxes) normal litter      | 11.94      | 12.50    | 2.18          | 0.65     | -0.31         | -0.08 | 12.22      | 0.65          | -0.20    | -0.20         | -0.20                                                 | -0.20 |
| Stored (boxes) heavy litter       | 12.99      | 13.43    | 1.58          | 1.52     | 0.71          | -0.44 | 13.21      | 1.85          | 0.14     | 0.14          | 0.14                                                  | 0.14  |
| Stored (yards) normal litter      | 13.08      | 13.50    | 2.01          | 0.34     | 1.02          | -0.60 | 13.29      | 0.96          | 0.21     | 0.21          | 0.21                                                  | 0.21  |
| Stored (yards) heavy litter       | 12.06      | 12.81    | 2.01          | 1.07     | 1.69          | 0.46  | 12.44      | 1.54          | 1.07     | 1.07          | 1.07                                                  | 1.07  |
| Stored (yards) low feeding        | 13.41      | 13.25    | 1.29          | 0.75     | 0.99          | 0.52  | 13.33      | 1.02          | 0.76     | 0.76          | 0.76                                                  | 0.76  |
| As above with Sulphate of Ammonia | 12.84      | 13.51    | 3.08          | 0.27     | 1.10          | 0.20  | 13.16      | 1.68          | 0.65     | 0.65          | 0.65                                                  | 0.65  |
| Hotted bracken                    | 12.39      | 13.15    | 1.84          | 1.71     | 1.06          | 0.11  | 12.77      | 1.77          | 0.59     | 0.59          | 0.59                                                  | 0.59  |
|                                   | 13.17      | 12.61    | 0.84          | -0.09    | 0.12          | 0.31  | 12.99      | 0.37          | 0.22     | 0.22          | 0.22                                                  | 0.22  |

Standard errors (1) ±0.253                      (2) ±0.466

48/oa/ 1.3



48/Ca/2.1

## POTATOES

Effects of intensive intertillage, of earthing up, of mulching with straw, of applying artificials before and after ridging, and of spraying haulm before lifting.

RF - Sawyers II, 1948

System of replication: 4 randomized blocks of 10 plots each.

Area of each plot (after rejecting edge rows): 0.0098 acres.

### Treatments:

Cultivations: All four combinations of intensive and little intertillage between rows, with and without earthing up; also intensive cultivation until the crop was well through the ground, then mulching with 3 tons chaffed straw per acre between rows.

Application of fertilizers: Broadcast before ridging, applied in the bouts.

Spraying: Two of the four blocks were sprayed with sulphuric acid to kill off haulm before lifting.

### Cultivations, etc.:

Ploughed: during Jan. Cultivated: Mar 16. Harrowed: Mar 25.  
Artificials applied before ridging: Apr 10. Ridged, artificials applied, potatoes planted and covered in: Apr 12. Rolled ridges: Apr 21. Chain-harrowed: May 18. Grubbed "intensive intertillage" plots: June 14. Grubbed, all plots: June 19. Earthed up, appropriate plots: June 26. Chaffed straw applied: July 8. Sprayed to kill off haulm: Sept 14. Lifted: Oct 5, 6. Variety: Majestic (Scotch A).  
Previous crop: Barley.

### Standard errors per plot:

|                     |                             |
|---------------------|-----------------------------|
| Total tubers,       | 1.35 tons per acre or 10.2% |
| Percentage ware,    | 0.780                       |
| Percentage greened, | 5.02                        |

All standard errors estimated from 22 d.f.

|                                                  | Little Intertillage                         |                | Intensive Intertillage |                | Mean                              | Effect of Spraying                |
|--------------------------------------------------|---------------------------------------------|----------------|------------------------|----------------|-----------------------------------|-----------------------------------|
|                                                  | Not earthen up                              | Earthen up     | Not earthen up         | Earthen up     |                                   |                                   |
|                                                  | Total tubers; tons per acre ( $\pm 0.673$ ) |                |                        |                |                                   |                                   |
| Artificials applied before ridging after ridging | 12.12<br>13.69                              | 12.37<br>13.19 | 12.15<br>13.72         | 11.72<br>13.21 | ( $\pm 0.301$ )<br>12.63<br>13.76 | ( $\pm 0.602$ )<br>-0.38<br>-0.06 |
| Mean ( $\pm 0.476$ )                             | 12.91                                       | 13.03          | 12.93                  | 12.46          | 13.19                             |                                   |
| Effect of Spraying ( $\pm 0.952$ )               | -0.26                                       | 0.60           | -0.64                  | -0.57          | -0.23                             |                                   |
|                                                  | Percentage Warts ( $\pm 0.276$ )            |                |                        |                |                                   |                                   |
| Artificials applied before ridging after ridging | 97.92<br>97.70                              | 97.75<br>98.50 | 97.42<br>97.92         | 98.90<br>98.80 | 98.08<br>98.82                    | ( $\pm 0.349$ )<br>0.27<br>0.54   |
| Mean ( $\pm 0.276$ )                             | 97.81                                       | 98.12          | 97.68                  | 98.85          | 98.45                             |                                   |
| Effect of Spraying ( $\pm 0.552$ )               | 0.32                                        | 0.40           | -0.10                  | 0.15           | 1.25                              |                                   |

48/Ca/2.2

48/Ca/2.3

|                                    | Little Intertillage |            | Intensive Intertillage |            | Mean     | Effect of Spraying |
|------------------------------------|---------------------|------------|------------------------|------------|----------|--------------------|
|                                    | Not earthed up      | Earthed up | Not earthed up         | Earthed up |          |                    |
|                                    | 3.61                | 4.93       | 13.56                  | 5.82       | (+1.122) | (+2.244)           |
|                                    | 9.92                | 3.60       | 8.92                   | 2.53       | 6.91     | -3.16              |
|                                    | 6.76                | 4.26       | 11.24                  | 4.18       | 6.21     | -3.05              |
| Artificials applied before ridging | -3.52               | -2.08      | -0.69                  | -2.46      | 6.56     |                    |
| after ridging                      |                     |            |                        |            |          |                    |
| Mean (+1.774)                      |                     |            |                        |            |          |                    |
| Effect of Spraying (+3.548)        |                     |            |                        |            |          |                    |
| Percentage Greened: (+1.774)       |                     |            |                        |            |          |                    |

48/Ca/3.1

## POTATOES

The effects of four times of planting, of dung, sulphate of ammonia, superphosphate and muriate of potash.

RP - Sawyers II, 1948

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

Area of each plot: 0.0133 acre

### Treatments:

Time of planting: 10th April, 24th April, 8th May, 22nd May.

Dung: None, 15 tons F.Y.M. per acre

Sulphate of ammonia: None, 0.6 cwt. N per acre

Superphosphate: None, 0.6 cwt.  $P_2O_5$  per acre

Muriate of Potash: None, 1.0 cwt.  $K_2O$  per acre.

Cultivations: Whole experiment; Ploughed: during Jan. Cultivated: Mar 16  
Tooth harrowed: Mar 25. Sprayed with Perenox: Aug 10. Sprayed with  
20% B.O .V. to kill off haulm: Sept 15. Lifted: Oct 4-5.

1st planting; Bouted: Apr 8. Artificially applied: Apr 9.

Dung applied, potatoes planted and covered in: Apr 10. Rolled ridges:  
Apr 12. Chain harrowed: May 18. Grubbed: June 14 and again June 19.  
Earthed up: June 21.

2nd planting; Ridged, dung and artificially applied, potatoes  
planted and covered in: Apr 24. Rolled ridges: May 6. Chain harrowed:  
May 18. Grubbed: June 14 and again June 19. Earthed up: June 26.

3rd planting; Thistles cut, ridged, dung and artificially  
applied, potatoes planted and covered in: May 7. Rolled ridges: May 8.  
Chain harrowed: June 5. Weeded: July 5. Earthed up: July 7.

4th planting; Thistles cut: May 7. Dung and artificially  
applied, potatoes planted and covered in: May 21. Rolled ridges: May 22.  
Chain harrowed: June 5. Weeded: July 5. Earthed up: July 29.

Variety: Majestic (Scotch A), Previous crop: Barley.

Standard error per plot: Total tubers,  $\pm 1.98$  tons per acre or 21.0% (34 d.f.)

Total tubers: tons per acre

48/Ca/3.2

|                                            | Time of Planting |               |            |             | Mean                |
|--------------------------------------------|------------------|---------------|------------|-------------|---------------------|
|                                            | 10th<br>April    | 24th<br>April | 8th<br>May | 22nd<br>May |                     |
| Mean ( $\pm 0.496$ )                       | 12.15            | 9.22          | 9.42       | 6.91        | 9.42                |
| No Dung ( $\pm 0.701$ )                    | 10.75            | 8.35          | 8.61       | 7.10        | 8.71                |
| Dung                                       | 13.55            | 10.08         | 10.23      | 6.71        | 10.14               |
| Response to Dung ( $\pm 0.992$ )           | 2.80             | 1.73          | 1.62       | -0.39       | 1.43 <sup>(1)</sup> |
| No Nitrogen ( $\pm 0.701$ )                | 11.96            | 9.53          | 8.92       | 6.54        | 9.24                |
| Nitrogen                                   | 12.34            | 8.91          | 9.92       | 7.28        | 9.61                |
| Response to Nitrogen ( $\pm 0.992$ )       | 0.38             | -0.62         | 1.00       | 0.74        | 0.37 <sup>(1)</sup> |
| No Superphosphate ( $\pm 0.701$ )          | 10.98            | 8.63          | 9.46       | 7.36        | 9.11                |
| Superphosphate                             | 13.32            | 9.81          | 9.38       | 6.46        | 9.74                |
| Response to Superphosphate ( $\pm 0.992$ ) | 2.34             | 1.18          | -0.03      | -0.90       | 0.63 <sup>(1)</sup> |
| No Potash ( $\pm 0.701$ )                  | 11.22            | 9.19          | 9.17       | 6.83        | 9.10                |
| Potash                                     | 13.08            | 9.25          | 9.68       | 6.99        | 9.75                |
| Response to Potash ( $\pm 0.992$ )         | 1.86             | 0.06          | 0.51       | 0.16        | 0.65 <sup>(1)</sup> |
| Standard Error (1) $\pm 0.496$             |                  |               |            |             |                     |

48/08/3.3

Responses to Treatments  $\pm 0.701$

| Response to         | Dung |       | Sulphate of Ammonia |       | Super-Phosphate |       | Muriate of Potash |       |
|---------------------|------|-------|---------------------|-------|-----------------|-------|-------------------|-------|
|                     | Abs. | Pres. | Abs.                | Pres. | Abs.            | Pres. | Abs.              | Pres. |
| Dung                | -    | -     | 1.14                | 1.74  | 1.69            | 1.19  | 1.97              | 0.91  |
| Sulphate of ammonia | 0.07 | 0.67  | -                   | -     | 0.41            | 0.33  | 0.60              | 0.14  |
| Super-phosphate     | 0.89 | 0.39  | 0.68                | 0.60  | -               | -     | 0.58              | 0.70  |
| Muriate of potash   | 1.18 | 0.12  | 0.88                | 0.42  | 0.59            | 0.71  | -                 | -     |

48/Ce/1.1

## SUGAR BEET

The effects of two methods of broadcasting and of two other methods of placement of two levels of a compound fertilizer.

RS - Long Hoos. 1948

System of replication: 3 randomized blocks of 11 plots each

Area of each plot (after rejecting edge rows): 0.00906 acre

### Treatments:

Levels of fertilizer: None, 5, 10 cwt per acre of National Compound No 2 (9% N, 7% P<sub>2</sub>O<sub>5</sub>, 4½% K<sub>2</sub>O)

Methods of placement: Broadcast before all cultivations, broadcast on seedbed and harrowed in at once, placed in band 2" below and 1" to side of seed, placed in band 2" below and 3" to side of seed.

Basal Manuring: None

Cultivations etc: Ploughed: Sept. 30 - Oct 2. Springtine harrowed then rolled and springtined: Mar 10. Ground chalk applied 2 tons per acre: Mar 13. Fertilizer broadcast before cultivation on appropriate plots: Mar 19. Cultivated: Mar 20. Rolled and springtine harrowed: Mar 22. Harrowed and ring rolled, fertilizer broadcast on seedbed, seed drilled, and fertilizers placed: Mar 30. Dusted against flea beetle: May 7, 14 and 15. Hoed: May 27 - 28. Singled: June 4 - 5. Hoed: June 12 - 15, 16, 23 - 24, July 15 - 16 and 19 - 20. Lifted: Dec 8. Variety: Klein E. Previous crop: Barley.

### Standard errors per plot:

Clean beet: ±0.950 tons per acre or 7.33%  
Sugar percentage: ±0.352  
Total sugar: ±3.27 cwt per acre or 7.4%  
Tops: ±1.70 tons per acre or 12.2%  
Plant number: ±1.02 thousand per acre or 4.4%

All standard errors estimated from 22 d.f.

48/Ce/1.2

| Fertilizer<br>(cwt/acre)                      | Broad-<br>cast<br>before<br>cultivations | Broad-<br>cast on<br>seed bed | Band 2"<br>below<br>and 1"<br>to side | Band 2"<br>below<br>and 3"<br>to side | Mean                  |
|-----------------------------------------------|------------------------------------------|-------------------------------|---------------------------------------|---------------------------------------|-----------------------|
| Clean Beet: tons per acre ( $\pm 0.549$ )     |                                          |                               |                                       |                                       |                       |
| None                                          |                                          |                               |                                       |                                       | 11.49 ( $\pm 0.317$ ) |
| 5                                             | 13.49                                    | 13.77                         | 13.24                                 | 13.19                                 | 13.42 ( $\pm 0.274$ ) |
| 10                                            | 13.88                                    | 13.37                         | 13.98                                 | 13.23                                 | 13.61                 |
| Mean ( $\pm 0.388$ )                          | 13.68                                    | 13.57                         | 13.61                                 | 13.21                                 | 12.97                 |
| Sugar Percentage: ( $\pm 0.203$ )             |                                          |                               |                                       |                                       |                       |
| None                                          |                                          |                               |                                       |                                       | 17.14 ( $\pm 0.117$ ) |
| 5                                             | 17.09                                    | 17.11                         | 17.11                                 | 16.98                                 | 17.07 ( $\pm 0.102$ ) |
| 10                                            | 16.77                                    | 16.79                         | 16.79                                 | 17.26                                 | 16.90                 |
| Mean ( $\pm 0.144$ )                          | 16.93                                    | 16.95                         | 16.95                                 | 17.12                                 | 17.03                 |
| Total Sugar: cwt per acre ( $\pm 1.89$ )      |                                          |                               |                                       |                                       |                       |
| None                                          |                                          |                               |                                       |                                       | 39.4 ( $\pm 1.09$ )   |
| 5                                             | 46.1                                     | 47.1                          | 45.3                                  | 44.8                                  | 45.8 ( $\pm 0.95$ )   |
| 10                                            | 46.6                                     | 44.9                          | 47.0                                  | 45.7                                  | 46.0                  |
| Mean ( $\pm 1.34$ )                           | 46.3                                     | 46.0                          | 46.2                                  | 45.2                                  | 44.1                  |
| Tops: tons per acre ( $\pm 0.983$ )           |                                          |                               |                                       |                                       |                       |
| None                                          |                                          |                               |                                       |                                       | 10.44 ( $\pm 0.567$ ) |
| 5                                             | 13.64                                    | 12.36                         | 13.52                                 | 15.01                                 | 13.63 ( $\pm 0.491$ ) |
| 10                                            | 16.42                                    | 15.96                         | 18.89                                 | 16.55                                 | 16.95                 |
| Mean ( $\pm 0.695$ )                          | 15.03                                    | 14.16                         | 16.21                                 | 15.78                                 | 13.97                 |
| Plant Number: thous. per acre ( $\pm 0.589$ ) |                                          |                               |                                       |                                       |                       |
| None                                          |                                          |                               |                                       |                                       | 23.2 ( $\pm 0.340$ )  |
| 5                                             | 22.7                                     | 22.7                          | 23.1                                  | 23.3                                  | 23.0 ( $\pm 0.295$ )  |
| 10                                            | 23.2                                     | 23.1                          | 23.4                                  | 22.6                                  | 23.1                  |
| Mean ( $\pm 0.417$ )                          | 23.0                                     | 22.9                          | 23.3                                  | 22.9                                  | 23.1                  |



48/Cf/1.1

## LINSEED

The effects of time of sowing, seed rate, sulphate of ammonia, superphosphate and muriate of potash.

R/JL - Bones Close 1948

System of replication: 4 randomised blocks of 8 plots each; certain high order interactions confounded with block differences.

Area of each plot: 0.0212 acre.

### Treatments:

Time of sowing: 24th March (Early), 20th April (Late).  
Seed rate: 60 and 90 lbs per acre.  
Sulphate of ammonia: None, 0.45 cwt N per acre.  
Superphosphate: None, 0.60 cwt  $P_2O_5$  per acre.  
Muriate of Potash: None, 0.45 cwt  $K_2O$  per acre.

Basal Manuring: None.

Cultivations etc: Ploughed: Nov 10-18. Springtime harrowed: Mar 3-4. Rolled and springtime harrowed: Mar 12. Harrowed: Mar 23. "Early" seed drilled, and artificials applied to "Early" plots: Mar 24. Harrowed in: Mar 25. Ring rolled: Mar 27. "Late" seed drilled, and artificials applied to "Late" plots: Apr 20. Harrowed and light ring rolled: Apr 21. Dusted against flea beetle: May 18. Thistles hand hoed: May 25. Agroxone used against weeds: May 27. Hoed: June 4-7 and 8-9. Harvested: Aug 28. Variety: Royal  
Previous crop: Barley.

Note: The late sown crop was practically a failure, and was discarded.

Standard error per plot:  $\pm 0.979$  per acre or 12.6% (3 d.f.)

Grain: cwt per acre

Mean yield 7.78

Responses to treatments ( $\pm 0.693$ . Means  $\pm 0.490$ )

| Responses to:       | Sulphate of Ammonia |       | Superphosphate |       | Muriate of Potash |       | Seed Rate<br>lb per acre |
|---------------------|---------------------|-------|----------------|-------|-------------------|-------|--------------------------|
|                     | Abs.                | Pres. | Abs.           | Pres. | Abs.              | Pres. |                          |
| Sulphate of Ammonia | 1.61                | -     | 1.23           | 1.99  | -                 | -     | 60                       |
| Superphosphate      | -1.08               | -1.46 | -              | -     | -0.75             | -1.41 | 1.25                     |
| Muriate of Potash   | 1.90                | -     | 2.23           | 1.57  | -                 | -     | 1.97                     |
| Seed Rate 90-60     | 1.28                | 0.92  | 0.61           | 1.95  | 2.56              | 0.00  | -1.75                    |
|                     |                     |       |                |       |                   |       | 3.18                     |
|                     |                     |       |                |       |                   |       | 0.62                     |

Note:

Owing to the discarding of the late sown crop, the interaction of Sulphate of Ammonia and Muriate of Potash was confounded with block differences.

48/cf/1.2

48/Cf/2

LINSEED

The effects of rates and methods of application of a compound fertilizer.

R/JL - Bones Close 1948

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

Area of each plot: 0.0191 acre.

Treatments:

None

$4\frac{1}{2}$  and 9 cwt compound fertilizer per acre, broadcast.

$2\frac{1}{4}$  and  $4\frac{1}{2}$  cwt compound fertilizer per acre, drilled.

The compound fertilizer was made up of:

|                     |           |
|---------------------|-----------|
|                     | lb        |
| Sulphate of Ammonia | 32        |
| Superphosphate      | 57        |
| Muriate of Potash   | <u>11</u> |
| Total               | 100       |

= 6.7% N, 9.0% P<sub>2</sub>O<sub>5</sub>, 6.7% K<sub>2</sub>O.

Basal Manuring: None.

Cultivations etc: Ploughed: Nov 10-18. Springtime harrowed: Mar 3-4.  
 Rolled and springtime harrowed: Mar 12. Tooth-harrowed: Mar 23. Seed  
 drilled, and compound drilled and broadcast: Mar 24. Harrowed in:  
 Mar 25. Ring rolled Mar 27. Dusted against flea beetle: May 18.  
 Thistles hand hoed: May 25. Agroxone applied against weeds: May 27.  
 Hoed: June 4-7 and again 8-9. Harvested: Aug 28. Variety: Royal.  
 Previous crop: Barley.

Standard error per plot: 1.42 cwt per acre or 14.4% (16 d.f.)

Grain: cwt per acre

| Level      | Compound |           | Mean |         |
|------------|----------|-----------|------|---------|
|            | None     | Broadcast |      | Drilled |
| 1          |          | 11.2      | 9.6  | 10.4    |
| 2          |          | 8.2       | 7.9  | 8.1     |
| Mean       | 11.2     | 9.7       | 8.8  | 9.9     |
| Difference |          | -3.0      | -1.7 | -2.3    |

(±0.71)      (±0.50)

(±0.50)      (±1.01)      (±0.71)

48/Cf/3.1

LINSEED

The effects of time of sowing, seed rate, sulphate of ammonia, superphosphate and muriate of potash.

Broad Mead I Woburn 1948

System of replication: 4 randomized blocks of 8 plots each; certain high order interactions confounded with block differences.

Area of each plot: 0.0212 acre.

Treatments:

Time of sowing: 22nd March (Early), 16th April (Late)

Seed rate: 60 and 90 lbs per acre.

Sulphate of ammonia: None, 0.45 cwt N per acre.

Superphosphate: None, 0.60 cwt  $P_2O_5$  per acre.

Muriate of potash: None, 0.45 cwt  $K_2O$  per acre

Basal Manuring: None.

Cultivations etc: Ploughed: Feb 4 and Mar 1. **Rolled:** Mar 2. Harrowed three times: between Mar 12-18. "Early" seed sown and artificials applied to "Early" plots: Mar 22. Harrowed and rolled: Mar 23. "Late" seed sown and artificials applied to "Late" plots: Apr 16. Harrowed and rolled: Apr 16. Dusted against flea beetle: May 5-8, and again May 14. Weeds pulled: June 8. Early plots harvested: Aug 19. Late plots harvested: Sept 9.

Standard Error per plot:  $\pm 1.296$  cwt per acre or 14.7% (13 d.f.)

Grain: cwt per acre

Mean yield: 6.79

Responses to treatments: ( $\pm 0.648$ . Means  $\pm 0.458$ )

| Response to:        | Sulphate of ammonia |         | Super phosphate |         | Muriate of potash |         | Sowing |       | Seed Rate lbs per acre |
|---------------------|---------------------|---------|-----------------|---------|-------------------|---------|--------|-------|------------------------|
|                     | Absent              | Present | Absent          | Present | Absent            | Present | Early  | Late  |                        |
| Mean                |                     |         |                 |         |                   |         |        |       |                        |
| Sulphate of ammonia | 0.05                | -       | 0.47            | -0.37   | 0.40              | -0.30   | -1.06  | 1.16  | 0.84                   |
| Superphosphate      | -0.16               | -0.58   | -               | -       | 0.77              | -1.09   | -0.32  | 0.00  | -0.84                  |
| Muriate of Potash   | 0.29                | -0.06   | 1.22            | -0.64   | -                 | -       | 0.10   | 0.48  | -0.26                  |
| Sowing Late-Early   | -1.00               | 0.11    | -1.16           | -0.84   | -1.19             | -0.81   | -      | -     | -0.26                  |
| Seed Rate 90-60     | 0.26                | -0.53   | 0.94            | -0.42   | -0.29             | 0.81    | 1.00   | -0.48 | -                      |

48/Cf/3.2

48/Cf/4

LINSEED

The effects of rates and methods of application of a compound fertilizer.

W/JL - Broad - Mead I Woburn 1948

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

Area of each plot: 0.0212 acre.

Treatments:

None.

$4\frac{1}{2}$  and 9 cwt compound fertilizer per acre, broadcast

$2\frac{1}{4}$  and  $4\frac{1}{2}$  cwt compound fertilizer per acre, drilled.

The compound fertilizer was made up of:

|                     |           |
|---------------------|-----------|
|                     | lb        |
| Sulphate of Ammonia | 32        |
| Superphosphate      | 57        |
| Muriate of Potash   | <u>11</u> |

Total 100

= 6.7% N.

9.0%  $P_2O_5$

6.7%  $K_2O$

Basal Manuring: None.

Cultivations etc: Ploughed: Feb 4 - Mar 1. Rolled: Mar.2. Harrowed three times: Mar 12-18. Seed sown and fertilizer applied to all plots: Mar 22. Harrowed and ring rolled: Mar 23. Dusted against flea beetle: May 5-8. Weeds pulled: June 8. Harvested: Aug 19. Variety: Royal. Previous crop: Ley.

Standard error per plot: 1.26 cwt. per acre or 13.0% (16 d.f.)

Grain: cwt per acre

|            | Compound |           |         | Mean         |
|------------|----------|-----------|---------|--------------|
|            | None     | Broadcast | Drilled |              |
| Level 1    |          | 9.9       | 10.5    | 10.2         |
|            |          | (±0.63)   |         | (±0.45)      |
| Level 2    |          | 8.9       | 8.6     | 8.7          |
| Mean       | 10.2     | 9.4       | 9.5     | 9.7          |
| (±0.45)    |          |           |         |              |
| Difference |          | -1.0      | -1.9    | -1.5 (±0.63) |
| (±0.89)    |          |           |         |              |

48/Cg/1.1

## PEAS

The effects of two methods of broadcasting and of two other methods of placement of two levels of a compound fertilizer.

R/PE - Long Hoos, 1948

System of replication: 3 randomized blocks of 12 plots each

Area of each plot: 0.0150 acre

### Treatments:

Levels of fertilizer: None, 3, 6 cwt. per acre of a special mixture (10% P<sub>2</sub>O<sub>5</sub>, 20% K<sub>2</sub>O)

Methods of placement: Broadcast before all cultivations, broadcast on seedbed and harrowed in at once, placed in band 2" below and 1" to side of seed, placed in band 2" below and 3" to side of seed.

Basal manuring: None

Cultivations, etc.: Ploughed: Sept 30 - Oct 2. Springtine harrowed then rolled and springtined: Mar 10. Ground chalk, 2 tons per acre, applied: Mar 13. Broadcast fertilizers, before cultivations on appropriate plots: Mar 19. Cultivated: Mar 20. Rolled and springtine harrowed: Mar 22. Harrowed, and ring rolled: Mar 30. Fertilizers broadcast in seedbed, seed drilled and fertilizers placed: Mar 30. Plant almost failed so decision made to resow, thistles cut, and seed redrilled: Apr 20. Harrowed and light ring rolled: Apr 21. Weeds pulled: June 7-9. Hoed: June 12.

### Standard errors per plot:

Yield, 1.61 cwt. per acre or 9.2% (25 d.f.)

Plant number, 1.47 tens of thousands per acre or 10.5% (25 d.f.)

| Fertilizer<br>(cwt/acre)                                 | 48/Cg/1.2                           |                               |                                       |                                       | Mean            |
|----------------------------------------------------------|-------------------------------------|-------------------------------|---------------------------------------|---------------------------------------|-----------------|
|                                                          | Broadcast<br>before<br>cultivations | Broad-<br>cast on<br>seed bed | Band 2"<br>below<br>and 1"<br>to side | Band 2"<br>below<br>and 3"<br>to side |                 |
| Yield of threshed peas: cwt. per acre ( $\pm 0.927$ )    |                                     |                               |                                       |                                       | ( $\pm 0.464$ ) |
| None                                                     |                                     |                               |                                       |                                       | 16.3            |
| 3                                                        | 17.8                                | 17.2                          | 18.2                                  | 18.6                                  | 17.9            |
| 6                                                        | 17.3                                | 17.2                          | 19.2                                  | 18.1                                  | 17.9            |
| Mean ( $\pm 0.656$ )                                     | 17.5                                | 17.2                          | 18.7                                  | 18.4                                  | 17.4            |
| Plant number: tens of thousands per acre ( $\pm 0.851$ ) |                                     |                               |                                       |                                       | ( $\pm 0.425$ ) |
| None                                                     |                                     |                               |                                       |                                       | 13.4            |
| 3                                                        | 14.0                                | 13.2                          | 13.5                                  | 15.5                                  | 14.1            |
| 6                                                        | 14.6                                | 13.7                          | 15.3                                  | 14.2                                  | 14.5            |
| Mean ( $\pm 0.601$ )                                     | 14.3                                | 13.5                          | 14.4                                  | 14.9                                  | 14.0            |



48/Da/1

MEADOW HAY

17th Season

Direct and residual effects of mixed artificials and compost.

Lady Manners School, Bakewell 1948

System of replication: 4 randomized blocks of 9 plots each

Area of each plot: 0.00492 acre

Treatments: 3 x 3 factorial design.

No manure, mixed artificials (2 cwt nitrate of soda, 3 cwt superphosphate and 1 cwt muriate of potash per acre), 8 tons per acre compost applied in alternate years from 1932 to 1948 or from 1933 to 1947.

Basal Manuring: None

Soil: Limestone

Cultivations: Compost and artificials applied: Mar 22. Harvested: July 1.

Standard error per plot:  $\pm 7.02$  cwt. per acre or 16.0% (24 d.f.)

Hay: cwt. per acre

| Alternate years<br>1932 - 1948 | Alternate years 1933 - 1947 |                |         | Mean           | Increase       |
|--------------------------------|-----------------------------|----------------|---------|----------------|----------------|
|                                | No<br>Manure                | NPK            | Compost |                |                |
|                                |                             | ( $\pm 3.51$ ) |         | ( $\pm 2.03$ ) | ( $\pm 2.87$ ) |
| No manure                      | 29.9                        | 27.7           | 43.5    | 33.7           |                |
| NPK                            | 41.7                        | 44.0           | 49.0    | 44.9           | 11.2           |
| Compost                        | 51.2                        | 54.4           | 53.1    | 52.9           | 19.2           |
| Mean ( $\pm 2.03$ )            | 41.0                        | 42.0           | 48.5    | 43.8           |                |
| Increase ( $\pm 2.87$ )        |                             | 1.0            | 7.5     |                |                |

48/Da/2

MEADOW HAY

18th Season

Effects of nitrate of soda, superphosphate and muriate of potash

Lady Manners School, Bakewell 1948

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

Area of each plot: 0.00723 acre

Treatments: 2 x 2 x 2 factorial design

Nitrate of soda: None, 2 cwt per acre

Superphosphate: None, 3 cwt per acre

Muriate of Potash: None, 1 cwt per acre

Basal Manuring: None

Soil: Limestone.

Artificials applied: Mar 22. Harvested: June 30

Standard error per plot:  $\pm 7.08$  cwt per acre of 21.2% (14 d.f.)

Hay: cwt per acre

Mean yield 33.3

Responses to treatments ( $\pm 4.09$  Means  $\pm 2.89$ )

|                   | Mean | Nitrate of soda |         | Superphosphate |         | Muriate of potash |         |
|-------------------|------|-----------------|---------|----------------|---------|-------------------|---------|
|                   |      | Absent          | Present | Absent         | Present | Absent            | Present |
| Nitrate of Soda   | 7.2  | -               | -       | 7.4            | 7.0     | 2.5               | 11.9    |
| Super-phosphate   | 3.7  | 3.9             | 3.5     |                |         | -1.2              | 8.6     |
| Muriate of potash | 9.1  | 4.4             | 13.8    | 4.2            | 14.0    | -                 | -       |

48/z1/1

CHEMICAL ANALYSES OF MANURES USED IN THE THREE, FOUR  
AND SIX COURSE ROTATIONS 1948

Three Course Rotation

| Manures             | % Organic matter | % N  | % P <sub>2</sub> O <sub>5</sub> | % K <sub>2</sub> O |
|---------------------|------------------|------|---------------------------------|--------------------|
| Chaffed Straw       | 82.0             | 0.41 | 0.11                            | 0.66               |
| Adco                | 21.9             | 0.43 | 0.22                            | 0.18               |
| Sulphate of Ammonia |                  | 21.0 |                                 |                    |
| Nitrate of Soda     |                  | 15.5 |                                 |                    |
| Superphosphate      |                  |      | 17.7 (total)                    |                    |
| Muriate of Potash   |                  |      |                                 | 62.0               |

Four Course Rotation

| Manures             | % Organic matter | % N  | % P <sub>2</sub> O <sub>5</sub> | % K <sub>2</sub> O |
|---------------------|------------------|------|---------------------------------|--------------------|
| Chaffed Straw       | 82.0             | 0.41 | 0.11                            | 0.66               |
| Dung                | 20.6             | 0.58 | 0.29                            | 0.92               |
| Adco                | 21.9             | 0.43 | 0.22                            | 0.18               |
| Sulphate of Ammonia |                  | 21.0 |                                 |                    |
| Superphosphate      |                  |      | 17.7                            |                    |
| Mineral Phosphate   |                  |      | 33.3                            |                    |
| Muriate of Potash   |                  |      |                                 | 62.0               |

Six Course Rotation

| Manures             | % Organic matter | % N  | % P <sub>2</sub> O <sub>5</sub> | % K <sub>2</sub> O |
|---------------------|------------------|------|---------------------------------|--------------------|
| Sulphate of Ammonia |                  | 21.0 |                                 |                    |
| Superphosphate      |                  |      | 17.7 (total)                    | 62.0               |
| Muriate of Potash   |                  |      |                                 | 62.0               |