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Report for 1930

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The Classical Experiments

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DATES OF SOWING AND HARVESTING, AND YIELD PER ACRE, 1930

Field.	Crop.	Variety.	Principal Cultivations and Dates.	Manuring, cwt. per acre.	Sowing Dates.	Cutting Dates.	Carting Dates.	Yield per acre.
<i>I. Arable and Modern Experiments—</i> Pastures (1) (2)	Forage	Beans, Tares and Rye	Sept. 9-19 plough, 23 harrow, 24 and 25 drill and harrow in.	(1) Six course ro- tation expt. see p. 133	Sept. 24-25	—	—	see p. 133
	Forage		Ploughed part of field after forage May 14-15, Harrow and drill Kale May 17 and roll. Re- drilled and rerolled June 4.	(2) Com- mercial forage 14 tons FYM 1 N/Soda	Forage 24-25 Sept.	Folded off by sheep	—	—
(3)	Kale	Marrow Stem Thousand- Head	June 4 and 5 plough, and harrow rest of field, sow Kale harrow, drill, roll. June 21 drill and roll again where failed	(3) Kale 1 N/Soda, 3 S/Amm. 4 M/Pot. and 1½ Super.	Kale May 17- June 21	Kale con- sumed Dec.- Feb.	—	18 tons
Gt. Harpenden	Forage Seeds	see p. 142 Ital. Rye Grass Broad Red Clover	see p. 142	— — 1½ S/Amm. 1 M/Pot. 3 Super. 1½ S/Amm. later	— —	June 16-23	June 27- 30	see p. 142 2 tons
Little Hoos	Winter Oats	Grey Winter	Aug. 29-Sept. 7, 1929 tractor plough and cultivate, do. Sept. 14-16, drill and harrow Sept. 19, roll Mar. 25	1 S/Amm., 3 Super. and 1 M/Pot. (early spring) 1 S/Amm later	Sept. 14-16	July 19-25	Aug. 9-12	22 cwt.
Broad Baulk Fosters	Mangolds Wheat One year Seeds	see p. 149 Million 16lb. Ital. Rye Grass 12lb. Broad Red Clover	see p. 149 July 4-15, 1929, tractor plough clover stubble. Sept. 18-19 use thistle bar (tractor). Sept. 24 cultivate, 26 harrow for seed bed. Sept. 27 drill, 28 harrow in. Undersown with seeds April 10 and 11	— 1 S/Amm. 1 M/Pot. and 3 Super.	Sept. 27 Seeds April 10 and 11	Aug. 6-7	Aug. 18- 19	see p. 149 18 cwt.

DATES OF SOWING AND HARVESTING, AND YIELD PER ACRE, 1930 (Contd.)

Field.	Crop.	Variety.	Principal Cultivations and Dates.	Manuring, cwt. per acre.	Sowing Dates.	Cutting Dates.	Carting Dates.	Yield per acre.
Great Knott	Wheat	Million	Ploughed in mustard June 22-29, 1929. Aug. 28 disc harrow and harrow behind. Reploughed Sept. 13-19. Horse harrow and drill, tractor harrow in. See also p. 138	Basal 1 S/Amm. 1 Pot. Salts 2½ Super. 1 S/Amm.	Sept. 20-21	Aug. 7-14	Aug. 19-21	see p. 138
Long Hoos (1)	Winter Oats	Grey Winter	Sept. 28 and 30, 1929, tractor plough. Sept. 30 tractor harrow. Drill Oct. 1, harrow after. Rye Sown Sept. 26-30	1½ cwt. S/Amm. in two dressings	Oct 1	July 26	—	22 cwt.
(2)	Forage and Mustard	Tares, Beans and Oats	Sept. 27, 1929 cultivate. Mar. 7-10, 1930 plough in dung. Mar. 13 harrow and drill forage. May 28 plough in forage, 29 harrow across. May 30 drill Kale, roll before and after. June 11, re-drill Kale, disc harrow in front, flat roll behind failed. July 11, sow mustard. Sept. 2-10 sheep penned on mustard. Rye sown Sept. 26-30	Dung 10-12 tons approx.	—	—	—	—
Long Hoos (3)	Wheat		see p. 135					see p. 135
(4)	Seeds		Rye Sown Sept. 26-30.					see p. 132
(5)	Barley		{ Six course rotation expt.,					see p. 132
(6)	Potatoes and Sugar Beet		{ see p. 132 Potatoes, see p. 133 Sugar Beet, see p. 132					see p. 133
II. Grassland— Gt. Harpenden	Grazing, then Hay New perm. grass	see 1927-8 Report see 1927-8 Report	Mar. 26 tractor harrow and roll	8 basic slag & 1 S/Amm.	—	June 12-13	June 19- July 9	1 ton
Fosters Corners	Grazing	see 1927-8 Report	—	—	—	—	—	—
Great Knott	Grazing	see 1927-8 Report	—	—	—	—	—	—

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DATES OF SOWING AND HARVESTING, AND YIELD PER ACRE, 1930 (Contd.)

Field.	Crop.	Variety.	Principal Cultivations and Dates.	Manuring, cwt. per Acre.	Sowing Dates.	Cutting Dates.	Carting Dates.	Yield per acre.
Great Field	Grazing	—	Mar. 28-29, tractor harrow and roll. July 6-7 topped	2 acre hockey pitch 10-12 tons Dung, 1 S/ Amm., small paddock 1 S/Amm.	—	—	—	—
Little Knott	$\frac{1}{2}$ Grazing $\frac{1}{2}$ Hay (after early Grazing)	—	—	Liquid Manure	—	July 8-9	July 17	25 cwt.
New Zealand	Grazing	—	Mar. 25 tractor harrow and roll	$1\frac{1}{2}$ S/Amm. Autumn and 1 S/Amm. Spring	—	—	—	—
Stackyard	Grazing	—	Mar. 25 tractor harrow and roll July 8 topped	$1\frac{1}{2}$ S/Amm. and 1 S/Amm. Spring	—	—	—	—
West Barnfield	Hay after early Grazing	—	April 25-28 chain harrow, April 29-30 horse roll	5 Basic Slag and 1 S/Amm.	—	June 10-11	June 17-20	28 cwt.
Sawyers E	Hay after early Grazing	—	—	2 N/Soda	—	June 6	June 14-18	30 cwt.
" W	4 acres Hay rest Grazing	—	—	1 S/Amm. on 14 acres, 1 M/Amm.	—	June 18	June 25- July 1	—
" NW	Grazing	—	Topped July 4-10	Autumn on 8 acres, 1 S/Amm. Spring on 16 acres	—	—	—	—

DATES OF SOWING AND HARVESTING, AND YIELD PER ACRE, 1930 (Contd.)

Field.	Crop.	Variety.	Principal Cultivations and Dates.	Manuring, cwt. per acre.	Sowing Dates.	Cutting Dates.	Carting Dates.	Yield per acre.
III. Classical Experiments— Broadbalk	Wheat	Red Standard	Sept. 5 and 6, 1929 tractor cultivate across. Sept. 20 ditto, thistle bar attached. Oct. 1-8 plough. Oct. 14 and 15 harrow (tractor). 16 harrow in seed. Feb. 21 chain harrow I and II. April 23 harrow I and II across. 29 harrow whole field across. May 2 chain harrow I and II across and tooth harrow III, IV and V lengthwise Feb. 19 cultivate. 20-21 cultivate across. 25 and 27-Mar. 3 plough. 3-4 spring tined harrows followed by tooth harrows across. 6 roll, drag harrows, and spike harrows. 7 harrow in seed. May 1 harrow. Horse and hand hoe May 22-July 9	see pp. 122-3	Oct. 15	Aug. 18	Aug. 27-30	see pp. 122-3
Hoos	Barley	Plumage Archer Spratt Archer		see p. 124	Mar. 6	Aug. 21 and Sept. 1	Sept. 8 and 9	see p. 124
Barnfield	Four Course Rotation Mangolds	see pp. 130-1 Prize Winner Yellow Globe	Nov. 15, 1929 and Jan. 16-17 plough. Mar. 31-April 3 steam tackle. April 15-17 drag harrow. 23-28 horse roll. 29-May 1 applied manures and cultivate across 1 and 2 cultivate down. 9 and 10 tractor disc harrow, followed by roll down. 10 drill. 19-20 ring roll Oct. 14 and 15 tractor plough. 31 disc harrow tractor. Nov. 1 harrow in wheat seed	see p. 120	May 10	—	Oct. 29- Nov. 10	see pp. 130-1 see p. 120
Agdell	Clover and Fallow	—		see p. 119	—	July 5 1st crop, Oct 8 2nd crop	July 10 1st crop. Oct. 13 2nd crop	see p. 119
Park	Hay	—	Mar. 14 drag harrow. April 1 roll horses	see p. 121	—	June 26-28 1st crop Oct. 17-21 2nd crop	July 2-4 1st crop Oct. 22-24 2nd crop	see p. 121

CROP YIELDS ON THE EXPERIMENTAL PLOTS

Notes.—In each case the year refers to the harvest, *e.g.*, Wheat 1930 means wheat harvested in 1930. In the tables, total straw includes straw, cavings and chaff. These were weighed separately prior to 1928. Since 1928 the figure given as total straw in the replicated experiments has been arrived at as the difference: total sheaf weight—weight of grain.

CONVERSION TABLE.

1 acre =	0.405 Hectare	0.963 Feddan.
1 bushel (Imperial) .. =	0.364 Hectolitre (36.364 litres)	0.184 Ardeb.
1 lb. (pound avoirdupois) =	0.453 Kilogramme	1.009 Rotls.
1 cwt. (hundredweight, 112 lb.) =	50.8 Kilogrammes	}
1 ton (20 cwt. or 2,240 lb.) =	1016 Kilogrammes.	
1 metric quintal or Doppel Zentner (dz.) .. =	100.0 Kilogrammes.	1.366 Maunds.
1 bushel per acre .. =	0.9 Hectolitre per Hectare ..	0.191 Ardeb per Feddan
1 lb. per acre .. =	1.12 Kilogramme per Hectare	1.049 Rotls per Feddan
1 cwt. per acre .. =	1.256 dz. per Hectare ..	117.4 Rotls per Feddan
1 ton per acre .. =	25.12 dz. per Hectare.	
1 dz. per Hectare .. =	0.796 cwt. per acre.	
1 kg. per Hectare .. =	0.892 lb. per acre	

In America the Winchester bushel is used = 35.236 litres. 1 English bushel = 1.032 American bushels.

CONVERSION TABLE.—CWT. TO BUSHELS.

Crop.	Cwt.									
	1	2	3	4	5	10	15	20	25	30
Wheat (60 lb.) bushels ..	1.87	3.73	5.60	7.47	9.33	18.67	28.00	37.33	46.67	56.00
Barley (52 lb.)	2.15	4.31	6.46	8.62	10.77	21.54	32.31	43.08	53.85	64.62
Oats (42 lb.)	2.67	5.33	8.00	10.67	13.33	26.67	40.00	53.33	66.67	80.00

The yields of grain in the 1925-26 Report were given for the replicated experiments in standard bushels of 60, 52 and 42 lb. respectively.

Average Wheat Yield of Various Countries.

Country.	Mean yield per acre, 1919-27. cwt.	Country.	Mean yield per acre, 1919-27. cwt.
Great Britain.. ..	17.4	Denmark	22.5
England	17.3	Argentina	6.6
Hertfordshire	16.3	Australia	6.6
France	10.8	Canada	8.6
Germany	14.1	United States.. ..	7.5
Belgium	20.0	U.R.S.S. (Europe and Asia)*	5.7

Note.—Figures for Great Britain, England and Hertfordshire are taken from the Ministry of Agriculture's "Agricultural Statistics," Vol. 62. Other figures from "International Year Book of Agricultural Statistics," 1922-28.
*1924-27.

METEOROLOGICAL RECORDS, 1930

	Rain.		Drainage through soil.			Bright Sun-shine.	Temperature (Mean).				
	Total Fall 1/1000th Acre Gauge.	No. of Rainy Days (0.01 inch or more) 1/1000th Acre. Gauge.	20 ins. deep.	40 ins. deep.	60 ins. deep.		Max.	Min.	1 ft. in ground	Solar Max.	Grass Min.
1930.	Inches.	No.	Inches.	Inches.	Inches.	Hours.	°F.	°F.	°F.	°F.	°F.
Jan. ..	3.247	18	3.016	3.084	2.911	48.8	46.3	36.4	40.2	68.4	32.8
Feb. ..	0.855	9	0.612	0.735	0.699	59.1	40.0	32.8	37.0	75.7	30.1
Mar. ..	1.451	10	0.712	0.753	0.706	123.5	48.1	34.3	39.9	99.5	30.2
April ..	2.308	15	0.858	0.964	0.886	114.8	52.2	39.7	45.2	104.5	36.3
May ..	2.904	18	0.531	0.587	0.561	166.3	58.2	44.5	51.7	119.9	40.8
June ..	0.939	4	0.116	0.148	0.145	242.6	68.0	50.3	59.7	129.1	45.9
July ..	2.321	14	0.233	0.183	0.212	194.6	66.1	52.0	61.4	129.3	47.6
Aug. ..	2.719	14	0.624	0.671	0.653	226.0	68.3	52.7	60.0	129.8	48.2
Sept. ..	3.498	17	1.694	1.710	1.669	125.0	62.3	50.8	58.2	114.9	47.4
Oct. ..	1.244	17	0.187	0.220	0.206	134.9	56.7	44.4	50.5	105.6	39.4
Nov. ..	5.114	19	4.354	4.476	4.339	76.6	48.6	36.3	43.5	78.1	32.8
Dec. ..	2.855	19	2.535	2.680	2.619	31.2	42.9	33.7	39.7	58.5	31.3
Total or Mean	29.455	174	15.472	16.211	15.606	1543.4	54.8	42.3	48.9	101.1	38.6

RAIN AND DRAINAGE.

MONTHLY MEAN FOR 60 HARVEST YEARS, 1870-1—1929-30.

	Rain-fall.	Drainage.			Drainage % of Rainfall.			Evaporation.		
		20-in. Gauge.	40-in. Gauge.	60-in. Gauge.	20-in. Gauge.	40-in. Gauge.	60-in. Gauge.	20-in. Gauge.	40-in. Gauge.	60-in. Gauge.
	Ins.	Ins.	Ins.	Ins.	%	%	%	Ins.	Ins.	Ins.
Sept. ..	2.363	0.804	0.779	0.717	34.0	33.0	30.3	1.559	1.584	1.646
Oct. ..	3.171	1.818	1.786	1.653	57.3	56.3	52.1	1.353	1.385	1.518
Nov. ..	2.844	2.168	2.223	2.094	76.2	78.2	73.6	0.676	0.621	0.750
Dec. ..	2.871	2.450	2.551	2.434	85.3	88.9	84.8	0.421	0.320	0.437
Jan. ..	2.422	1.987	2.183	2.082	82.0	90.1	86.0	0.435	0.239	0.340
Feb. ..	2.031	1.517	1.630	1.556	74.7	80.3	76.6	0.514	0.401	0.475
March ..	1.997	1.064	1.193	1.128	53.3	59.7	56.5	0.933	0.804	0.869
April ..	2.028	0.659	0.739	0.703	32.5	36.4	34.7	1.369	1.289	1.325
May ..	2.061	0.476	0.544	0.510	23.1	26.4	24.7	1.585	1.517	1.551
June ..	2.224	0.540	0.569	0.548	24.3	25.6	24.6	1.684	1.655	1.676
July ..	2.719	0.716	0.743	0.692	26.3	27.3	25.5	2.003	1.976	2.027
Aug. ..	2.649	0.702	0.715	0.671	26.5	27.0	25.3	1.947	1.934	1.978
Year ..	29.380	14.901	15.655	14.788	50.7	53.3	50.3	14.479	13.725	14.592

Area of each gauge 1/1000th acre.

CHEMICAL ANALYSES OF FERTILISERS USED IN REPLICATED EXPERIMENTS

Fertilisers.	%N.	% Water Sol. P ₂ O ₅	Citric Acid Sol. P ₂ O ₅	% Total P ₂ O ₅	% K ₂ O	%Cl.
Sulphate of Ammonia	20.9	—	—	—	—	—
Muriate of Ammonia	26.0	—	—	—	—	—
Nitrate of Soda	16.0	—	—	—	—	—
Urea	45.8	—	—	—	—	—
Cyanamide	19.6	—	—	—	—	—
Dried Blood	10.4	—	—	0.52	—	—
Superphosphate	—	16.4	—	17.4	—	—
Basic Slag—High Sol	—	—	96.5	14.9	—	—
Basic Slag—Low Sol	—	—	23.0	15.1	—	—
Ground Mineral Phosphate	—	—	—	25.9	—	—
Steamed Bone Flour	—	—	—	29.2	—	—
Sulphate of Potash	—	—	—	—	48.9	—
Muriate of Potash	—	—	—	—	51.3	49.3
Potash Manure Salts (30%)	—	—	—	—	30.9	50.9
Potash Mineral	—	—	—	—	16.2	—
Agricultural Salt	—	—	—	—	—	56.5
Magnesium Sulphate	—	—	—	—	14.1	—
					(MgO)	

SOIL DATA FOR ROTHAMSTED. ROTHAMSTED SOIL—MECHANICAL ANALYSES.

Diameter mm.	Great Harpenden.	Barnfield profile.				Broadbalk. Plot 14 : 8
	0-10 cm.	0-19 cm.	19-47 cm.	47-97 cm.	97-127 cm.	0-15 cm. *
Coarse sand 2-0.2 ..	9.6	6.7	1.9	2.2	6.4	9.2
Fine sand 0.2-0.02 ..	39.6	33.0	19.1	13.1	25.0	36.0
Silt 0.02-0.002 ..	22.5	18.5	14.3	12.3	15.7	24.0
Clay below 0.002 ..	23.3	31.7	59.3	65.3	49.3	27.0
Moisture in air dry soil	2.9	4.1	6.9	8.4	6.1	2.1
Loss by solution	0.8	1.0	0.3	0.2	0.1	0.6
Difference	+1.3	+5.0	-1.8	-1.5	-2.6	+1.1
Total	100.0	100.0	100.0	100.0	100.0	100.0

* These results were obtained from the 1926 A.E.A. fractions

WOBURN DATA. Soil Mechanical Analyses.

Diameter mm.	Woburn profile.		
	0-19 cm.	19-40 cm.	40-63 cm.
Coarse sand 2-0.2	39.4	41.2	32.2
Fine sand 0.2-0.02	29.8	31.9	37.3
Silt 0.02-0.002	11.5	12.3	16.5
Clay below 0.002	10.5	10.0	11.7
Air dry moisture	2.9	1.8	1.7
Loss by solution	1.0	0.7	0.3
Difference	+4.9	+2.1	+0.3
Total	100.0	100.0	100.0

CROPS GROWN IN ROTATION, AGDELL FIELD PRODUCE PER ACRE.

Year.	Crop.	O.		M.		C.	
		Unmanured since 1848.		Mineral Manure† No Nitrogen.		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 Courses, 1848-1927.

Roots (Swedes) .. cwt.*	32.7	11.2	175.7	195.9	355.3	302.1
Barley—						
Dressed Grain bush.	22.2	20.2	23.1	27.4	31.1	35.4
Total Straw† cwt.	13.6	13.4	13.7	15.7	18.8	21.8
Beans—						
Dressed Grain bush.	—	13.1	—	18.2	—	22.3
Total Straw cwt.	—	9.2	—	13.2	—	15.3
Clover Hay cwt.	—	27.1	—	52.3	—	52.6
Wheat—						
Dressed Grain bush.	24.0	22.3	28.1	30.6	28.9	30.4
Total Straw† .. cwt.	23.4	21.6	28.6	29.8	30.8	29.8

Present Course (21st), 1928, 1929 and 1930.

1928	Roots (Swedes) cwt.	19.7	11.7	143.8	163.6	293.2	223.2
1929	Barley—						
	Dressed Grain bush.	9.9	11.8	14.4	11.5	13.4	26.0
	Offal Grain lb.	46.0	56.0	92.0	48.0	40.0	64.0
	Straw lb.	516.0	750.0	765.0	1011.0	746.0	1619.0
	Total Straw† cwt.	7.0	9.5	11.5	12.8	9.3	18.9
	Wt. of Dressed Grain per bush. } lb.	55.3	53.2	55.8	56.6	55.4	56.9
	Proportion of Total Grain to 100 of } Total Straw	75.6	64.5	69.6	48.8	74.7	72.9
1930	Clover Hay (1st Crop) cwt.	—	4.3	—	36.2	—	28.9
	(2nd „) cwt.**	—	3.3	—	13.6	—	15.6

* Plots 1, 3 and 5 based upon 18 courses. Plots 2, 4 and 6 based upon 17 courses.

† Includes straw, cavings and chaff.

‡ Mineral Manure: 528 lb. Superphosphate (35%); 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.

** Estimated hay yields, calculated from the dry matter.

Wheat after Fallow (without Manure, 1851 and since). Hoos Field, 1927-1930.

	1927	1928	1929	1930	Average 75 years 1856—1930
Dressed Grain { Yield per acre—bushels	0.48	10.47	12.23	9.52	14.22
Weight per bushel—lb.	57.0	55.6	60.3	62.0	59.5
Offal Grain per Acre—lb.	20.0	—	4.8	118.5	51.2
Straw per Acre—lb.	229.0	1078.3	1038.6	898.0	—
Total straw per Acre—cwt.	2.7	9.6	9.3	10.7	12.4
Proportion of Total Grain to 100 of total Straw	15.8	54.0	71.4	59.2	—

MANGOLDS—BARNFIELD, 1930
Mangolds each year since 1876.
PRODUCE PER ACRE.

Roots each year since 1856.

Strip.	Wide—normal spacing 26in. (as hitherto). Narrow—spacing of 20in. Strip Manures. (Amounts stated are per acre).	1930.					50-Year Average, 1876-1928†						
		Cross Dressings.					Cross Dressings.						
		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.)	None.	Nitrate of Soda (550 lb.)	Sulphate of Ammonia (412 lb.)	Sulphate of Ammonia (412 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.)
		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
ROOTS													
1	Dung only (14 tons)	7.65	15.59	11.55	16.68	16.69	17.47	21.70	23.58	23.53	21.70	23.58	23.53
2	Dung, Superphosphate (3½ cwt.), Sulphate of Potash (500 lb.)	11.77	17.96	12.72	19.82	18.84	18.94	24.71	27.57	26.80	24.71	27.57	26.80
4	Complete Minerals: Super. and Potash as 2	10.43	16.00	10.18	20.48	18.06	4.60	14.37	26.06	20.96	14.37	26.06	20.96
5	Salt (200 lb.), Sulphate of Magnesia (200 lb.)	3.21	12.75	14.10	19.47	16.39	(a) 17.35	6.70	9.49	10.16	(b) 17.81§	6.70	9.49
6	Superphosphate only (3½ cwt.)	3.62	4.39††	14.34	30.01	19.04	4.47	13.50	22.55	18.14	4.47	13.50	22.55
7	Super. (3½ cwt.) Sulphate of Potash (500 lb.)	4.06	5.85††	8.15	12.45	10.69	4.03	14.70	22.31	19.10	4.03	14.70	22.31
8	Super. (3½ cwt.) Sulphate of Magnesia (200 lb.) & Sodium Chloride (200 lb.)	4.37	6.04	16.39	21.48	14.99	4.86	5.32	8.52	8.89	4.86	5.32	8.52
9	No Mineral	4.09	7.56	19.74	22.43	19.18	3.34	—	—	—	3.34	—	—
	Sodium Chloride (200 lb.), Nit. Soda (550 lb.), Sulph. Potash (500 lb.) and Sulph. Mag. (200 lb.)	3.55	3.37††	7.41	8.95	8.95	—	—	—	—	—	—	—
		1.70	—	9.25	10.94	12.41	—	—	—	—	—	—	—
		21.28	—	—	—	—	—	—	—	—	—	—	—
		20.08	—	—	—	—	—	—	—	—	—	—	—
LEAVES													
1	Dung only (14 tons)	2.48	4.20	3.86	6.24	5.73	3.04	4.33	5.25	4.54	3.04	4.33	5.25
2	Dung, Superphosphate (3½ cwt.), Sulphate of Potash (500 lb.)	3.31	4.34	3.82	6.38	6.72	3.16	5.49	6.29	4.80	3.16	5.49	6.29
4	Complete Minerals: Super. and Potash as 2	2.93	3.19	3.83	5.23	4.40	1.04	2.88	5.33	3.37	(a) 3.87	2.88	5.33
5	Salt (200 lb.) Sulphate of Magnesia (200 lb.)	0.79	3.21*	3.59	6.23	3.60	(b) 3.19	2.61	3.29	2.84	(a) 4.09**	2.61	3.29
6	Superphosphate only (3½ cwt.)	1.00	1.23††	3.64	3.77	3.77	1.05	2.81	5.20	2.87	(b) 4.09**	2.81	5.20
7	Super. (3½ cwt.) Sulphate of Potash (500 lb.)	1.12	1.57††	3.58	5.00	4.35	0.93	3.01	5.23	3.31	1.05	3.01	5.23
8	Super. (3½ cwt.) Sulphate of Magnesia (200 lb.)	1.10	1.57	3.55	5.55	3.75	1.10	2.52	3.30	2.84	0.93	2.52	3.30
9	No Minerals	0.99	1.43	3.67	5.26	3.21	0.98	—	—	—	1.10	—	—
	Sodium Chloride (200 lb.), Nit. Soda (550 lb.), Sulph. Potash (500 lb.) and Sulph. Mag. (200 lb.)	1.14	1.19††	3.77	5.27	4.19	—	—	—	—	1.10	—	—
		1.16	—	3.05	3.64	3.73	—	—	—	—	0.98	—	—
		0.75	—	3.38	4.00	4.19	—	—	—	—	—	—	—
		3.57	—	—	—	—	—	—	—	—	—	—	—
		3.10	—	—	—	—	—	—	—	—	—	—	—

* 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 as to 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 seed.
 † Excluding 1885, when Nitrogenous fertilisers were not applied, owing to poor crop, and 1908 and 1927 when the crop was swedes.
 § 23 years only, 1904-1928. For this period the average yield of plot 4(a) was 18.11 for roots and 4.05 for leaves.
 †† Normal spacing. ††† Wide and narrow bulked owing to small amount of produce.

HAY—THE PARK GRASS PLOTS

Plot.	Manuring (amounts stated are per acre).	1930.						Plot.	
		Yield of Hay per acre.			Dry Matter per acre.				
		1st Crop.	2nd* Crop.	Total.	1st Crop.	2nd Crop.	Total.		
1	Single dressing (206 lb.) Sulphate of Ammonia (=43 lb. N.); (with Dung also 8 years 1856-63)	not limed	cwt. 27.7	cwt. 12.3	cwt. 40.0	lb. 2658	lb. 1105	lb. 3763	1
2	Unmanured (after Dung 8 years, 1856-63)	limed	20.0	8.4	28.4	2052	750	2802	2
3	Unmanured	not limed	22.8	8.8	31.6	2188	786	2974	3
4-1	Superphosphate of Lime (3½ cwt.)	limed	20.9	6.2	27.1	1985	553	2538	4-1
4-2	Superphosphate of Lime (3½ cwt.) and double dressing (412 lb.) Sulphate of Ammonia (=86 lb. N.)	not limed	20.4	6.3	26.7	1862	562	2424	4-2
5-1	(N. half) Unmanured following double dressing Amm. salts (=86 lb. N.) 1856-97	limed	18.4	4.5	22.9	1686	400	2086	5-1
5-2	(S. half) Superphosphate (3½ cwt.); Sulphate of Potash (500 lb.); following double dressing Amm. salts (=86 lb. N.) 1856-97	not limed	25.8	5.5	31.3	2407	494	2901	5-2
6	Complete Mineral Manure as Plot 7; following double dressing Amm. salts (=86 lb. N.) 1856-68	limed	19.0	3.0	22.0	1854	265	2119	6
7	Complete Mineral Manure: Super. (3½ cwt.); Sulphate of Potash (500 lb.); Sulphate of Magnesia (100 lb.); Sulphate of Soda (100 lb.); Sulphate of Magnesia (100 lb.)	not limed	8.9	1.1	10.0	780	95	875	7
8	Mineral Manure without Potash	limed	41.3	6.9	48.2	4187	620	4807	8
9	Complete Mineral Manure and double dressing (412 lb.) Sulphate of Ammonia (=86 lb. N.)	not limed	17.1	4.0	21.1	1707	358	2065	9
10	Mineral Manure (without Potash) and double dressing Amm. salts (=86 lb. N.)	limed	21.9	7.7	29.6	2196	687	2883	10
11-1	Complete Mineral Manure and treble dressing (618 lb.) Sulphate of Ammonia (129 lb. N.)	not limed	28.4	12.2	40.6	2877	1089	3966	11-1
11-2	As Plot 11-1 and Silicate of Soda	not limed	31.2	13.6	44.8	3145	1215	4360	11-2
12	Unmanured	limed	45.0	20.3	65.3	4192	1820	6012	12
13	Dung (14 tons) in 1905, and every fourth year since (omitted 1917), Fish Guano (6 cwt.) in 1907 and every fourth year since	not limed	24.6	9.1	33.7	2425	811	3236	13
14	Complete Mineral Manure and double dressing (550 lb.) Nitrate of Soda (=86 lb. N.)	limed	18.5	8.5	27.0	1887	762	2649	14
15	Complete Mineral Manure as Plot 7; following double dressing Nitrate of Soda (=86 lb. N., 1858-75)	not limed	31.3	23.0	54.3	3037	2059	5096	15
16	Complete Mineral Manure and Single Dressing (275 lb.) Nitrate of Soda (=43 lb. N.)	limed	59.5	21.5	81.0	5999	1927	7926	16
17	Single dressing (275 lb.) Nitrate of Soda (=43 lb. N.)	not limed	19.5	14.8	34.3	2032	1325	3357	17
18	Mineral Manure (without Super.), and double dressing Sulphate of Amm. (=86 lb. N.), 1905 and since; following Minerals and Amm. salts supplying the constituents of 1 ton of Hay, 1865-1904	limed	47.0	12.0	59.0	4709	1076	5785	18
19	Farmyard Dung (14 tons) in 1905 and every fourth year since (omitted in 1917), following Nitrate of Soda (=43 lb. N.) and Minerals, 1872-1904	not limed	47.3	30.0	77.3	4806	2692	7498	19
20	Farmyard Dung (14 tons) in 1905 and every fourth year since (omitted in 1917); each intervening year Plot 20 receives Sulphate of Potash (100 lb.); Superphosphate (200 lb.) and 1½ cwt. Nitrate of Soda (=26 lb. N.); following Nitrate of Potash and Superphosphate, 1872-1904	limed	63.4	19.0	82.4	6341	1699	8040	20
		not limed	55.3	32.4	87.7	5594	2906	8500	
		limed	63.2	28.2	91.4	6338	2529	8867	
		not limed	17.9	9.0	26.9	1809	807	2616	
		not limed	42.6	22.9	65.5	4236	2048	6284	
		limed	39.2	17.4	56.6	4015	1558	5573	
		not limed	59.1	24.8	83.9	5921	2218	8139	
		limed (sun)	51.6	13.5	65.1	5190	1210	6400	
		limd (shade)	40.6	7.5	48.1	4079	670	4749	
		not limed	35.8	17.7	53.5	3565	1583	5148	
		limed	36.0	13.2	49.2	3544	1180	4724	
		not limed	40.1	14.7	54.8	4126	1320	5446	
		limed	30.9	12.6	43.5	3115	1127	4242	
		not limed	30.6	10.4	41.0	2970	936	3906	
		limed	30.4	7.3	37.7	3118	655	3773	
		not limed	20.4	12.5	32.9	2026	1116	3142	
		limed	53.9	21.7	75.6	5367	1945	7312	
		(6788 lb.)	40.8	17.0	57.8	4150	1523	5673	
		limed	29.1	18.8	47.9	2968	1688	4656	
		(3951 lb.)	24.0	13.5	37.5	2325	1213	3538	
		limed	24.4	11.5	35.9	2450	1032	3482	
		(570 lb.)	36.9	16.1	53.0	3835	1445	5280	
		not limed	36.4	15.1	51.5	3826	1353	5179	
		limed	38.1	14.1	52.2	3905	1260	5165	

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, and at the rate of 2,500 lb. to the acre in the Winter of 1920-21, except where otherwise stated.

Up to 1914 the Limed and Unlimed plot results were not separately given in the Annual Report, but the mean of the two was given. From 1915 onwards the separate figures are given.

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

WHEAT—BROADBALK FIELD, 1930

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.
		3rd year after fallow.		after 4 years' fallow.		after 2 years' fallow.		after 4 years' fallow.		after 2 years' fallow.		
		I	II	III	IV	V	I	II	III	IV	V	
2A	Farmyard Manure (14 tons)	7.5	16.8	34.7	35.9	26.1	5.4	10.2	23.4	23.1	17.3	16.3**
2B	Farmyard Manure (14 tons)	9.0	19.3	40.9	44.0	28.8	6.2	12.1	25.4	28.0	18.3	19.4
3	Unmanured since 1839	5.0	6.9	32.5	27.1	22.4	3.3	4.5	20.4	16.4	12.9	6.7
5	Complete Mineral Manure ††	4.6	6.3	34.9	29.5	25.2	3.1	4.3	21.5	18.5	14.2	7.8
6	As 5, and 206 lb. Sulphate of Ammonia	7.1	9.1	40.6	32.6	23.0	4.5	5.8	25.3	19.9	14.6	12.5
7	As 5, and 412 lb. Sulphate of Ammonia	9.1	14.9	38.9	34.6	24.2	5.8	9.4	25.9	22.6	16.2	17.6
8	As 5, and 618 lb. Sulphate of Ammonia	10.6	21.3	42.9	45.5	31.0	6.8	12.8	26.7	26.7	20.2	20.1
9	As 5, and 275 lb. Nitrate of Soda	9.9	15.8	39.1	38.7	31.2	6.4	9.4	24.6	22.8	18.3	13.9††
10	412 lb. Sulphate of Ammonia	8.0	12.7	44.1	35.5	22.4	5.3	8.1	26.2	21.8	14.8	10.9
11	As 10, and Superphosphate (3½ cwt.)	8.5	11.2	44.0	41.0	33.5	5.3	6.9	26.0	24.4	19.0	12.3
12	As 10, and Super. (3½ cwt.) and Sulph. Soda (366 lb.)	6.4	9.7	41.0	44.2	30.8	4.4	6.1	23.9	26.9	19.2	15.7
13	As 10, and Super (3½ cwt.) and Sulph. Potash (200 lb.)	6.5	10.9	42.3	37.9	29.2	4.6	7.1	25.3	23.0	17.1	17.0
14	As 10, and Super (3½ cwt.) and Sulph. Magnesia (280 lb.)	7.6	8.3	45.1	43.1	24.1	5.0	5.6	26.7	25.9	15.7	15.5
15	As 5, and 412 lb. Sulphate of Ammonia all applied in Autumn	7.2	10.5	41.1	39.8	24.5	4.7	6.8	24.8	23.7	14.2	16.1
16	As 5, and 550 lb. Nitrate of Soda	6.0	9.9	42.6	40.6	27.5	4.0	6.8	26.1	24.8	16.5	17.8††
17	Minerals alone as 5 or 412 lb. Sulphate of Ammonia	A6.1	9.4	39.2	33.3	22.5	4.0	6.0	23.7	20.3	14.3	A16.1*
18	alone in alternate years	M0.6	2.9	33.7	29.8	19.1	0.5	2.1	20.3	17.9	12.2	M 8.1
19	Rape Cake (1,889 lb.)	7.2	12.7	39.8	33.9	20.9	4.7	8.0	24.3	20.6	13.2	12.6†
20	As 7, without Super.	5.2	—	—	—	—	3.5	—	—	—	—	10.3‡

For notes see p. 123. *A=Ammonia series. M=Mineral series.

WHEAT—BROADBALK FIELD, 1930

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.	
		3rd year after fallow.		after 4 years' fallow.		after 2 years' fallow.		I	II	III	IV		V
		I	II	III	IV	V	I	II	III	IV	V		
2A	Farmyard Manure (14 tons)	60.5	61.0	62.2	62.5	61.5	26.8	27.1	56.6	56.3	60.0	32.1**	
2B	Farmyard Manure (14 tons)	59.8	61.3	61.8	61.8	61.0	29.1	27.9	60.8	62.1	62.1	34.2	
3	Unmanured since 1839	61.0	60.3	63.1	63.1	59.5	6.0	5.7	37.3	24.8	24.5	9.8	
5	Complete Mineral Manure§§	60.5	60.5	63.2	62.6	58.7	7.0	8.7	41.0	33.3	30.3	11.5	
6	As 5, and 206 lb. Sulphate of Ammonia	60.8	60.5	62.5	62.2	62.4	10.6	11.8	54.5	43.9	40.4	20.3	
7	As 5, and 412 lb. Sulphate of Ammonia	60.5	61.5	61.1	60.9	60.9	23.2	21.4	59.8	59.0	60.8	32.1	
8	As 5, and 618 lb. Sulphate of Ammonia	59.4	60.6	60.7	59.6	60.5	36.2	34.9	69.3	67.1	63.8	39.8	
9	As 5, and 275 lb. Nitrate of Soda	60.5	60.3	61.0	60.9	60.3	21.2	22.4	61.4	57.4	59.8	24.6††	
10	412 lb. Sulphate of Ammonia	60.8	62.4	62.1	62.5	62.6	19.6	17.1	52.1	45.0	39.4	17.8	
11	As 10, and Superphosphate (3½ cwt.)	60.0	60.8	60.6	60.8	58.3	16.2	14.7	54.4	51.9	51.3	21.4	
12	As 10, and Super (3½ cwt.) and Sulph. Soda (366 lb.)	60.5	60.3	60.2	60.2	59.4	13.6	13.3	59.4	64.9	58.3	26.8	
13	As 10, and Super (3½ cwt.) and Sulph. Potash (200 lb.)	60.5	61.5	61.0	59.3	58.4	14.3	15.3	61.3	63.2	58.1	30.6	
14	As 10, and Super (3½ cwt.) and Sulph. Magnesia (280 lb.)	60.3	60.8	61.1	60.2	60.6	13.5	12.4	60.0	64.9	50.8	26.8	
15	As 5, and 412 Sulphate of Ammonia all applied in Autumn	60.3	61.6	61.5	62.1	59.4	10.0	11.6	51.9	51.6	35.1	28.2	
16	As 5, and 550 lb. Nitrate of Soda	59.5	61.0	60.5	61.1	59.6	24.3	25.1	69.7	61.4	60.5	35.2††	
17	Minerals alone as 5 or 412 lb. Sulphate of Ammonia	M	61.0	61.2	61.0	61.2	11.6	14.2	53.3	56.3	50.6	A28.1*	
18	alone in alternate years	M	60.0	62.9	62.4	62.3	2.0	3.3	36.3	37.1	28.4	M12.3	
19	Rape Cake (1,889 lb.)	60.0	61.0	62.0	62.3	61.8	13.7	14.9	49.5	50.1	40.7	22.0‡	
20	As 7, without Super	58.5	—	—	—	—	12.6	—	—	—	—	18.6§	

† Includes straw, cavings and chaff. *A = Ammonia series, M = Mineral series.
 ** 26 years only, 1900-1925. †† 41 years only, 1885-1925. ‡ 33 years only, 1893-1925. § 18 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.
 In 1926 and 1927 the crop was confined to the lower (eastern) part of the field (IV and V) the upper part (I, II and III) being completely fallowed for 2 years. This was the first complete fallow on this area since the experiment began in 1843. In October, 1927, the upper or western part (I and II) was sown with wheat, and again in 1928, while in 1929 the whole field was sown, and harvested in 1930 in five separate portions.

PERMANENT BARLEY PLOTS

Hoos Field, 1930

Plot	Manuring (Amounts stated are per acre)	Total Grain per acre		76 Years' Average 1852-1928 Dressed Grain per acre.	Total Straw per acre.		76 Years' Average 1852-1928 Total Straw per acre.
		Plumage Archer	Spratt Archer		Plumage Archer	Spratt Archer	
		cwt.	cwt.	bush.	cwt.	cwt.	cwt.†
1O	Unmanured	0.3	0.4	13.4	1.0	0.8	7.8
2O	Superphosphate only (3½ cwt.) ..	4.9	4.6	19.0	4.1	3.8	9.8
3O	Alkali Salts only (200 lb. Sulphate of Potash; 100 lb. Sulphate of Soda; 100 lb. Sulphate of Mag- nesia)	1.8	1.5	14.3	2.8	2.1	8.7
4O	Complete Minerals; as 3O with Superphosphate (3½ cwt.) ..	3.6	4.8	19.0	3.3	4.1	11.2
5O	Potash (200 lb.) and Superphos- phate (3½ cwt.)	4.2	4.2	15.5	4.1	4.6	9.4
1A	Ammonium Salts only (206 lb. Sul- phate of Ammonia)	1.4	2.0	23.7	2.2	3.3	13.7
2A	Superphosphate and Amm. Salts ..	9.0	9.5	35.8	8.9	8.4	20.4
3A	Alkali Salts and Amm. Salts ..	3.9	2.6	25.8	5.5	4.1	16.0
4A	Complete Minerals and Amm. Salts	7.4	8.9	39.3	8.4	8.7	23.6
5A	Potash, Super. and Amm. Salts ..	6.6	6.1	33.8	9.7	8.6	21.7
1AA	Nitrate of Soda only (275 lb.) ..	2.4	2.4	24.3*	4.3	4.1	15.4*
2AA	Superphosphate and Nitrate of Soda	9.0	9.5	38.8*	9.3	9.4	23.1*
3AA	Alkali Salts and Nitrate of Soda ..	4.0	4.0	24.5*	5.5	5.5	16.6*
4AA	Complete Minerals and Nitrate of Soda	8.5	8.7	37.7*	9.3	8.5	23.6*
1AAS	As Plot 1AA and Silicate of Soda (400 lb.)	3.4	5.5	30.2*	3.8	6.7	18.2*
2AAS	As Plot 2AA and Silicate of Soda (400 lb.)	10.3	10.7	39.7*	10.5	11.2	23.9*
3AAS	As Plot 3AA and Silicate of Soda (400 lb.)	6.4	6.7	31.2*	7.2	7.1	19.9*
4AAS	As Plot 4AA and Silicate of Soda (400 lb.)	9.6	10.5	39.9*	10.3	10.4	25.4*
1C	Rape Cake only (1,000 lb.) ..	6.0	6.2	35.5	6.7	6.5	20.6
2C	Superphosphate and Rape Cake ..	9.0	9.1	38.1	10.7	9.9	22.0
3C	Alkali Salts and Rape Cake ..	7.3	8.2	33.7	9.6	9.3	20.4
4C	Complete Minerals and Rape Cake	8.3	8.9	37.5	10.0	10.1	22.6
7-1	Unmanured (after dung (14 tons) for 20 years (1852-71) ..	4.0	4.9	22.5‡	4.4	5.1	13.5‡
7-2	Farmyard Manure (14 tons) ..	7.7	8.1	44.6	9.1	10.0	28.1
6-1	Unmanured since 1852	1.6	0.9	14.7	2.7	2.3	8.6
6-2	Ashes from Laboratory furnace ..	2.3	2.9	15.7	2.7	3.3	9.3
1N	Nitrate of Soda only (275 lb.) ..	2.1	1.7	28.7§	2.6	2.4	17.8§
2N	Nitrate of Soda only (275 lb.) ..	6.8	5.1	31.7§§	8.8	7.2	20.0§§

|| 1 cwt = 2.15 bushels. 1912, 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.