ROTHAMSTED RESEARCH

Rothamsted Report for 1938

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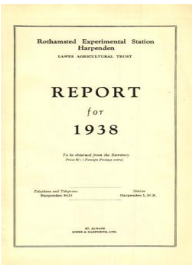

The Classical Experiments

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 Fallow	6 Clover or Beans	3 Fallow	4 Clover or Beans	1 Fallow	2 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), 1936-8								
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
1938	Clover hay ..	cwt.	—	8.3	—	29.1	—	26.4

* 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.—Cropped sections: Seed undersown in barley, May 10, 1937. Variety: Montgomery Red. Digging out docks: May 4. Hand hoed: June 3. Cut: July 2. Fallow sections: Ploughed: Oct. 19. Cultivated: March 10. Spring-tine harrowed: May 5. Rolled May 5. Thistles cut: June 22.

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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 :

W

A	B
1	1
2	2
3	3
4	4

Cropping of strips A and B

C = Crop. F = Fallow.

Year	A1	A2	A3	A4	B1	B2	B3	B4
1932	F	C	C	C	F	F	F	F
1933	F	F	F	F	C	C	F	C
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	F
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.

CULTIVATIONS, ETC.—Cropped sections : Ploughed : Sept. 23-27. Cultivated : Oct. 16. Harrowed : Nov. 6, March 17. Spring-tine harrowed : Oct. 20. Rolled : Oct. 20, March 19. Seed sown : Nov. 6. Variety : Red Standard. Harvested : Aug. 11. Fallow section : Ploughed : Sept. 23-27, June 23. Cultivated : Oct. 16, March 5. Spring-tine harrowed : May 7, June 3. Rolled : May 7, June 3. Thistles cut : June 21, Aug. 15.

PRODUCE PER ACRE, 1938

	A1	A2	A3	*Mean*	*Average 82 years, 1856-1937*
Dressed Grain—bushels	33.0	29.5	30.1	*30.9*	*14.2*
Total Grain—cwt.	19.2	17.0	17.7	*18.0*	*8.1*
Weight per bushel—lb.	63.2	63.1	63.7	*63.3*	*58.9*
Total Straw—cwt.	21.2	19.4	18.9	*19.8*	*12.7*

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MANGOLDS—BARNFIELD, 1938

Roots each year since 1856. **Mangolds each year since 1876.**

PRODUCE PER ACRE

Strip		Strip Manures (Amounts stated are per acre)	1938 Cross Dressings O None	N Nitrate of Soda (550 lb.)	A Sulphate of Ammonia (412 lb.)	AC Sulphate of Ammonia (412 lb.) & Rape Cake (2,000 lb.)	C Rape Cake (2,000 lb.)	56 Year Average, 1876-1937.† Cross Dressings O None	N Nitrate of Soda (550 lb.)	A Sulphate of Ammonia (412 lb.)	AC Sulphate of Ammonia (412 lb.) & Rape Cake (2,000 lb.)	C Rape Cake (2,000 lb.)
			Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Tons
Roots	1	Dung (14 tons)	16.31	26.61	23.05	26.51	23.40	17.41	26.42	21.90	23.64	23.53
	2	Dung, Superphosphate (3½ cwt.), Sulphate of Potash (500 lb.)	14.31	26.76	22.62	27.14	24.49	19.08	27.19	24.91	27.53	26.52
	4	Complete Minerals: Super. and Potash as 2, Sodium Chloride (200 lb.), Sulphate of Magnesia (200 lb.)	3.34	(*a*)17.85** (*b*)17.17	15.57	24.83	19.74	4.69	(*a*)17.86 (*b*)18.77*	14.71	26.04	21.05
	5	Superphosphate (3½ cwt.)	2.61	15.50	4.92	4.81	8.04	4.50	15.09	6.91	9.41	10.13
	6	Super. (3½ cwt.) Sulphate of Potash (500 lb.)	2.56	14.94	12.12	17.66	15.55	4.09	15.55	13.67	22.31	18.15
	7	Super. (3½ cwt.) Sulphate of Magnesia (200 lb.), and Sodium Chloride (200 lb.)	2.19	15.21	14.80	18.61	16.32	4.83	16.51	14.95	22.06	19.25
	8	Unmanured	2.06	7.35	5.00	3.50	4.99	3.35	10.00	5.50	8.54	9.07
	9	Sodium Chloride (200 lb.), Nit. Soda (550 lb.), Sulphate of Potash (500 lb.) and Sulphate of Magnesia (200 lb.)	14.85	—	—	—	—	—	—	—	—	—
Leaves	1	Dung (14 tons)	4.93	7.58	7.43	9.33	8.14	3.10	4.68	4.91	5.24	4.59
	2	Dung, Superphosphate (3½ cwt.), Sulphate of Potash (500 lb.)	5.02	8.66	7.81	9.34	8.01	3.21	5.20	5.43	6.18	4.82
	4	Complete Minerals: Super. and Potash as 2, Sodium Chloride (200 lb.), Sulphate of Magnesia (200 lb.)	1.52	(*a*)5.60 (*b*)5.65	5.29	9.07	5.74	1.07	(*a*)3.89 (*b*)4.12*	2.93	5.26	3.39
	5	Superphosphate (3½ cwt.)	1.33	5.07	3.99	4.16	4.94	1.07	3.22	2.63	3.29	2.88
	6	Super. (3½ cwt.) Sulphate of Potash (500 lb.)	1.23	5.42	4.79	7.42	5.16	0.95	3.11	2.83	5.12	2.92
	7	Super. (3½ cwt.) Sulphate of Magnesia (200 lb.) and Sodium Chloride (200 lb.)	1.23	5.18	4.85	7.93	5.66	1.11	3.40	3.09	5.22	3.39
	8	Unmanured	1.89	4.44	3.75	3.08	3.93	0.99	3.25	2.56	3.31	2.91
	9	Sodium Chloride (200 lb.), Nit. Soda (550 lb.), Sulphate of Potash (500 lb.) and Sulphate of Magnesia (200 lb.)	5.37	—	—	—	—	—	—	—	—	—

** 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.

* 29 years only, 1904-1937, excluding 1908, 1927, 1930, 1931 and 1935. For this period the average yield of plot 4(*a*) was 18.95 for roots and 4.04 for leaves.

CULTIVATIONS, ETC.— Ploughed : Dec. 9-Feb. 4. Dung applied : Dec. 8-9, Jan. 1-3. Cultivated : Mar. 9, 11. Harrowed : May 6. Spring-tine harrowed : Mar. 15, May 4. Rolled : Mar. 15, May 4, 6, 9. Hoed : June 3-4, 17-20, July 1-6, 21-23, Aug. 19-20. Singled : July 12-22. Manures applied : Mar. 24-28, July 26-27. Seed sown : May 6. Variety : Yellow Globe. Lifted : Nov. 8-18.

HAY—THE PARK GRASS PLOTS, 1938

Plot	Manures since 1905	Yield of Hay (cwt. per acre) Not limed 1st Crop	Not limed 2nd Crop ***	Not limed Total	Limed 1st Crop	Limed 2nd Crop ***	Limed Total	Dry Matter (cwt. per acre) Not limed 1st Crop	Not limed 2nd Crop	Not limed Total	Limed 1st Crop	Limed 2nd Crop	Limed Total
1	Sulhhate of ammonia (206 lb.)	0.8	1.3	*2.1*	7.2	1.5	*8.7*	0.7	0.9	*1.6*	5.9	1.2	*7.1*
2	Unmanured	2.8	0.8	*3.6*	4.3	0.3	*4.6*	2.3	0.6	*2.9*	3.5	0.2	*3.7*
3	Unmanured	3.3	0.6	*3.9*	5.2	0.1	*5.3*	2.8	0.5	*3.3*	4.0	0.1	*4.1*
4-1	Superphosphate (3½ cwt.)	3.5	0.9	*4.4*	4.3	0.3	*4.6*	2.7	0.7	*3.4*	3.3	0.2	*3.5*
4-2	As 4-1 and sulphate of ammonia (412 lb.)	3.2	5.6	*8.8*	11.7	6.1	*17.8*	2.5	4.1	*6.6*	9.2	4.2	*13.4*
5-1	Unmanured	2.5	1.7	*4.2*				1.9	1.2	*3.1*			
5-2	Superphosphate (3½ cwt.) and sulphate of potash (500 lb.)	8.0	5.2	*13.2*				6.2	3.9	*10.1*			
6	As 5-2, and sulphate of soda (100 lb.) and sulphate of magnesia (100 lb.)	17.3	7.4	*24.7*				13.6	5.3	*18.9*			
7	As 6	19.8	6.1	*25.9*	15.3	1.9	*17.2*	16.1	4.5	*20.6*	12.0	1.4	*13.4*
8	As 6 without potash	7.5	2.8	*10.3*	4.7	1.1	*5.8*	6.1	2.1	*8.2*	3.9	0.8	*4.7*
9	As 6 and sulphate of ammonia (412 lb.)	10.4	13.8	*24.2*	30.3	7.0	*37.3*	8.0	9.4	*17.4*	24.2	5.0	*29.2*
10	As 8 and sulphate of ammonia (412 lb.)	7.1	8.0	*15.1*	21.6	6.3	*27.9*	5.6	6.0	*11.6*	16.9	4.3	*21.2*
11-1	As 6 and sulphate of ammonia (618 lb.)	8.8	18.7	*27.5*	35.3	9.2	*44.5*	6.8	14.2	*21.0*	29.2	6.7	*35.9*
11-2	As 11-1 and silicate of soda (3½ cwt.)	16.6	22.8	*39.4*	42.7	10.9	*53.6*	12.7	15.9	*28.6*	33.8	8.0	*41.8*
12	Unmanured	4.7	1.2	*5.9*				3.7	0.8	*4.5*			
13	Dung (14 tons) in 1905, fish guano (6 cwt.) in 1907 and every fourth year	18.8	4.4	*23.2*	14.7	2.0	*16.7*	14.9	3.3	*18.2*	11.5	1.6	*13.1*
14	As 6 and nitrate of soda (550 lb.)	43.6	6.3	*49.9*	33.6*	13.9*	*47.5*	34.2	4.9	*39.1*	26.0	10.6	*36.6*
					30.0**	1.8**	*31.8*				23.1	1.3	*24.4*
15	As 6	10.2	4.7	*14.9*	10.3	2.0	*12.3*	8.2	3.5	*11.7*	8.0	1.5	*9.5*
16	As 6 and nitrate of soda (275 lb.)	24.5	5.3	*29.8*	19.5	3.3	*22.8*	19.0	4.0	*23.0*	15.1	2.5	*17.6*
17	Nitrate of soda (275 lb.)	11.1	3.6	*14.7*	7.9	1.5	*9.4*	8.6	2.7	*11.3*	6.4	1.2	*7.6*
18	As 6 (without superphosphate) and sulphate of ammonia (412 lb.)	2.1	0.2	*2.3*	14.8†	0.7†	*15.5*	1.7	0.1	*1.8*	12.1	0.5	*12.6*
					9.7††	1.1††	*10.8*				7.9	0.8	*8.7*
19	Dung every fourth year	16.0	4.6	*20.6*	11.0§	3.5§	*14.5*	13.0	3.5	*16.5*	8.6	2.7	*11.3*
					16.5§§	3.5§§	*20.0*				12.9	2.7	*15.6*
20	As 19 and superphosphate (200 lb.), sulphate of potash (100 lb.) and nitrate of soda (168 lb.) every intervening year	23.7	4.3	*28.0*	14.8‡	1.1‡	*15.9*	19.6	3.3	*22.9*	12.0	0.8	*12.8*
					14.8§§	1.2§§	*16.0*				12.2	0.9	*13.1*

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. §§570 lb. ‡2,772 lb. of lime.

CULTIVATIONS, ETC.—Chain harrowed: Feb. 9. Rolled: April 13. Manures applied: Feb. 9-10, Mar. 17-18, April 8. Cut: 1st Crop, June 23-24: 2nd Crop, Oct. 31-Nov. 2.

PARK GRASS PLOTS

BOTANICAL COMPOSITION PER CENT. 1938 (*1st Crop*)

Plot	Manuring	Liming	Gramineae	Leguminosae	Other orders	"Other orders" consist largely of
3	Unmanured	Limed	36.90	9.64	53.46	*Plantago lanceolata*, *Poterium sanguisorba*, *Leontodon hispidus*
		Unlimed	28.53	4.18	67.29	As 3 limed
7	Complete Mineral Manure	Limed	56.14	20.48	23.38	*Taraxacum vulgare*
		Unlimed	48.01	27.99	24.00	*Centaurea nigra*
8	Mineral Manure (without Potash)	Limed	54.62	6.73	38.65	*Plantago lanceolata*
		Unlimed	33.72	11.12	55.16	*Plantago lanceolata*
9	Complete Mineral Manure and double Amm. Salts	Limed	94.00	2.22	3.78	*Rumex acetosa*
		Unlimed	0.08	99.92	—	—
10	Mineral Manure (without Potash) and double Amm. Salts	Limed	94.47	—	5.53	*Rumex acetosa*
		Unlimed	100.00	—	—	—
14	Complete Mineral Manure and double Nitrate of Soda	Limed (sun)	89.25	2.25	8.50	*Anthriscus sylvestris*
		Limed (shade)	85.54	10.07	4.39	*Anthriscus sylvestris*
		Unlimed	94.15	0.84	5.01	*Anthriscus sylvestris*, *Rumex acetosa*
18	Mineral Manure (without Super.) and double Sulphate Amm., 1905 and since	L.6,788 lb.	76.19	0.17	23.64	*Taraxacum vulgare*
		L.3,951 lb.	73.59	0.16	26.25	*Taraxacum vulgare*
		Unlimed	92.34	0.16	7.50	*Centaurea nigra*
19	Farmyard Dung in 1905 and every fourth year since (omitted 1917)	L.3,150 lb.	75.66	7.63	16.71	*Plantago lanceolata*, *Tragapogon pratensis*
		L.570 lb.	70.90	9.56	19.54	No weed dominant
		Unlimed	68.32	13.54	18.14	*Rumex acetosa*
20	Farmyard Dung in 1905 and every fourth year since (omitted 1917) each intervening year sulphate of Potash, Super., and Nitrate of Soda	L.2,772 lb.	63.37	9.23	27.40	*Ranunculus sp.*
		L.570 lb.	82.79	6.64	10.57	No weed dominant
		Unlimed	80.33	6.20	13.47	No weed dominant

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PARK GRASS PLOTS

BOTANICAL COMPOSITION PER CENT. 1938 (*1st Crop*)

	Unlimed (U); Limed (L) Plots	3U	3L	7U	7L	8U	8L	9U	9L	10U	10L	14U	Sun 14L	Shade 14L
	Gramineae													
1	Agrostis vulgaris	5.86	0.25	6.83	0.05	2.91	0.60	1.74	2.22	9.55	2.01	—	—	0.31
3	Alopecurus pratensis	0.70	1.07	4.59	10.83	0.31	0.40	—	49.28	0.21	51.24	45.14	15.74	10.45
4	Anthoxanthum odoratum	3.07	0.33	1.54	0.05	2.00	0.48	1.04	2.18	14.04	0.80	—	—	0.06
5	Arrhenatherum avenaceum	0.07	1.15	5.10	17.20	14.74	23.67	—	24.29	3.16	6.28	37.34	57.46	17.07
6	Avena flavescens	0.21	1.73	0.84	1.47	1.49	2.88	—	—	—	—	0.09	1.39	1.24
7	Avena pubescens	4.60	20.18	0.66	1.71	2.52	12.46	—	—	—	—	—	0.41	9.28
8	Briza media	1.12	2.31	—	—	0.16	0.96	—	—	—	—	—	—	—
9	Bromus mollis	—	—	0.05	0.34	—	—	—	0.23	—	0.05	—	—	0.12
10	Cynosurus cristatus	—	0.08	—	—	—	—	—	—	—	—	—	—	—
11	Dactylis glomerata	3.42	4.45	23.02	21.75	3.42	5.61	—	11.99	—	—	6.48	2.65	2.23
12	Festuca ovina..	7.88	1.73	2.34	0.64	3.30	1.44	—	0.82	0.12	28.38	0.04	4.54	39.33
13	Festuca pratensis	—	—	—	0.54	0.16	3.00	—	—	—	—	—	—	—
14	Holcus lanatus	1.53	1.73	2.62	0.24	2.32	1.76	97.14	0.58	72.92	0.84	—	—	0.25
15	Lolium perenne	—	0.08	—	—	0.08	0.32	—	—	—	—	—	—	—
16	Poa pratensis	0.07	1.48	0.37	0.39	0.31	0.72	—	2.22	—	4.87	0.49	1.39	2.35
17	Poa trivialis	—	0.33	0.05	0.93	—	0.32	—	0.19	—	—	4.57	5.67	2.85
	Leguminosae.													
1	Lathyrus pratensis	0.49	1.32	10.72	8.13	0.12	0.12	—	2.22	—	—	0.84	2.25	9.15
2	Lotus corniculatus	2.23	3.87	2.29	—	2.16	1.24	—	—	—	—	—	—	—
3	Ononis arvensis	—	—	—	—	—	—	—	—	—	—	—	—	—
4	Trifolium pratense	1.46	4.45	14.51	8.23	8.80	5.37	—	—	—	—	—	—	0.12
5	Trifolium repens	—	—	0.47	4.12	0.04	—	—	—	—	—	—	—	0.80

PARK GRASS PLOTS

BOTANICAL COMPOSITION PER CENT. 1938 (*1st Crop*)

(*Continued*)

	Unlimed (U); Limed (L) Plots	3U	3L	7U	7L	8U	8L	9U	9L	10U	10L	14U	Sun 14L	Shade 14L
	Other Orders.													
1	Ranunculus acris	—	5.27	0.75	2.79	3.69	1.56	—	—	—	—	—	—	—
2	Ranunculus bulbosus													
4	Cerastium vulgatum	—	—	—	0.05	0.04	0.08	—	—	—	—	—	—	—
5	Stellaria graminea	—	—	—	—	—	—	—	—	—	—	—	—	—
6	Linum catharticum	—	—	—	—	—	—	—	—	—	—	—	—	—
7	Agrimonia eupatoria	—	—	—	—	—	—	—	—	—	—	—	—	—
11	Poterium sanguisorba	18.06	12.69	—	—	—	—	—	—	—	—	—	—	—
13	Anthriscus sylvestris	—	—	—	0.39	—	—	—	—	—	—	2.48	6.48	3.65
14	Conopodium denudatum	0.63	0.17	0.51	0.05	0.47	—	—	—	—	—	—	—	—
15	Heracleum sphondylium	—	0.08	2.29	4.61	—	—	—	0.16	—	—	—	—	—
16	Pimpinella saxifraga	0.21	0.16	—	0.05	0.31	0.28	—	—	—	—	—	—	—
17	Galium verum	—	—	—	—	0.31	0.04	—	—	—	—	—	—	—
18	Scabiosa arvensis	0.28	3.21	—	—	0.98	3.53	—	—	—	—	—	—	—
19	Achillea millefolium	0.90	0.33	1.73	0.20	2.00	0.72	—	—	—	—	—	—	—
20	Centaurea nigra	4.39	1.07	8.05	3.14	4.56	3.49	—	—	—	—	—	—	—
22	Hieraceum pilosella	—	—	—	—	—	—	—	—	—	—	—	—	—
24	Leontodon hispidus	17.29	11.70	—	—	3.97	3.20	—	—	—	—	—	—	—
26	Taraxacum vulgare	0.14	0.08	0.05	7.69	0.08	0.20	—	1.44	—	—	0.27	0.81	0.62
27	Tragopogon pratensis	0.28	—	0.19	0.64	0.08	—	—	—	—	—	—	—	—
29	Plantago lanceolata	24.41	16.64	2.71	0.88	33.40	17.58	0.08	—	—	—	—	—	—
30	Veronica chamaedrys	0.14	0.08	—	0.05	0.08	0.36	—	—	—	—	—	—	—
31	Ajuga reptans	—	—	—	—	—	—	—	—	—	—	—	—	—
32	Prunella vulgaris	—	—	—	—	—	—	—	—	—	—	—	—	—
34	Rumex acetosa	0.14	1.73	4.68	2.84	3.11	7.41	—	2.18	—	5.53	2.26	1.21	0.12
35	Luzula campestris	0.14	0.17	0.14	—	0.12	0.04	—	—	—	—	—	—	—
36	Carex praecox	0.28	—	—	—	—	—	—	—	—	—	—	—	—
23	Hypochoeris radicata	—	—	—	—	1.96	0.04	—	—	—	—	—	—	—
12	Spiraea ulmaria	—	0.08	2.90	—	—	0.12	—	—	—	—	—	—	—

WHEAT—BROADBALK FIELD, 1938

Plot	Manurial Treatment (amounts stated are per acre).	Dressed Grain, bushels per acre					Total Grain, cwt. per acre					*74-year Average 1852-1925 (prior to fallow). Total Grain, cwt.*
		I	II	III	IV	*Mean*	I	II	III.	IV	*Mean*	
2A	Farmyard Manure (14 tons)	39.1	72.2	53.1	38.2	*50.7*	23.3	43.1	30.8	23.0	*30.0*	*16.3***
2B	Farmyard Manure (14 tons)	67.6	74.0	58.8	39.1	*59.9*	40.0	44.6	34.2	23.6	*35.6*	*19.4*
3	Unmanured since 1839	18.6	39.0	21.3	19.7	*24.6*	11.0	22.5	12.4	11.7	*14.4*	*6.7*
5	Complete Mineral Manure§§	37.2	50.5	24.1	23.9	*33.9*	21.9	30.1	14.2	14.1	*20.1*	*7.8*
6	As 5, and 2 cwt. Sulphate of Ammonia	36.6	56.6	33.2	34.4	*40.2*	22.0	32.8	19.1	20.4	*23.6*	*12.5*
7	As 5, and 4 cwt. Sulphate of Ammonia	46.4	58.4	47.3	42.0	*48.5*	28.2	34.1	27.3	24.9	*28.6*	*17.6*
8	As 5, and 6 cwt. Sulphate of Ammonia	54.5	65.2	56.4	47.5	*55.9*	33.1	38.4	32.9	28.6	*33.2*	*20.1*
9	As 5, and 275 lb. Nitrate of Soda	36.2	60.1	36.2	36.8	*42.3*	21.6	35.0	21.0	22.0	*24.9*	*13.9*††
10	2 cwt. Sulphate of Ammonia	41.2	42.5	34.8	27.4	*36.5*	24.2	25.3	20.4	16.3	*21.6*	*10.9*
11	As 10, and Superphosphate (3½ cwt.)	41.4	42.2	35.0	27.5	*36.5*	24.4	25.0	20.4	16.3	*21.5*	*12.3*
12	As 11, and Sulph. Soda (366 lb.)	42.8	48.7	41.2	39.3	*43.0*	25.5	29.2	24.0	22.9	*25.4*	*15.7*
13	As 11, and Sulph. Potash (200 lb.)	41.8	58.2	38.8	42.5	*45.3*	24.8	34.8	22.6	25.3	*26.9*	*17.0*
14	As 11, and Sulph. Magnesia (280 lb.)	40.8	44.2	37.2	37.0	*39.8*	24.2	26.0	22.1	22.3	*23.7*	*15.5*
15	As 5, and 2 cwt. Sulph. Amm. applied in Autumn	43.2	57.6	44.8	49.3	*48.7*	25.6	33.9	26.2	29.2	*28.7*	*16.1*
16	As 5, and 550 lb. Nitrate of Soda	48.5	61.1	48.9	48.3	*51.7*	29.0	36.3	28.5	28.6	*30.6*	*17.8*††
17	Minerals alone as 5 or 412 lb. Sulphate of Ammonia	A 37.8	57.0	43.2	46.5	*46.1*	22.5	33.8	25.2	27.6	*27.3*	A*16.1*
18	alone in alternate years	M 19.9	47.1	17.1	23.3	*26.9*	11.8	27.6	10.2	13.8	*15.8*	M *8.1**
9	Rape Cake (1,889 lb.)	39.3	57.5	34.8	39.5	*42.8*	23.4	34.0	20.5	23.4	*25.3*	*12.6*‡
20	As 7, without Super.	36.0	43.4	—	—	*39.7*	21.3	25.6	—	—	*23.5*	*10.3*§

FALLOWING 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.

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

WHEAT—BROADBALK FIELD, 1938

Plot	Manurial Treatment (amounts stated are per acre).	Bushel Weight in lb.					Total Straw†, cwt. per acre					*74-year Average 1852-1925 (prior to fallow). Total Straw, cwt.*
		I	II	III	IV	*Mean*	I	II	III	IV	*Mean*	
2A	Farmyard Manure (14 tons)	63.5	64.7	63.2	64.3	*63.9*	46.1	61.5	48.2	41.0	*49.2*	*32.1***
2B	Farmyard Manure (14 tons)	64.3	65.0	63.3	64.4	*64.2*	48.3	64.1	51.0	41.8	*51.3*	*34.2*
3	Unmanured since 1839	63.2	62.8	62.9	63.1	*63.0*	12.5	25.6	13.1	12.9	*16.0*	*9.8*
5	Complete Mineral Manure§§	63.6	64.7	63.2	63.2	*63.7*	27.2	37.3	14.8	16.1	*23.9*	*11.5*
6	As 5, and 2 cwt. Sulphate of Ammonia	64.0	63.5	62.4	63.7	*63.4*	27.7	40.8	24.2	22.6	*28.8*	*20.3*
7	As 5, and 4 cwt. Sulphate of Ammonia	64.3	63.8	62.8	63.8	*63.7*	36.5	44.6	35.0	31.8	*37.0*	*32.1*
8	As 5, and 6 cwt. Sulphate of Ammonia	64.4	64.3	63.5	64.2	*64.1*	48.2	52.2	43.4	43.1	*46.7*	*39.8*
9	As 5, and 275 lb. Nitrate of Soda	63.5	63.6	62.4	63.7	*63.3*	28.3	43.5	26.3	26.4	*31.1*	*24.6*††
10	2 cwt. Sulphate of Ammonia	63.4	63.9	62.9	61.9	*63.0*	27.2	26.2	20.7	17.9	*23.0*	*17.8*
11	As 10, and Superphosphate (3½ cwt.)	62.8	62.9	62.5	61.9	*62.5*	29.4	28.2	21.0	16.5	*23.8*	*21.4*
12	As 11, and Sulph Soda (366 lb.)	63.2	63.4	62.5	62.5	*62.9*	31.8	35.2	21.5	26.1	*28.7*	*26.8*
13	As 11, and Sulph. Potash (200 lb.)	63.5	64.3	62.8	63.9	*63.6*	34.4	47.0	29.9	31.9	*35.8*	*30.6*
14	As 11, and Sulph. Magnesia (280 lb.)	63.5	63.2	63.7	64.2	*63.6*	30.2	32.5	25.5	25.6	*28.4*	*26.8*
15	As 5, and 2 cwt. Sulph. Amm. applied in Autumn	63.4	64.2	63.5	63.9	*63.8*	36.1	45.4	34.9	39.0	*38.8*	*28.2*
16	As 5, and 550 lb. Nitrate of Soda	64.2	64.8	63.0	63.8	*64.0*	38.3	47.2	35.2	34.5	*38.8*	*35.2*††
17	Minerals alone as 5 or 2 cwt. Sulphate of Ammonia	A 64.2	64.6	63.3	64.4	*64.1*	28.7	41.6	30.3	31.6	*33.0*	A*28.1*
18	alone in alternate years	M62.8	63.8	63.4	63.4	*63.4*	14.5	32.4	12.5	16.1	*18.9*	M*12.3*
19	Rape Cake (1,889 lb.)	63.8	64.1	62.5	63.4	*63.4*	32.6	38.7	27.1	32.0	*32.6*	*22.0*‡
20	As 7, without Super.	64.0	64.0	—	—	*64.0*	28.6	31.9	—	—	*30.3*	*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. One cwt. per acre of Sulphate of Ammonia is applied in autumn and the remainder of the dressing 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. Minerals are always applied in autumn.

Note : There have been errors in the quantities of Sulphate of Ammonia in the Reports 1927-1937; see Errata, page 211.

CULTIVATIONS, ETC.—Cropped sections: Ploughed: Sept. 6-29. Dung applied: Sept. 22. Cultivated: Oct. 14-16. Harrowed: Nov. 4-6, Mar. 15. Spring-tine harrowed: Oct. 19. Rolled: Oct. 19, Mar. 16. Manures applied: Oct. 12-14, Mar. 11, April 7. Seed sown: Nov. 4-6. Variety: Red Standard. Harvested: Aug. 5. Fallow section: Ploughed: Sept. 6-29, June 7-11. Cultivated: Oct. 14-16. Spring-tine harrowed: Oct. 19, Mar. 5 April 2, May 5, Aug. 15. Rolled: Oct. 19, May 5.

BARLEY—HOOS FIELD, 1938

Plot	Manuring (amounts stated are per acre).	Dressed Grain bushels per acre 1938	Dressed Grain bushels per acre *Average 1852-1928*	Total Grain cwt. per acre	Bushel weight in lb.	Total Straw cwt. per acre† 1938	Total Straw cwt. per acre† *Average 1852-1928*
1O	Unmanured	19.7	*13.4*	10.1	55.8	8.2	*7.8*
2O	Superphosphate (3½ cwt.)	25.0	*19.0*	12.8	55.5	9.1	*9.8*
3O	Alkali Salts (see below)	23.9	*14.3*	12.1	55.2	10.4	*8.7*
4O	Super. and Alkali Salts	28.6	*19.0*	14.6	55.8	11.9	*11.2*
5O	Super. and Potash (200 lb.)	18.7	*15.5*	9.6	55.2	9.5	*9.4*
1A	As 1O	27.4	*23.7*	14.2	56.0	12.0	*13.7*
2A	As 2O and sulphate	34.9	*35.8*	17.0	51.8	13.3	*20.4*
3A	As 3O of ammonia	32.7	*25.8*	16.4	54.7	14.9	*16.0*
4A	As 4O (206 lb.).	34.1	*39.3*	18.4	57.3	14.5	*23.6*
5A	As 5O	37.8	*33.8*	19.7	56.6	17.6	*21.7*
1AA	As 1O	33.0	*24.3**	17.6	56.8	16.2	*15.4**
2AA	As 2O and nitrate of	46.4	*38.8**	23.3	55.0	17.5	*23.1**
3AA	As 3O soda (275 lb.).	37.4	*24.5**	19.5	56.4	17.6	*16.6**
4AA	As 4O	44.5	*37.7**	23.0	56.8	19.6	*23.6**
1AAS	As 1AA	36.9	*30.2**	19.4	57.3	19.5	*18.2**
2AAS	As 2AA and silicate of	44.9	*39.7**	23.3	55.9	19.1	*23.9**
3AAS	As 3AA soda (400 lb.).	38.4	*31.2**	19.7	55.9	18.0	*19.9**
4AAS	As 4AA	43.8	*39.9**	22.8	56.9	20.4	*25.4**
1C	As 1O	41.4	*35.5*	21.7	57.2	17.4	*20.6*
2C	As 2O and rape	43.6	*38.1*	22.6	56.4	17.9	*22.0*
3C	As 3O cake (1,000 lb.).	34.8	*33.7*	17.9	56.1	16.0	*20.4*
4C	As 4O	37.6	*37.5*	19.4	56.5	16.4	*22.6*
7-1	Dung (14 tons) 1852-71 : afterwards unmanured	33.8	*22.5‡*	17.4	56.3	14.0	*13.5‡*
7-2	Farmyard Manure (14 tons)	75.8	*44.6*	39.4	57.2	33.8	*28.1*
6-1	Unmanured	25.9	*14.7*	13.0	55.1	10.8	*8.6*
6-2	Ashes from Laboratory furnace 1852-1933 : afterwards unmanured	23.5	*15.7*	12.2	56.0	10.3	*9.3*
1N	Nitrate of Soda (275 lb.)	32.5	*28.7§*	16.9	55.6	15.4	*17.8§*
2N	Nitrate of Soda (550 lb., 1852-7, afterwards 275 lb.)	38.8	*31.7§§*	20.3	56.9	18.1	*20.0§§*

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

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.—Ploughed : Jan. 1-25. Dung applied : Jan. 4. Cultivated : Oct. 1-4, Feb. 23. Harrowed : Feb. 25. Spring-tine harrowed : Feb. 25. Rolled : Feb. 25, Apr. 8. Manures applied : Feb. 8-9. Seed sown : Feb. 25. Variety : Plumage Archer. Harvested : Aug. 4.

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