

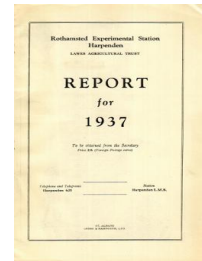
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The Classical Experiments

Rothamsted Research

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CROPS GROWN IN ROTATION, AGDELL FIELD

PRODUCE PER ACRE

| Year | Crop | O Unmanured since 1848 | | M Mineral Manure† No Nitrogen | | C Complete Mineral and Nitrogenous Manure | |
|------|------|------------------------------|--------------------|-------------------------------------|--------------------|--|--------------------|
| | | 5 | 6 | 3 | 4 | 1 | 2 |
| | | Fallow | Clover or Beans | Fallow | Clover or Beans | Fallow | Clover or Beans |

Average of first twenty-two Courses, 1848-1935

| | | | | | | |
|-------------------------|------|------|-------|-------|-------|-------|
| Roots (Swedes) .. cwt.* | 31.4 | 15.5 | 169.6 | 201.9 | 340.4 | 298.9 |
| Barley— | | | | | | |
| Dressed grain .. bush. | 20.8 | 19.0 | 22.1 | 26.0 | 29.1 | 33.6 |
| Total straw .. cwt.† | 13.0 | 12.8 | 13.3 | 15.4 | 18.0 | 21.3 |
| Beans— | | | | | | |
| Dressed grain .. bush.‡ | — | 12.6 | — | 18.9 | — | 21.2 |
| Total straw .. cwt.‡ | — | 9.4 | — | 14.9 | — | 15.4 |
| Clover hay .. cwt.§ | — | 25.6 | — | 52.1 | — | 52.0 |
| Wheat— | | | | | | |
| Dressed grain .. bush. | 22.7 | 21.3 | 26.5 | 28.8 | 26.7 | 28.3 |
| Total straw .. cwt.† | 22.8 | 21.2 | 28.5 | 29.7 | 29.4 | 29.0 |

Present Course (23rd), 1936-7

| | | | | | | | |
|------|-------------------------|------|-----|------|------|-------|------|
| 1936 | Roots (Turnips) .. cwt. | 24.4 | 9.4 | 53.8 | 51.0 | 112.6 | 65.3 |
| 1937 | Barley— | | | | | | |
| | Dressed grain .. bush. | 0.6 | 0.4 | 2.7 | 0.5 | 0.9 | 1.5 |
| | Total straw .. cwt.† | 3.4 | 2.1 | 2.5 | 4.7 | 2.7 | 3.4 |

* Plots 1, 3 and 5 based upon 20 courses. Plots 2, 4 and 6 based upon 19 courses.

† Includes straw, cavings and chaff.

‡ Mineral manure: 528 lb. 16% Superphosphate; 500 lb. Sulphate of Potash; 100 lb. Sulphate of Soda; 200 lb. Sulphate of Magnesia, all per acre. Nitrogenous Manure; 206 lb. Sulphate of Ammonia and 2,000 lb. Rape Dust per acre. Manures applied once every four years, prior to sowing of Swedes.

‡‡ Based on 9 courses.

§ Based on 13 courses.

CULTIVATIONS, ETC.—Ploughed: Nov. 26. Spring tine harrowed: March 30. Harrowed: March 31. Hoed: May 6. Clover sown: May 10. Variety: Montgomery Red. Rolled: May 10 and 17. Hand hoed: June 8 and 9. Seed sown: March 31. Variety: Plumage Archer. Harvested: Sept. 3.

Note.—The crop was very weedy and the straw figures were obtained by sampling for the ratio of grain plus straw to weeds.

WHEAT AFTER FALLOW—HOOS FIELD

Without Manure 1851, and since.

SCHEME FOR COMPARING A THREE YEAR FALLOW WITH A ONE YEAR FALLOW

Each of the two strips on Hoos Wheat after Fallow is divided into four parts. In the year when a strip is in crop, one quarter continues to be fallowed, so that this quarter has a three-year fallow. Different quarters are selected for fallow in successive years in the rotation given in the following table ;

Cropping of strips A and B
C=Crop. F=Fallow.

| W | | | | | | | | | | |
|---|---|------|----|----|----|----|----|----|----|----|
| A | B | | | | | | | | | |
| 1 | 1 | Year | A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 |
| 2 | 2 | 1932 | F | C | C | C | F | F | F | F |
| 3 | 3 | 1933 | F | F | F | F | C | C | F | C |
| 4 | 4 | 1934 | C | F | C | C | F | F | F | F |
| | | 1935 | F | F | F | F | C | C | C | F |
| | | 1936 | C | C | F | C | F | F | F | F |
| | | 1937 | F | F | F | F | F | C | C | C |
| | | 1938 | C | C | C | F | F | F | F | C |
| | | 1939 | F | F | F | F | C | F | C | C |
| | | 1940 | F | C | C | C | F | F | F | F |

A comparison of the effect of a three-year fallow with the effect of a one-year fallow will be possible in every year.

Half the experiment continues to be wheat after one year fallow, and continuity with previous results will thus be maintained.

PRODUCE PER ACRE, 1937

| | B2 | B3 | B4 | Mean | <i>Average 81 years, 1856-1936</i> |
|-----------------------------|------|------|------|------|--|
| Dressed Grain—bushels | 8.9 | 6.7 | 8.1 | 7.9 | 14.3 |
| Total Grain—cwt. | 6.0 | 4.8 | 4.8 | 5.2 | 8.1 |
| Weight per bushel—lb. | 62.1 | 61.6 | 61.4 | 61.7 | 58.9 |
| Total Straw—cwt. | 10.6 | 7.9 | 9.2 | 9.2 | 12.7 |

CULTIVATIONS, ETC.—Cropped sections: Ploughed: Oct. 16. Harrowed: Oct. 21 and May 3. Seed sown: Oct. 21. Variety: Red Standard. Harvested: Aug. 20. Fallowed sections: Ploughed: Aug. 24, June 3 and 4. Cultivated: Oct. 5 and June 9. Spring tine harrowed: Mar. 26 and April 26.

MANGOLDS—BARNFIELD, 1937

Roots each year since 1856.

Mangolds each year since 1876.

PRODUCE PER ACRE

| Strip | Strip Manures (Amounts stated are per acre) | 1937 | | | | | | | | | | 55 Year Average, 1876-1936.† | | | | |
|-------|---|-----------------|---------------------------|-------------------------------|---|-----------------------|-----------------|---------------------------|-------------------------------|---|-----------------------|------------------------------|---------------------------|-------------------------------|---|-----------------------|
| | | Cross Dressings | | | | | Cross Dressings | | | | | Cross Dressings | | | | |
| | | O | N | A | AC | C | O | N | A | AC | C | O | N | A | AC | C |
| | | None | Nitrate of Soda (550 lb.) | Sulphate of Ammonia (412 lb.) | Sulphate of Ammonia (412 lb.) & Rape Cake (2,000 lb.) | Rape Cake (2,000 lb.) | None | Nitrate of Soda (550 lb.) | Sulphate of Ammonia (412 lb.) | Sulphate of Ammonia (412 lb.) & Rape Cake (2,000 lb.) | Rape Cake (2,000 lb.) | None | Nitrate of Soda (550 lb.) | Sulphate of Ammonia (412 lb.) | Sulphate of Ammonia (412 lb.) & Rape Cake (2,000 lb.) | Rape Cake (2,000 lb.) |
| | | Tons | Tons | Tons | Tons | Tons | Tons | Tons | Tons | Tons | Tons | Tons | Tons | Tons | Tons | Tons |
| 1 | Dung (14 tons) | 8.34 | 16.50 | 15.84 | 18.49 | 16.09 | 17.57 | 26.60 | 22.01 | 23.73 | 23.66 | 19.25 | 27.35 | 25.12 | 27.76 | 26.77 |
| 2 | Dung, Superphosphate (3¼ cwt.), Sulphate of Potash (500 lb.) | 9.54 | 18.41 | 13.21 | 14.85 | 12.97 | 4.74 | (a)17.98 (b)11.71** | 8.62 | 13.18 | 9.17 | 4.55 | 15.15 | 6.91 | 9.46 | 10.20 |
| 4 | Complete Minerals: Super. and Potash as 2, Sodium Chloride (200 lb.), Sulphate of Magnesia (200 lb.) | 2.08 | (a)11.21** (b)11.71** | 7.07 | 7.05 | 6.53 | 4.89 | 15.65 | 13.81 | 22.52 | 18.34 | 4.14 | 15.65 | 13.81 | 22.52 | 18.34 |
| 5 | Superphosphate (3¼ cwt.) | 1.89 | 12.01 | 6.20 | 11.25 | 7.34 | 4.89 | 16.64 | 15.08 | 22.26 | 19.46 | 4.89 | 16.64 | 15.08 | 22.26 | 19.46 |
| 6 | Super. (3¼ cwt.) Sulphate of Potash (500 lb.) | 1.45 | 9.97 | 7.41 | 11.23 | 7.84 | 3.38 | 10.03 | 5.51 | 8.59 | 9.14 | 4.89 | 16.64 | 15.08 | 22.26 | 19.46 |
| 7 | Super. (3¼ cwt.) Sulphate of Magnesia (200 lb.), and Sodium Chloride (200 lb.) | 1.58 | 9.37 | 5.19 | 5.80 | 5.37 | — | — | — | — | — | — | — | — | — | — |
| 8 | No Minerals | 1.71 | 8.34 | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 9 | Sodium Chloride (200 lb.), Nit. Soda (550 lb.), Sulphate of Potash (500 lb.) and Sulphate of Magnesia (200 lb.) | 7.19 | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 1 | Dung (14 tons) | 3.22 | 5.99 | 5.55 | 6.03 | 4.80 | 3.10 | 4.66 | 4.89 | 5.22 | 4.59 | 3.10 | 4.66 | 4.89 | 5.22 | 4.59 |
| 2 | Dung, Superphosphate (3¼ cwt.), Sulphate of Potash (500 lb.) | 4.01 | 7.15 | 5.29 | 5.31 | 4.40 | 3.19 | 5.16 | 5.43 | 6.19 | 4.82 | 3.19 | 5.16 | 5.43 | 6.19 | 4.82 |
| 4 | Complete Minerals: Super. and Potash as 2, Sodium Chloride (200 lb.), Sulphate of Magnesia (200 lb.) | 1.22 | (a)4.60 (b)3.96 | 3.40 | 3.69 | 2.42 | 1.07 | (a)3.87 (b)4.13* | 2.92 | 5.28 | 3.40 | 1.07 | (a)3.87 (b)4.13* | 2.92 | 5.28 | 3.40 |
| 5 | Superphosphate (3¼ cwt.) | 1.06 | 4.21 | 2.91 | 4.02 | 3.08 | 1.07 | 3.20 | 2.62 | 3.27 | 2.87 | 1.07 | 3.20 | 2.62 | 3.27 | 2.87 |
| 6 | Super. (3¼ cwt.) Sulphate of Potash (500 lb.) | 0.97 | 4.85 | 3.17 | 4.67 | 3.72 | 0.95 | 3.08 | 2.82 | 5.13 | 2.92 | 0.95 | 3.08 | 2.82 | 5.13 | 2.92 |
| 7 | Super. (3¼ cwt.) Sulphate of Magnesia (200 lb.) and Sodium Chloride (200 lb.) | 1.07 | 5.36 | 3.81 | 5.80 | 3.11 | 1.11 | 3.36 | 3.07 | 5.21 | 3.40 | 1.11 | 3.36 | 3.07 | 5.21 | 3.40 |
| 8 | No Minerals | 1.10 | 4.39 | 2.86 | 4.02 | 3.35 | 0.98 | 3.23 | 2.55 | 3.29 | 2.91 | 0.98 | 3.23 | 2.55 | 3.29 | 2.91 |
| 9 | Sodium Chloride (200 lb.), Nit. Soda (550 lb.), Sulphate of Potash (500 lb.) and Sulphate of Magnesia (200 lb.) | 3.57 | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

** From 1904 onwards plot 4N has been divided, 4(a) receiving Superphosphate, Sulphate of Potash, Sulphate of Magnesia, Sodium Chloride and Nitrate of Soda, amounts as above: 4(b) receiving Superphosphate, Calcium Chloride (190 lb.), Potassium Nitrate (570 lb.) and Calcium Nitrate (100 lb.). Nitrogenous manures are applied one-third at time of sowing and two-thirds as top dressing at a later date, except with Rape Cake which all goes on with the seed.

† Excluding 1885 when nitrogenous fertilisers were not applied, owing to poor crop, 1908 and 1927 when the crop was swedes, 1930 when the spacing of the rows was changed, 1931 when the crop was a mixture of mangolds and swedes and 1935 when it was fallow.

* 28 years only, 1904-1936, excluding 1908, 1927, 1930, 1931 and 1935. For this period the average yield of plot 4(a) was 19.23 for roots and 4.02 for leaves.

CULTIVATIONS, etc.—Ploughed (except plot 9): Nov. 27-Dec. 2. Ploughed in dung: Dec. 1 and 2. Ploughed plot 9: April 8. Springtime harrowed: May 4. Harrowed and rolled: May 8. Hand hoed: June 7 and 8. Horse hoed: June 7, 8, July 6, 7, 15 and 20-23. Singled: July 7-30. Manures applied: May 5-7, Aug. 5 and 6. Seed sown: May 8. Variety: Yellow Globe. Lifted: Nov. 1-11.

HAY—THE PARK GRASS PLOTS, 1937

| Plot | Manures since 1905 | Yield of Hay (cwt. per acre) | | | Dry Matter (cwt. per acre) | | |
|------|---|------------------------------|----------|-------|----------------------------|-------|-------|
| | | 1st Crop | 2nd Crop | Total | Not limed | Limed | Total |
| 1 | Sulphate of ammonia (206 lb.) | 17.1 | 6.4 | 23.5 | 12.1 | 5.1 | 17.2 |
| 2 | Unmanured | 13.1 | 8.0 | 21.1 | 10.0 | 6.4 | 16.4 |
| 3 | Unmanured | 11.8 | 6.0 | 17.8 | 8.7 | 4.8 | 13.5 |
| 4-1 | Superphosphate (3½ cwt.) | 16.2 | 6.7 | 22.9 | 12.3 | 5.4 | 17.7 |
| 4-2 | As 4-1 and sulphate of ammonia (412 lb.) | 32.9 | 7.5 | 40.4 | 24.3 | 6.0 | 30.3 |
| 5-1 | Unmanured | 17.5 | 6.6 | 24.1 | 12.0 | 5.3 | 17.3 |
| 5-2 | Superphosphate (3½ cwt.) and sulphate of potash (500 lb.) | 22.4 | 12.0 | 34.4 | 15.0 | 9.6 | 24.6 |
| 6 | As 5-2, and sulphate of soda (100 lb.) and sulphate of magnesia (100 lb.) | 28.9 | 11.6 | 40.5 | 18.7 | 9.3 | 28.0 |
| 7 | As 6 | 30.1 | 15.7 | 45.8 | 19.7 | 12.5 | 32.2 |
| 8 | As 6 without potash | 21.1 | 10.7 | 31.8 | 15.0 | 8.6 | 23.6 |
| 9 | As 6 and sulphate of ammonia (412 lb.) | 47.8 | 14.3 | 62.1 | 34.2 | 11.4 | 45.6 |
| 10 | As 8 and sulphate of ammonia (412 lb.) | 34.5 | 9.8 | 44.3 | 22.3 | 7.8 | 30.1 |
| 11-1 | As 6 and sulphate of ammonia (618 lb.) | 41.0 | 25.5 | 66.5 | 30.5 | 20.5 | 51.0 |
| 11-2 | As 11-1 and silicate of soda (3½ cwt.) | 47.5 | 24.7 | 72.2 | 34.6 | 19.7 | 54.3 |
| 12 | Unmanured | 12.5 | 17.8 | 30.3 | 7.8 | 14.2 | 22.0 |
| 13 | Dung (14 tons) in 1905, fish guano (6 cwt.) in 1907 and every fourth year | 51.6 | 18.0 | 69.6 | 29.6 | 14.4 | 44.0 |
| 14 | As 6 and nitrate of soda (550 lb.) | 43.7 | 18.2 | 61.9 | 32.2 | 14.6 | 46.8 |
| 15 | As 6 | 24.5 | 13.4 | 37.9 | 19.0 | 10.7 | 29.7 |
| 16 | As 6 and nitrate of soda (275 lb.) | 37.8 | 16.4 | 54.2 | 26.9 | 13.1 | 40.0 |
| 17 | Nitrate of soda (275 lb.) | 20.6 | 9.9 | 30.5 | 13.9 | 7.9 | 21.8 |
| 18 | As 6 (without superphosphate) and sulphate of ammonia (412 lb.) | 17.2 | 9.9 | 27.1 | 12.6 | 7.9 | 20.5 |
| 19 | Dung every fourth year | 35.2 | 20.0 | 55.2 | 22.1 | 16.0 | 38.1 |
| 20 | As 19 and superphosphate (200 lb.), sulphate of potash (100 lb.) and nitrate of soda (168 lb.) every intervening year | 40.5 | 19.5 | 60.0 | 26.8 | 15.6 | 42.4 |
| | | | | 29.3 | | | 22.6 |
| | | | | 21.5 | | | 16.8 |
| | | | | 19.1 | | | 14.4 |
| | | | | 16.9 | | | 13.2 |
| | | | | 48.9 | | | 35.7 |
| | | | | 63.0 | | | 36.6 |
| | | | | 58.7 | | | 31.5 |
| | | | | 48.7 | | | 34.8 |
| | | | | 51.8 | | | 39.1 |
| | | | | 32.8 | | | 24.2 |
| | | | | 32.4 | | | 21.8 |
| | | | | 40.1 | | | 27.0 |
| | | | | 43.7 | | | 29.3 |
| | | | | 48.8 | | | 33.4 |
| | | | | 43.7 | | | 30.3 |
| | | | | 53.2 | | | 37.0 |

Ground lime was applied to the southern portion (limed) of the plots at the rate of 2,000 lb. to the acre in the winters of 1903-4, 1907-8, 1915-16, 1923-24, 1927-28, 1931-32, 1935-36 and at the rate of 2,500 lb. to the acre in the winter of 1920-21 except where otherwise stated.

***The second crop was carted green; the figures given are estimated hay yields, calculated from the dry matter.

*Sun. **Shade. †6,788 lb. ††3,951 lb. ‡3,150 lb. §870 lb. ¶2,772 lb. of lime.

CULTIVATIONS, ETC.—Harrowed: Mar. 5. Dung applied: Mar. 19 and 20. Rolled: April 28. Manures applied: Mar. 22-24, April 8, 9 and May 13, cut 1st crop, June 10-12; 2nd crop, Oct. 15, 16 and 18.

For a complete description of the manures since 1856, see the 1935 Report, p. 151.

PARK GRASS PLOTS
 BOTANICAL COMPOSITION PER CENT. 1937 (*1st Crop*)

| Plot | Manuring | Liming | Gram-ineae | Legum-inosae | Other Orders | " Other Orders " consist largely of |
|------|---|---------------|------------|--------------|--------------|---|
| 4 | Unmanured | Limed | 54.84 | 14.93 | 30.23 | <i>Scabiosa arvensis</i> <i>Plantago lanceolata</i> |
| | | Unlimed | 56.96 | 7.69 | 35.35 | <i>Plantago lanceolata</i> <i>Poterium sanguisorba</i> |
| 7 | Complete Mineral Manure | Limed | 74.23 | 9.60 | 16.17 | <i>Rumex acetosa</i> <i>Rumex acetosa</i> |
| | | Unlimed | 58.39 | 20.55 | 21.06 | |
| 8 | Mineral Manure (without Pot-ash) | Limed | 69.39 | 13.99 | 16.62 | <i>Plantago lanceolata</i> |
| | | Unlimed | 57.56 | 14.57 | 27.87 | <i>Plantago lanceolata</i> |
| 9 | Complete Mineral Manure and double Amm. Salts | Limed | 98.25 | — | 1.75 | — |
| | | Unlimed | 100.00 | — | — | — |
| 10 | Mineral Manure (without Pot-ash) and double Amm. Salts | Limed | 96.93 | 0.15 | 2.92 | <i>Rumex acetosa</i> |
| | | Unlimed | 99.89 | — | 0.11 | — |
| 14 | Complete Mineral Manure and double Nitrate of Soda | Limed (sun) | 84.22 | 0.50 | 15.28 | <i>Anthriscus sylvestris</i> |
| | | Limed (shade) | 94.33 | 1.73 | 3.94 | — |
| | | Unlimed | 92.63 | 0.29 | 7.08 | <i>Anthriscus sylvestris</i> |
| 18 | Mineral Manure (without Super) and double Sulphate Amm. 1905 and since. | L.6,788 lb. | 72.00 | 0.40 | 27.60 | <i>Taraxacum vulgare</i> |
| | | L.3,951 lb. | 80.99 | 0.15 | 18.86 | <i>Taraxacum vulgare</i> |
| | | Unlimed | 99.67 | — | 0.33 | — |
| 19 | Farmyard Dung in 1905 and every fourth year since (omitted 1917) | L.3,150 lb. | 85.28 | 5.63 | 9.09 | — |
| | | L.570 lb. | 75.61 | 9.90 | 14.49 | — |
| | | Unlimed | 84.44 | 5.33 | 10.23 | — |
| 20 | Farmyard Dung in 1905 and every fourth year since (omitted 1917); each intervening year Sulphate of Potash, Super., and Nitrate of Soda | L.2772 lb. | Lost | by accid | ent | — |
| | | L.570 lb. | 87.47 | 2.14 | 10.39 | — |
| | | Unlimed | Lost | by accid | ent | — |

PARK GRASS PLOTS
BOTANICAL COMPOSITION PER CENT. 1934 (1st Crop)

| Plot | Manuring | Liming | Gram-ineae | Legum-inosae | Other Orders | "Other Orders" consist largely of |
|----------------|---|---------------|------------|--------------|--------------|--|
| 3 | Unmanured | Limed | 53.01 | 5.71 | 41.28 | <i>Poterium sanguisorba</i> |
| | | Unlimed | 57.37 | 5.33 | 37.30 | — |
| 5 ¹ | Unmanured after Ammonium Salts | Unlimed | 70.59 | 4.41 | 25.00 | { <i>Centaurea nigra</i> <i>Plantago lanceolata</i> |
| 5 ² | Mineral Manure after Ammonium Salts | Unlimed | 56.03 | 35.48 | 8.49 | <i>Achillea millefolium</i> |
| 6 | Complete Mineral Manure after Ammonium Salts | Unlimed | 41.00 | 40.47 | 18.53 | <i>Heracleum sphondylium</i> |
| 7 | Complete Mineral Manure | Limed | 42.17 | 41.16 | 16.67 | { <i>Centaurea nigra</i> <i>Heracleum sphondylium</i> |
| | | Unlimed | 46.48 | 37.12 | 16.40 | — |
| 9 | Complete Mineral Manure and double Amm. Salts | Limed | 97.59 | 0.64 | 1.77 | <i>Heracleum sphondylium</i> |
| | | Unlimed | 100.00 | — | — | — |
| 14 | Complete Mineral Manure and double Nitrate of Soda | Limed (sun) | 96.40 | 1.51 | 2.09 | <i>Anthriscus sylvestris</i> |
| | | Limed (shade) | 95.52 | 2.95 | 1.53 | <i>Heracleum sphondylium</i> |
| | | Unlimed | 96.66 | 1.35 | 1.99 | <i>Anthriscus sylvestris</i> |
| 18 | Mineral Manure (without Super) and double Sulphate Amm. 1905 and since | L.6,788 lb. | 71.96 | — | 28.04 | <i>Taraxacum vulgare</i> |
| | | L.3,951 lb. | 72.67 | 0.21 | 27.12 | <i>Taraxacum vulgare</i> |
| | | Unlimed | 98.88 | — | 1.12 | <i>Rumex acetosa</i> |
| 19 | Farmyard Dung in 1905 and every fourth year since (omitted 1917) | L.3,150 lb. | 90.67 | 1.34 | 7.99 | <i>Centaurea nigra</i> |
| | | L.570 lb. | 89.70 | 2.40 | 7.90 | <i>Achillea millefolium</i> |
| | | Unlimed | 84.63 | 3.74 | 11.63 | — |
| 20 | Farmyard Dung in 1905 and every fourth year since (omitted 1917); each intervening year Sulphate of Potash, Super., and Nitrate of Soda | L.2772 lb. | 80.05 | 8.25 | 11.70 | — |
| | | L.570 lb. | 94.57 | 0.64 | 4.79 | <i>Achillea millefolium</i> |
| | | Unlimed | 90.81 | 2.49 | 6.70 | <i>Achillea millefolium</i> |

These figures were not available in time for the 1934 Report and are included here for the sake of completeness.

PARK GRASS PLOTS
BOTANICAL COMPOSITION PER CENT. 1937 (1st Crop)

| | Unlimed (U) ; Limed (L) | Plots | 3U | 3L | 7U | 7L | 8U | 8L | 9U | 9L | 10U | 10L | 14U | Sun 14L | Shade 14L |
|-----|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|-----------|
| | <i>Gramineae.</i> | | | | | | | | | | | | | | |
| 1. | Agrostis vulgaris .. | .. | 11.76 | 0.96 | 11.69 | 0.29 | 4.36 | 1.14 | 0.50 | 0.27 | 10.98 | 0.64 | — | — | 0.69 |
| 3. | Alopecurus pratensis .. | .. | 1.64 | 5.25 | 1.44 | 17.05 | 0.49 | 1.76 | 0.32 | 49.93 | 1.02 | 61.84 | 44.76 | 18.73 | 21.66 |
| 4. | Anthoxanthum odoratum .. | .. | 10.25 | 0.67 | 4.78 | 0.05 | 7.32 | 1.24 | 0.19 | 3.18 | 32.96 | 2.33 | — | — | 0.61 |
| 5. | Arrhenatherum avenaceum .. | .. | 0.46 | 0.44 | 2.89 | 17.44 | 10.28 | 25.60 | — | 30.27 | 2.37 | 6.49 | 39.36 | 44.90 | 16.21 |
| 6. | Avena flavescens .. | .. | 0.39 | 2.74 | 1.26 | 2.92 | 1.97 | 4.80 | — | — | — | — | — | 0.54 | 2.34 |
| 7. | Avena pubescens .. | .. | 4.20 | 16.48 | 1.51 | 3.07 | 4.93 | 10.84 | — | — | — | — | 0.04 | 0.41 | 10.05 |
| 8. | Briza media .. | .. | 2.96 | 4.66 | — | — | 0.21 | 0.83 | — | — | — | — | — | — | — |
| 9. | Bromus mollis .. | .. | — | — | — | 0.15 | — | — | — | — | — | — | — | — | 0.52 |
| 10. | Cynosurus cristatus .. | .. | 0.13 | 0.07 | — | — | — | — | — | — | — | — | — | 0.05 | — |
| 11. | Dactylis glomerata .. | .. | 5.25 | 4.51 | 16.34 | 17.00 | 1.34 | 7.23 | — | 9.40 | 0.11 | 0.20 | 3.23 | 3.13 | 1.47 |
| 12. | Festuca ovina .. | .. | 14.45 | 8.06 | 6.98 | 1.70 | 10.42 | 4.90 | — | 1.16 | 1.08 | 19.92 | — | 2.54 | 31.37 |
| 13. | Festuca pratensis .. | .. | — | — | — | — | — | 0.83 | — | — | — | — | — | — | — |
| 14. | Holcus lanatus .. | .. | 5.45 | 5.32 | 10.43 | 0.93 | 14.92 | 3.98 | 98.93 | 2.78 | 51.37 | 0.05 | 0.04 | — | 0.17 |
| 15. | Lolium perenne .. | .. | — | 2.66 | 0.88 | 1.46 | 0.71 | 0.62 | — | — | — | — | — | — | 0.13 |
| 16. | Poa pratensis .. | .. | — | 3.03 | 0.19 | 12.18 | 0.63 | 4.08 | 0.06 | 1.25 | — | 5.45 | 0.50 | 0.59 | 2.60 |
| 17. | Poa trivialis .. | .. | — | — | — | — | — | — | — | — | — | — | 4.69 | 13.33 | 6.50 |
| | <i>Leguminosae</i> | | | | | | | | | | | | | | |
| 1. | Lathyrus pratensis .. | .. | 0.92 | 1.11 | 11.19 | 2.05 | 0.42 | 0.21 | — | — | — | 0.15 | 0.29 | 0.50 | 1.34 |
| 2. | Lotus corniculatus .. | .. | 5.25 | 9.90 | 1.75 | — | 3.94 | 2.99 | — | — | — | — | — | — | — |
| 3. | Ononis arvensis .. | .. | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 4. | Trifolium pratense .. | .. | 1.44 | 3.92 | 7.17 | 3.80 | 9.99 | 10.74 | — | — | — | — | — | — | — |
| 5. | Trifolium repens .. | .. | 0.07 | — | 0.44 | 3.75 | 0.21 | 0.05 | — | — | — | — | — | — | 0.39 |

WHEAT—BROADBALK FIELD, 1937

| Plot. | Manurial Treatment (amounts stated are per acre). | Dressed Grain, bushels per acre (in some cases estimated from half or quarter-bushel). | | | | | Total Grain, cwt. per acre. | | | | | 74-year Average 1852-1925 (prior to fallow), Total Grain, cwt. |
|-------|---|--|--------|--------|--------|------|-----------------------------|--------|--------|--------|------|--|
| | | Mean | | | | | Mean | | | | | |
| | | I | III | IV | V | V | I | III | IV | V | V | |
| 2A | Farmyard Manure (14 tons) | (7.8) | (14.7) | (15.8) | (14.5) | 13.2 | (10.9) | (9.0) | (9.7) | (8.9) | 9.6 | 16.3** |
| 2B | Farmyard Manure (14 tons) | 17.7 | (14.5) | 17.4 | (15.0) | 16.2 | 10.9 | (8.9) | 10.6 | (9.2) | 9.9 | 19.4 |
| 3 | Unmanured since 1839 | 7.6 | 7.5 | (9.3) | (4.3) | 7.2 | 5.4 | 5.2 | (6.7) | (3.1) | 5.1 | 6.7 |
| 5 | Complete Mineral Manure§§ | (11.9) | 7.3 | (6.3) | (6.6) | 8.0 | (8.6) | 5.6 | (4.6) | (4.8) | 5.9 | 7.8 |
| 6 | As 5, and 206 lb. Sulphate of Ammonia | (22.0) | (10.3) | (9.8) | (12.1) | 13.6 | (13.4) | (6.3) | (6.0) | (7.4) | 8.3 | 12.5 |
| 7 | As 5, and 412 lb. Sulphate of Ammonia | (17.6) | 16.8 | 12.7 | 13.3 | 15.1 | (11.0) | 10.4 | 7.8 | 8.5 | 9.4 | 17.6 |
| 8 | As 5, and 618 lb. Sulphate of Ammonia | 22.5 | (21.6) | 20.4 | 18.3 | 20.7 | 13.1 | (13.0) | 12.1 | 11.5 | 12.4 | 20.1 |
| 9 | As 5, and 275 lb. Nitrate of Soda | 19.2 | (16.2) | 12.4 | (13.9) | 15.4 | 11.3 | (9.7) | 7.6 | (8.3) | 9.2 | 13.9†† |
| 10 | 412 lb. Sulphate of Ammonia | 21.2 | (21.4) | 15.3 | (18.5) | 19.1 | 12.5 | (12.8) | 9.2 | (11.1) | 11.4 | 10.9 |
| 11 | As 10, and Superphosphate (3½ cwt.) | 23.7 | (19.0) | (17.2) | 15.0 | 18.7 | 13.5 | (11.4) | (10.3) | 9.2 | 11.1 | 12.3 |
| 12 | As 10, and Super. (3½ cwt.) and Sulph. Soda (366 lb.) | 19.5 | (19.2) | 17.7 | 16.3 | 18.2 | 11.5 | (11.3) | 10.2 | 9.5 | 10.6 | 15.7 |
| 13 | As 10, and Super. (3½ cwt.) and Sulph. Potash (200 lb.) | 21.8 | (14.9) | (14.6) | 14.6 | 16.5 | 13.0 | (9.1) | (8.9) | 9.0 | 10.0 | 17.0 |
| 14 | As 10, and Super. (3½ cwt.) and Sulph. Magnesia (280 lb.) | 18.4 | 18.6 | 17.8 | 21.3 | 19.0 | 11.4 | 11.1 | 10.4 | 12.4 | 11.3 | 15.5 |
| 15 | As 5, and 412 lb. Sulphate Amm. all applied in Autumn | 18.8 | (11.2) | 8.4 | 11.3 | 12.4 | 11.8 | (7.1) | 5.3 | 7.2 | 7.8 | 16.1 |
| 16 | As 5, and 550 lb. Nitrate of Soda | (23.6) | 23.0 | 25.4 | 23.5 | 23.9 | (13.7) | 13.4 | 14.5 | 13.7 | 13.8 | 17.8†† |
| 17 | Minerals alone as 5 or 412 lb. Sulphate of Ammonia | M11.5 | (6.2) | 7.1 | 8.0 | 8.2 | 7.8 | (4.1) | 4.6 | 5.3 | 5.4 | M 8.1* |
| 18 | alone in alternate years | A (22.6) | 20.8 | 20.1 | 21.1 | 21.2 | (13.4) | 12.4 | 11.8 | 12.6 | 12.6 | A 16.1 |
| 19 | Rape Cake (1,889 lb.) | (18.4) | (17.2) | 19.1 | 15.4 | 17.5 | (10.8) | (10.1) | 11.3 | 9.0 | 10.3 | 12.6† |
| 20 | As 7, without Super | (24.3) | — | — | — | 24.3 | (15.2) | — | — | — | 15.2 | 10.3§ |

FOLLOWING ROTATION. After the fallows of 1925-6 to 1928-9 a regular cycle of fallowing was started in the season 1930-1. This cycle and the preceding fallows are shown in the accompanying diagram (C=crop, F=fallow). The sections (I to V) are numbered in order from the upper or western end of the field. Preparatory to the first fallow the field was harvested in five separate sections (1924-5).

For notes, see next page.

The grain from a number of plots was severely damaged by rats in the barn before threshing. After examination of the grain-straw ratios of previous years, it was considered that the grain yields for these plots could reasonably be estimated from the grain-straw ratios of comparable undamaged plots; these estimates are enclosed in brackets.

| Season | Season | | | | | Season |
|---------|--------|----|----|----|---|------------------|
| | I | II | IV | IV | V | |
| 1925-26 | F | F | F | C | C | 1930-31 and 5-6 |
| 1926-27 | F | F | F | C | C | 1931-32 and 6-7 |
| 1927-28 | C | C | F | F | F | 1932-33 and 7-8 |
| 1928-29 | C | C | F | F | F | 1933-34 and 8-9 |
| 1929-30 | C | C | C | C | C | 1934-35 and 9-40 |

WHEAT—BROADBALK FIELD, 1937

| Plot. | Manurial Treatment (amounts stated are per acre). | Bushel Weight in lb. (in some cases estimated from half or quarter-bushel). | | | | | Total Straw†, cwt. per acre. | | | | | 74-year Average 1852-1925 (prior to fallow). Total Straw, cwt. |
|-------|---|---|------|------|------|------|------------------------------|------|------|------|------|--|
| | | Mean | | | | | Mean | | | | | |
| | | I | III | IV | V | | I | III | IV | V | | |
| 2A | Farmyard Manure (14 tons) | 61.0 | 60.0 | 60.8 | 62.0 | 61.0 | 45.3 | 37.4 | 40.5 | 37.1 | 40.1 | 32.1** |
| 2B | Farmyard Manure (14 tons) | 61.2 | 62.0 | 60.8 | 60.4 | 61.1 | 47.1 | 37.1 | 41.8 | 38.4 | 41.1 | 34.2 |
| 3 | Unmanured since 1839 | 63.4 | 61.0 | 61.2 | 61.6 | 61.8 | 29.3 | 16.2 | 23.0 | 10.7 | 19.8 | 9.8 |
| 5 | Complete Mineral Manure§§ | 63.2 | 62.2 | 62.0 | 61.2 | 62.2 | 29.5 | 20.8 | 15.9 | 16.6 | 20.7 | 11.5 |
| 6 | As 5, and 206 lb. Sulphate of Ammonia | — | 62.6 | 61.6 | 61.8 | 62.0 | 53.5 | 25.3 | 24.1 | 29.5 | 33.1 | 20.3 |
| 7 | As 5, and 412 lb. Sulphate of Ammonia | 59.8 | 61.5 | 59.2 | 59.0 | 59.9 | 58.1 | 49.7 | 48.6 | 42.5 | 49.7 | 32.1 |
| 8 | As 5, and 618 lb. Sulphate of Ammonia | 59.1 | 58.9 | 58.7 | 58.4 | 58.8 | 62.9 | 64.9 | 59.5 | 56.7 | 61.0 | 39.8 |
| 9 | As 5, and 275 lb. Nitrate of Soda | 61.3 | — | 61.2 | 60.4 | 61.0 | 42.6 | 37.2 | 31.8 | 31.9 | 35.9 | 24.6†† |
| 10 | 412 lb. Sulphate of Ammonia | 59.9 | 61.2 | 60.5 | 60.4 | 60.5 | 41.7 | 45.6 | 36.5 | 39.8 | 40.9 | 17.8 |
| 11 | As 10, and Superphosphate (3½ cwt.) | 58.8 | 61.0 | 59.3 | 58.9 | 59.5 | 48.2 | 40.6 | 36.7 | 34.6 | 40.0 | 21.4 |
| 12 | As 10, and Super. (3½ cwt.) and Sulph. Soda (366 lb.) | 59.4 | 60.4 | 58.2 | 58.5 | 59.1 | 46.6 | 45.1 | 40.2 | 38.5 | 42.6 | 26.8 |
| 13 | As 10, and Super. (3½ cwt.) and Sulph. Potash (200 lb.) | 60.0 | 61.3 | 60.2 | 60.2 | 60.4 | 55.9 | 45.7 | 44.7 | 50.3 | 49.2 | 30.6 |
| 14 | As 10, and Super. (3½ cwt.) and Sulph. Magnesia (280 lb.) | 59.4 | 61.1 | 58.4 | 59.4 | 59.6 | 48.9 | 56.4 | 40.5 | 42.7 | 47.1 | 26.8 |
| 15 | As 5, and 412 lb. Sulphate Amm. all applied in Autumn | 62.0 | 61.8 | 60.2 | 60.1 | 61.0 | 40.3 | 26.2 | 24.1 | 24.3 | 28.7 | 28.2 |
| 16 | As 5, and 550 lb. Nitrate of Soda | 59.6 | 59.4 | 58.5 | 57.9 | 58.8 | 52.6 | 59.5 | 52.2 | 50.3 | 53.6 | 35.2†† |
| 17 | Minerals alone as 5 or 412 lb. Sulphate of Ammonia | M64.1 | 61.2 | 60.0 | 60.4 | 61.4 | 31.9 | 16.3 | 19.0 | 20.2 | 21.8 | M12.3* |
| 18 | alone in alternate years | A58.8 | 60.9 | 58.9 | 59.8 | 59.6 | 51.7 | 47.3 | 49.9 | 45.5 | 48.6 | A28.1 |
| 19 | Rape Cake (1,889 lb.) | 62.2 | 60.6 | 61.1 | 60.6 | 61.1 | 32.8 | 30.6 | 34.0 | 27.2 | 31.2 | 22.0‡ |
| 20 | As 7, without Super. | 60.0 | — | — | — | 60.0 | 60.9 | — | — | — | 60.9 | 18.6§ |

†Includes straw, cavings, and chaff. *A = Ammonia series. M = Mineral series.

**Twenty-six years only, 1900-25. ††Forty-one years only, 1885-1925. ‡Thirty-three years only, 1893-1925. §Eighteen years only, 1906-1925 (no crop in 1912 and 1914).

§§Complete mineral manure; 3½ cwt. Super., 200 lb. Sulph. Potash, 100 lb. Sulph. Soda, 100 lb. Sulph. Magnesia. Sulphate of Ammonia is applied as to one-third in Autumn and two-thirds in Spring except for Plot 15. Nitrate of Soda is all given in Spring, there being two applications at an interval of a month on Plot 16.

CULTIVATIONS, ETC.—Cropped sections: Ploughed: Sept. 15-24. Dung applied: Sept. 23. Cultivated: Oct. 8. Tractor spring time harrowed: Oct. 15. Tractor disc harrowed dung plots: Oct. 16. Spring time harrowed: Oct. 17. Harrowed: Oct. 20-21. Manures applied: Oct. 6, 7, April 1, 2 and May 10. Seed sown: Oct. 20-21. Variety: Red Standard. Harvested: Aug. 9-11. Fallowed section: Ploughed: Sept. 15-24. Cultivated: Oct. 8. Tractor spring time harrowed: Oct. 15. Tractor disc harrowed: Oct. 16. Tractor rolled and harrowed, then spring time harrowed: Oct. 17. Spring time harrowed: April 2 and 27. Ploughed: May 10. Cultivated: May 27 and Aug. 6. Nitrate of soda applied to plot, 16: May 10.

BARLEY—HOOS FIELD, 1937

| Plot | Manuring (amounts stated are per acre). | Dressed Grain bushels per acre | | Total Grain cwt. per acre | Bushel weight in lb. | Total Straw cwt. per acre† | | |
|------|--|--------------------------------------|-------------------|---------------------------|----------------------|----------------------------|-------------------|-------|
| | | 1937 | Average 1852-1928 | | | 1937 | Average 1852-1928 | |
| 1O | Unmanured | 4.0 | 13.4 | 2.3 | 51.2 | 6.1 | 7.8 | |
| 2O | Superphosphate (3½ cwt.) | 5.5 | 19.0 | 3.0 | 52.1 | 7.1 | 9.8 | |
| 3O | Alkali Salts (see below) | 5.6 | 14.3 | 3.1 | 50.7 | 8.3 | 8.7 | |
| 4O | Super. and Alkali Salts | 8.8 | 19.0 | 5.2 | 51.4 | 16.4 | 11.2 | |
| 5O | Super. and Potash (200 lb.) .. | 5.3 | 15.5 | 2.9 | 50.8 | 4.9 | 9.4 | |
| 1A | As 1O | } and sulphate of ammonia (206 lb.). | 9.2 | 23.7 | 4.6 | 50.6 | 11.0 | 13.7 |
| 2A | As 2O | | 16.8 | 35.8 | | | | |
| 3A | As 3O | | 12.3 | 25.8 | | | | |
| 4A | As 4O | | 20.4 | 39.3 | | | | |
| 5A | As 5O | | 18.9 | 33.8 | | | | |
| 1AA | As 1O | } and nitrate of soda (275 lb.). | 12.5 | 24.3* | 6.7 | 53.5 | 16.9 | 15.4* |
| 2AA | As 2O | | 23.7 | 38.8* | | | | |
| 3AA | As 3O | | 10.6 | 24.5* | | | | |
| 4AA | As 4O | | 18.9 | 37.7* | | | | |
| 1AAS | As 1AA | } and silicate of soda (400 lb.). | 12.7 | 30.2* | 6.6 | 53.8 | 16.3 | 18.2* |
| 2AAS | As 2AA | | 21.6 | 39.7* | | | | |
| 3AAS | As 3AA | | 12.6 | 31.2* | | | | |
| 4AAS | As 4AA | | 17.8 | 39.9* | | | | |
| 1C | As 1O | } and rape cake (1,000 lb.) | 15.6 | 35.5 | 7.9 | 52.8 | 14.7 | 20.6 |
| 2C | As 2O | | 20.4 | 38.1 | | | | |
| 3C | As 3O | | 11.7 | 33.7 | | | | |
| 4C | As 4O | | 19.0 | 37.5 | | | | |
| 7-1 | Dung (14 tons) 1852-71 : afterwards unmanured | 6.0 | 22.5‡ | 3.6 | 52.6 | 13.3 | 13.5‡ | |
| 7-2 | Farmyard Manure (14 tons) | 31.1 | 44.6 | 15.2 | 52.0 | 31.7 | 28.1 | |
| 6-1 | Unmanured | 3.2 | 14.7 | 1.8 | 52.4 | 5.2 | 8.6 | |
| 6-2 | Ashes from Laboratory furnace 1852-1933 : afterwards unmanured | 3.4 | 15.7 | 1.9 | 52.4 | 5.4 | 9.3 | |
| 1N | Nitrate of Soda (275 lb.) | 8.5 | 28.7§ | 4.5 | 52.4 | 10.9 | 17.8§ | |
| 2N | Nitrate of Soda (550 lb., 1852-7, afterwards 275 lb.) | 12.1 | 31.7§§ | 6.2 | 52.6 | 14.5 | 20.0§§ | |

Alkali salts consisted of 200 lb. sulphate of potash, 100 lb. sulphate of soda and 100 lb. sulphate of magnesia.

|| 1 cwt. = 2.15 bushels. In 1912 and 1933 all plots were fallowed.

† Total straw includes straw, cavings and chaff.

* 60 years, 1868-1928. ‡ 56 years, 1872-1928. § 75 years, 1853-1928. §§ 69 years, 1859-1928.

CULTIVATIONS, ETC.—Shallow ploughed : Sept. 11 and 12. Dung applied : Dec. 3. Ploughed : Dec. 4-21. Springtime harrowed : Mar. 30. Cultivated : Mar. 31. Harrowed and rolled : April 1. Harrowed : April 12. Rolled : May 18. Hand weeded : June 4 and 5. Manures applied : Mar. 25, 26 and April 7. Seed sown : April 7 and 12. Variety : Plumage Archer. Harvested : Sept. 4.