Report 1921-22 With the Supplement to the Guide to the Experimental Plots Containing the Yields per Acre Etc.

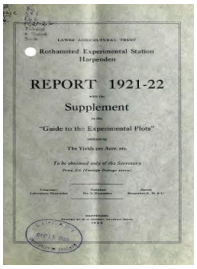

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Table of Results - the Classical Experiments

Rothamsted Research

Rothamsted Research (1923) *Table of Results - the Classical Experiments ;* Report 1921-22 With The Supplement To The Guide To The Experimental Plots Containing The Yields Per Acre Etc., pp 77 - 89 **- DOI: https://doi.org/10.23637/ERADOC-1-110**

DATES OF SOWING AND HARVESTING (Harvest 1921).

Field.	Crop.	Variety.	Sowing began.	Sowing finished.	Cutting began.	Carting began.	Carting finished.	Yield per Acre.
Great Knott, east ...	Oats	Grey Winter	Oct. 6, '20	Oct. 9, '20	July 14	July 21	July 23	44 bush.
,, west ...	Clover	Broad Red	Apr. 26,'20	Apr. 27, '20	June 13	June 21	June 23	21·5 cwt.
Little Knott	Grass Ley (3rd yr.)	Mixture...	Apr. 8, '18	Apr. 10, '18	June 28	June 30	July 1	17·0 cwt.
Fosters, east	Oats	Grey Winter	Oct. 9, '20	Oct. 14, '20	July 15	July 25	July 25	41·7 bush.
,, west	Oats ... ... / Barley	Grey Winter mended with Plumage Archer	Mar. 14, '21	Mar 14, '21	July 29	Aug. 5	Aug. 5	33 bush.
West Barnfield	Clover	Broad Red	Apr. 26, '20	Apr. 26, '20	June 9	June 15	June 15	31·3 cwt.
Long Hoos, east ...	Wheat	Red Standard ... ... / Danish Svalof	Nov. 9, '20	Nov. 11, '20	July 28	Aug. 6	Aug. 9	30·2 bush.
,, west ...	Wheat	Red Standard ... ... / Swedish Iron ... . / Marshall Foch	Oct. 21, '20	Oct. 23, '20	July 30	Aug. 6	Aug. 9	
Great Harpenden ...	Wheat	Red Standard	Oct. 15, '20	Oct. 20, '20	July 26	Aug. 2	Aug. 3	22 bush.
New Zealand	Wheat	Red Standard	Nov. 6, '20	Nov. 9, '20	July 27	Aug. 4	Aug. 4	30·2 bush.
Stackyard	Barley	Plumage Archer	Mar. 11, '21	Mar. 30, '21	Aug. 3	Aug. 12	Aug. 12	35·5 bush.
Sawpit	Potatoes	Arran Chief	Apr. 8, '21	Apr. 11, '21	...	Sept. 26	Oct. 10	1·5tons ware
		Kerr's Pink	Apr. 12, '21	Apr. 13, '21	...	Oct. 30	Nov. 5	1·1 ,, small
Broadbalk	Wheat	Red Standard	Nov. 4, '20	Nov. 5, '20	July 27	Aug. 9	Aug. 10	see p. 85
Little Hoos	Barley	Plumage Archer	Mar. 9, '21	Mar. 9, '21	Aug. 4	Aug. 12	Aug. 12	,, 90
Hoos	Barley	Plumage Archer	Feb. 19, '21	Feb. 21, '21	July 30	Aug. 11	Aug. 11	,, 89
	Wheat	Red Standard	Nov. 5, '20	Nov. 5, 20'	July 28	Aug. 10	Aug. 10	see pp. 87 and 88
Barnfield	Mangolds ...	Prizewinner Yellow Globe ...	Apr. 27, '21	Apr. 27, '21	...	Nov. 15	Dec. 2	see p. 81
Agdell	Barley	Plumage Archer	Feb. 23, '21	Feb. 23, '21	Aug. 5	Aug. 12	Aug. 12	,, 79
Great Field	Pasture	— —	... ...	... ...	... ...	... ...	... ...	...
Park	Hay	— —	... ...	... ...	June 23	June 27	June 28	see p. 82

DATES OF SOWING AND HARVESTING (Harvest 1922).

Field.	Crop.	Variety.	Sowing began.	Sowing finished.	Cutting began.	Carting began.	Carting finished.	Yield per Acre.
Great Knott, east ...	Wheat	Red Standard	Oct. 24, '21	Oct. 26, '21	Aug. 29	Sept. 11	Sept. 21	18 bush.
,, west ...	Clover	Red	Apr. 26, '20	Apr. 27, '20	June 9	not	carted	
Little Knott	Grass Ley (4th yr.)	Mixed	Apr. 8, '18	Apr. 10, '18	June 17	June 20	June 23	11 cwt.
Foster's, east	Wheat	Red Standard	Oct. 24, '21	Oct. 26, '21	Aug. 24	Sept. 6	Sept. 7	16 bush.
,, west	Wheat	Red Standard						
West Barnfield	Clover	Red	Apr. 26, '20	Apr. 26, '20	June 16	June 21	June 22	12 cwt.
Long Hoos, east ...	Oats	Grey Winter	Sept. 24,'21	Sept. 26,'21	Aug. 2	Aug. 16	Aug. 18	48 bush.
,, west ...	Barley	Plumage Archer	Mar. 30, '22	Apr. 1, '22	Sept. 12	Sept. 29	Sept. 30	33 bush.
Great Harpenden ...	Mangolds ...	Prizewinner Yellow Globe ...	May 2, '22	May 12, '22	... ...	Oct. 25	Nov. 22	19¾ tons.
	Potatoes	Kerr's Pink	Apr. 22 '22	Apr. 24, '22	... ...	Oct, 10	Oct. 26	see pp, 94 and 98
	Swedes	Hurst's Monarch	May 19, '22	May 26, '22	... ...	Oct. 4	Nov. 14	27½ tons.
New Zealand	Wheat	Red Standard	Nov. 10, '21	Nov. 11,'21	Sept. 4	Sept. 21	Sept. 26	28 bush.
Stackyard	Barley	Plumage Archer	Mar. 25, '22	Mar. 28,'22	Sept. 5	Sept. 22	Oct. 3	33 bush.
Sawpit	Wheat	Red Standard	Oct. 18, '21	Dec. 8,' 21	Aug. 23	Sept. 2	Sept. 16	24 bush.
Sawyers	Vetches and Oats mixed ...	Winter Vetches	Sept. 17, '21	Sept. 19,'21	Aug. 5	Sept. 8	Sept. 9	7½ bush.
		Grey Winter Oats						8 bush.
Broadbalk	Wheat	Red Standard	Oct. 28, '21	Oct. 28, '21	Aug. 29	Sept. 18	Sept. 20	see p. 86
Little Hoos	Barley	Plumage Archer	Mar. 25, '22	Mar. 25, '22	Sept. 7	Sept. 21	Sept. 23	,, 90
Hoos	Barley	Plumage Archer	Mar. 18, '22	Mar. 18, '22	Sept. 6	Sept. 25	Sept. 26	,, 89
	Wheat	Red Standard	Oct. 29, '21	Oct. 29, '21	Sept. 6	Sept. 26	Sept. 26	,, 87
Barnfield	Mangolds ...	Prizewinner Yellow Globe ...	May 1, '22	May 1, '22	... ...	Nov. 1	Nov. 9	,, 81
Agdell	Clover	Red	Apr. 21, '21	Apr. 22, '21	June 21	July 12	July 12	,, 79
Great Field	Hay	— —	... ...	... ...	June 22	June 30	July 1	,, 95
Park	Hay	1st Crop	... ...	... ...	June 26	July 1	July 10	,, 82
		2nd Crop	... ...	... ...	Oct. 5	Oct. 16	Oct. 17	,, 82

CROP YIELDS ON THE EXPERIMENTAL PLOTS

NOTES.—In each case the year refers to the harvest, *e.g.*, Wheat harvested in 1921. In the tables, total straw includes straw, cavings and chaff. In previous reports the figures for total straw only have been given.

CONVERSION TABLE

1 acre ... ... =	0·404	Hectare	0·963 Feddan.
1 bushel (Imperial) =	0·346	Hectolitre (36·346 litres) ...	0·184 Ardeb.
1 lb. (pound avoirdupois) =	0·453	Kilogramme	1·009 Rotls.
1 cwt. (hundredweight) =	50·8	Kilogrammes	113·0 Rotls. 1·366 Maunds
1 metric quintal ... =	100·0 220·46	Kilogrammes ... ... lb.	
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 ... =	125·60 1·256	Kilogrammes per Hectare or metric Quintals per Hectare	117·4 Rotls per Feddan.

In America the Winchester bushel is used = 35·236 litres. 1 English bushel = 1·032 American bushels.

CROPS GROWN IN ROTATION. AGDELL FIELD.

PRODUCE PER ACRE.

Year.	CROP.	O. Unmanured.		M. Mineral Manure.		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 THE FIRST EIGHTEEN COURSES, 1848–1919.						
	Roots (Swedes) cwt.*	33·4	11·8	176·4	191·3	360·7	317·4
	Barley—						
	Dressed Grain bush.	23·3	21·9	24·4	24·4	33·4	37·5
	Total Straw ... cwt.	14·1	14·0	14·3	16·1	20·2	22·9
	Beans—						
	Dressed Grain bush.	—	13·1	—	18·2	—	22·3
	Total Straw ... cwt.	—	9·2	—	13·2	—	15·3
	Clover Hay ... cwt.	—	30·7	—	58·6	—	60·2
	Wheat—						
	Dressed Grain bush.	24·6	22·7	29·0	31·4	30·1	31·6
	Total Straw ... cwt.	23·9	21·4	29·1	30·3	31·8	30·7
	PRESENT COURSE (19th), 1920–22.						
1920	Roots (Swedes) ... cwt.	20·5	2·1	163 9	270·0	262·1	56·4‡
1921	Barley—						
	Dressed Grain bush.	13·0	2·4†	12·8	26·3·	10·9	25·7
	Offal Grain ... lb.	57·0	42·0	45·0	58.0	39 0	65·0
	Straw ... ... lb.	891·0	601·0	596·0	1124·0	444·0	1444·0
	Total Straw ... cwt.	10·9	7·8	7·9	14·2	6·3	17·7
	Wght. of Dressed Grain per bush. lb.	55·1	51·0	56·5	56·8	56·4	56·7
	Proportion of Total Grain to 100 of Total Straw	63·0	19·0	86·3	97·5	92·2	77·1
1922	Clover Hay ... cwt. (1 crop only)	—	4·4	—	9·7	—	3·5

* Plots 1, 3 and 5 based upon 17 years. Plots 2, 4 and 6 based upon 16 years.
† Plot 6 was more badly attacked by Gout Fly than the other plots.
‡ The roots on this plot were badly attacked by finger and toe disease in 1920. In 1920 Rape Cake was omitted from plots 1 and 2.

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METEOROLOGICAL RECORDS, 1921 and 1922.

	Rain.		Drainage through soil.			Bright Sunshine.	Temperature (Mean).				
	Total Fall. $\frac{1}{1000}$ Acre Gauge.	No. of Rainy Days. (0·01 inch or more) $\frac{1}{1000}$ Acre Gauge.	20 ins. deep.	40 ins. deep.	60 ins. deep.		Max.	Min.	1 ft. in ground.	Solar Max.	Grass Min.
1921	Inches.	No.	Inches.	Inches.	Inches.	Hours.	°F.	°F.	°F.	°F.	°F.
Jan. ...	2·452	18	2·103	2·202	2·087	42·9	48·8	39·7	42·8	69·7	35·5
Feb. ...	0·214	7	0·016	0·068	0·053	77·9	45·2	34·0	39·6	78·9	27·8
Mar. ...	1·065	12	0·005	0·028	0·028	132·1	51·8	36·4	43·0	99·5	29·6
April ...	1·568	10	0·114	0·120	0·110	195·7	55·2	37·3	46·1	111·1	30·7
May ...	1·445	14	0·065	0·113	0·120	228·8	62·0	43·3	53·7	122·7	36·0
June ...	0·194	2	—	0·005	0·009	216·0	67·4	47·5	59·1	125·4	41·6
July ...	0·179	5	—	0·003	0·006	240·0	76·8	53 4	64·9	132·1	47·1
Aug. ...	1·113	10	—	—	—	145·2	69·2	52·7	61·9	122·8	48·5
Sept. ...	2·733	6	0·925	0·893	0·850	174·0	67·6	49·0	58·4	114·8	43·5
Oct. ...	0 787	8	—	—	—	154·2	63·6	46·4	54·0	106·6	40·5
Nov. ...	2·435	11	0·969	0·966	0·796	68·9	43·9	33·3	42·6	69·2	28·3
Dec. ...	1·908	16	1·569	1·586	1·420	47·3	47·9	36·7	41·8	67·1	32·8
Total or Mean	16·093	119	5·766	5·984	5·479	1723·0	58·3	42·5	50·7	101·7	36·8
1922											
Jan. ...	3·148	21	2·811	2·862	2·638	53·7	43·5	32·7	38·5	65·7	28·6
Feb. ...	2·507	16	1·734	1·718	1·612	104·9	44·9	33·6	38·2	76·1	28·6
Mar. ...	2·285	14	1·349	1·477	1·406	113·5	45·2	34·8	40·9	89·8	30·1
April ...	3·520	19	1·458	1·535	1·390	149·8	48·7	34·7	41·8	105·7	29·2
May ...	1·579	7	0·144	0·224	0·235	280·2	65·4	45·0	53·1	120·8	37·2
June ...	1·038	8	—	0·016	0·022	228·8	65·9	48·1	59·8	121·6	41·2
July ...	4·605	19	1·661	1·748	1·599	149·5	63·7	49·7	57·8	120·4	43·6
Aug. ...	2 930	16	0·675	0·698	0·651	127·3	63·2	49·2	57·9	117·8	42·8
Sept. ...	2·882	15	1·085	1·111	1·010	102·6	60·5	46·3	54·8	110·2	40·5
Oct. ...	0·764	13	0·175	0·194	0·159	140·0	52·8	40·0	48·4	99·7	33 5
Nov. ...	1·433	8	0·813	0·854	0·751	56·8	47·0	34·7	41·5	71·3	28·4
Dec. ...	3·091	18	2·719	2·741	2·572	55·5	45·4	36·3	40·5	66·6	30·9
Total or Mean	29·782	174	14·624	15·178	14·045	1562·6	53·9	40·4	47·8	97·1	34·6

RAIN AND DRAINAGE.

MONTHLY MEAN FOR 52 HARVEST YEARS, 1870-1—1921-2.

	Rainfall.	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.
September	2·334	0·751	0·714	0·655	32·2	30·6	28·1	1·583	1·620	1·679
October ...	3·153	1·788	1·742	1·617	56·7	55·2	51·3	1·365	1·411	1·536
November	2·769	2·095	2·127	2·006	75·7	76·8	72·4	0·674	0·642	0·763
December	2·845	2·417	2·505	2·393	84·9	88·0	84·1	0·428	0·340	0·452
January...	2·381	1·914	2·096	2·015	80·4	88·0	84·6	0·467	0 285	0·366
February	1·983	1·457	1·558	1·487	73·5	78·6	75·0	0·526	0·425	0·496
March ...	2·086	1·130	1·264	1·195	54·2	60·6	57·3	0·956	0·822	0 891
April ...	2·032	0·658	0·731	0·697	32·4	36·0	34·3	1·374	1·301	1·335
May ...	2·006	0·461	0·523	0·489	23·0	26·1	24·4	1·545	1·483	1·517
June ...	2·307	0·572	0·592	0·572	24·8	25·7	24·8	1·735	1·715	1·735
July ...	2·656	0·685	0·710	0·659	25·8	26·7	24·8	1·971	1·946	1·997
August ...	2·693	0·725	0·726	0·683	26·9	27·0	25·4	1·968	1·967	2·010
Year ...	29·245	14·653	15·288	14·468	50·1	52·3	49·5	14·592	13·957	14·777

Area of each gauge $\frac{1}{1000}$th acre.

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MANGOLDS, BARN FIELD, 1921 and 1922.

Roots since 1856. Mangolds since 1876.

Produce per Acre.

Strip.	Strip Manures.	Cross Dressings. O. None.	N. Nitrate of Soda	A. Ammon. Salts.	A.C. Ammon. Salts and Rape Cake.	C. Rape Cake.
	1921.	Tons.	Tons.	Tons.	Tons.	Tons.
1	Dung only	R. **16·25**	**24·82**	**15·50**	**13·71**	**17·44**
		L. 2·46	3·56	2·49	2·62	3·12
2	Dung, Super., Potash ...	R. **22·60**	**31·01**	**25·44**	**25·20**	**25·75**
		L. 3·42	4·99	4·95	5·33	4·68
4	Complete Minerals ...	R. **6·07**	*a* R. **19·18*** / L. 4·63	**14·62**	**23·27**	**16·69**
		L. 1·11	*b* R. **16·08** / L. 4·30	3·41	5·03	3·50
5	Superphosphate only ...	R. **5·36**	**12·35**	**3·57**	**3·19**	**4·43**
		L. 1·07	3·14	1·69	1·54	1·66
6	Super. and Potash ...	R. **5·46**	**17·20**	**13·58**	**18·37**	**14·04**
		L. 1·27	4·03	3·54	4·38	3·31
7	Super., Sulphate of Mag., and Sodium Chloride	R. **5·74**	**18·33**	**13·94**	**14·37**	**13·24**
		L. 1·33	4·29	3·20	4·45	3·56
8	None	R. **3·60**	**7·53**	**2·57**	**2·87**	**1·20**
		L. 1·07	3·02	1·63	1·53	1·34
9	Sodium Chloride, Nit. Soda, Sulph. Potash, and Sulph. Mag. ...	R. **20·15**				
		L. 4·53				
	1922†.					
1	Dung only	R. **14·90**	**18·54**	**14·25**	**26·37**	**26·11**
		L. 3·35	3·98	3·52	5·57	5·46
2	Dung, Super., Potash ...	R. **18·15**	**12·46**	**9·29**	**31·55**	**30·35**
		L. 3·51	2·67	2·20	6·34	5·40
4	Complete Minerals ...	R. **3·32**	*a* R. **2·27*** / L. 0·80	**0·54**	**28·46**	**21·89**
		L. 0·95	*b* R. **2·49** / L. 0·83	0·25	5·34	3·49
5	Superphosphate only ...	R. **1·90**	**3·38**	**0·35**	**10·53**	**11·39**
		L. 0·66	1·06	0·16	3·67	4·00
6	Super. and Potash ...	R. **2·28**	**3·64**	**0·67**	**21·96**	**19·56**
		L. 0·80	1·13	0·30	5·55	3·73
7	Super., Sulphate of Mag., and Sodium Chloride	R. **2·13**	**2·65**	**0·67**	**18·45**	**18·97**
		L. 0·79	0·85	0·33	5·12	3·81
8	None	R. **1·72**	**0·93**	**0·40**	**6·98**	**7·65**
		L. 0·69	0·49	0·22	2·95	3·13
9	Sodium Chloride, Nit. Soda, Sulph. Potash and Sulph. Mag. ...	R. **2·89**				
		L. 1·04				

R.=roots. L.=leaves.

* From 1904 onwards plot 4 N has been divided, 4*a* receiving Sulphate of Potash, Sulphate of Magnesia, Sodium Chloride and Nitrate of Soda; 4*b* receiving Calcium Chloride, Potassium Nitrate and Calcium Nitrate.

† In 1922 the top dressings of Nitrate of Soda and Sulphate of Ammonia were omitted from plots 4—8 on series N and A as the plant had failed. The plant on Series A, N, O and plot 9, was badly attacked by *Atomaria* (pigmy mangold beetle).

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HAY. THE PARK GRASS PLOTS. 1921, 1922.

Plot.	Manuring per acre.		1921. Yield of Hay per acre.	1921. Dry Matter per acre.	1922. Yield of Hay per acre. 1st Crop.	1922. Yield of Hay per acre. 2nd Crop.	1922. Yield of Hay per acre. Total.	1922. Dry Matter per acre. 1st Crop.	1922. Dry Matter per acre. 2nd Crop.	1922. Dry Matter per acre. Total.	Plot.
			cwt.	lb.	cwt.	cwt.	cwt.	lb.	lb.	lb.	
1	Single dressing Amm. Salts (=43 lb. N.); (with Dung also 8 years 1856-63)	not limed	15·9	1474	9·7	29·2	38·9	650	2143	2793	1
		limed	18·5	1637	19·0	18·7	37·7	1255	1403	2658	
2	Unmanured; (after Dung 8 years, 1856-63)	not limed	11·4	991	16·7	16·5	33·2	1112	1213	2325	2
		limed	14·7	1227	18·3	15·2	33·5	1178	1047	2225	
3	Unmanured	not limed	8·8	727	14·8	13·1	27·9	952	1010	1962	3
		limed	10·3	839	12·4	11·7	24·1	816	787	1603	
4-1	Superphosphate of Lime	not limed	17·1	1398	19·6	13·9	33·5	1245	1058	2303	4-1
		limed	14·6	1199	15·0	13·1	28·1	995	910	1905	
4-2	Superphosphate of Lime and double dressing Amm. Salts (=86 lb. N.)	not limed	23·4	1866	2·3	11·9	14·2	154	839	993	4-2
		limed	23·7	2081	25·9	24·8	50·7	1805	1924	3729	
5-1	(N. half) Unmanured; following double dressing Amm. Salts (= 86 lb. N.) 1856-97	not limed	14·3	1125	4·6	8·2	12·8	296	638	934	5-1
5-2	(S. half) Super., Sulphate of Potash; following double dressing Amm. Salts (= 86 lb. N.) 1856-97	not limed	21·5	1955	11·3	12·0	23·3	811	919	1730	5-2
6	Complete Mineral Manure as plot 7; following double dressing Amm. Salts (= 86 lb. N.) 1856-68	not limed	27·9	2534	20·9	21·6	42·5	1420	1681	3101	6
7	Complete Mineral Manure	not limed	25·7	2376	23·4	23·4	46·8	1520	1605	3125	7
		limed	23·4	2088	21·2	17·4	38·6	1571	1359	2930	
8	Mineral Manure without Potash	not limed	21·0	1822	19·2	16·0	35·2	1209	1194	2403	8
		limed	14·0	1269	14·8	14·1	28·9	1056	1074	2130	
9	Complete Mineral Manure and double dressing Amm. Salts (= 86 lb. N.)	not limed	43·8	3887	7·5	33·9	41·4	483	2349	2832	9
		limed	52·7	4692	46·9	21·8	68·7	3652	1869	5521	
10	Mineral Manure (without Potash) and double dressing Amm. Salts (= 86 lb. N.)	not limed	35·2	3069	9·9	25·5	35·4	672	2028	2700	10
		limed	38·2	3510	32·6	19·2	51·8	2725	1543	4268	
11-1	Complete Mineral Manure and treble dressing Amm. Salts (=129 lb. N.)	not limed	65·9	5301	15·0	28·7	43·7	972	1935	2907	11-1
		limed	64·5	5494	55·3	27·6	82·9	4072	2398	6470	
11-2	As plot 11-1 and Silicate of Soda	not limed	63·6	5402	42·3	31·9	74·2	2832	2174	5006	11-2
		limed	57·1	5220	59·5	30·1	89·6	4525	2636	7161	

12	Unmanured	not limed	15·1	1355	17·7	12·1	29·8	1119	843	1962	12
13	Dung in 1905, and every fourth year since (omitted in 1917). Fish Guano in 1907 and every fourth year since	not limed	37·6	3408	41·5	23·1	64·6	2789	1835	4624	13
		limed ...	34·3	2994	26·7	18·5	45·2	2009	1361	3370	
14	Complete Mineral Manure and double dressing Nitrate of Soda (=86 lb. N.)	not limed	52·9	4348	49·8	25·4	75·2	3638	1745	5383	14
		limed	47·5	4061	39·7	18·6	58·3	2928	1086	4014	
15	Complete Mineral Manure as plot 7; following double dressing Nitrate of Soda (= 86 lb. N.)	not limed	23·6	2218	22·2	22·7	44·9	1519	1539	3058	15
		limed ...	17·1	1607	12·9	19·7	32·6	1050	1237	2287	
16	Complete Mineral Manure and single dressing Nitrate of Soda (= 43 lb. N.)	not limed	31·3	3061	37·0	24·2	61·2	2395	1577	3972	16
		limed ...	26·6	2432	25·5	21·6	47·1	1773	1317	3090	
17	Single dressing Nitrate of Soda (= 43 lb. N.)	not limed	19·1	1590	22·2	22·8	45·0	1182	1602	2784	17
		limed ...	20·2	1629	20·4	22·2	42·6	1340	1352	2692	
18	Potash, Sulphate of Soda, Magnesia, 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	not limed	25·7	2349	5·2	36·0	41·2	401	2141	2542	18
		limed (6788 lb.)	29·7	2682	18.9	32·3	51·2	1338	2210	3548	
		limed (3951 lb.)	30·3	2746	16·3	27·1	43·4	1133	1893	3026	
19	Farmyard Dung in 1905 and every 4th year since (omitted in 1917); following Nitrate of Soda (= 43 lb. N.) and Minerals, 1872-1904	not limed	33·8	3040	23·3	31·1	54·4	1669	1723	3392	19
		limed (3150 lb.)	23·3	2128	8·7	23·6	32·3	683	1395	2078	
		limed (570 lb.)	25·7	2218	16·6	22·9	39·5	1142	1462	2604	
20	Farmyard Dung in 1905 and every 4th year since (omitted 1917); each intervening year, plot 20 receives Sulphate of Potash, Superphosphate and Nitrate of Soda (=26 lb. N.); following Nitrate of Potash and Superphosphate, 1872-1904	not limed	27·2	2468	26·3	25·1	51·4	2156	1824	3980	20
		limed (2772 lb.)	24·7	2382	31·5	21·4	52·9	2501	1575	4076	
		limed (570 lb.)	31·0	2842	33·6	23·1	56·7	2491	1713	4204	

Ground lime was applied to the Southern portion (limed) of the plots at the rate of 2,000 lb. to the acre in the Winter of 1903, 1907, 1915, and at the rate of 2,500 lb. to the acre in the Winter of 1920, 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.

1st and 2nd Hay Crops, 1922, were carted in very bad condition owing to the wet weather, some plots being much wetter than others. The Dry Matter figures give a truer indication of the relative yields of the different plots.

In 1921 there was no second crop.

The Park Grass Plots—*contd.*

BOTANICAL COMPOSITION, PER CENT. 1920 1st Crop.

Plot.	Manuring.	Liming.	Gramineæ.	Leguminosæ.	Other Orders.	"Other Orders" consist largely of	Plot.
3	Unmanured	Limed ...	61·20	11·75	27·06	Centaurea nigra	3
		Not limed	51·50	10·36	38·14	Centaurea nigra	
5-1	Unmanured, following double Amm. Salts, 1856-97	Not limed	73·43	1·36	25·20	Centaurea nigra	5-1
5-2	Super. and Sulph. Potash following double Amm. Salts, 1856-97 ...	Not limed	60·15	9·94	29·62	Luzula campestris (noticeable) ...	5-2
7	Complete Mineral Manure	Limed ...	42·82	44·21	12·98	Centaurea nigra	7
		Not limed	42·85	28·37	28·79	Achillea millefolium	
8	Mineral Manure (without Potash) ...	Limed ...	56·96	13·80	29·25	Centaurea nigra	8
		Not limed	48·46	17·22	34·33	Plantago lanceolata, Achillea millefolium and Centaurea nigra ...	
9	Complete Mineral Manure and double Amm. Salts	Limed ...	96·01	0·69	3·30	Rumex acetosa	9
		Not limed	95·04	—	4·97	Rumex acetosa	
10	Mineral Manure (without Potash) and double Amm. Salts	Limed ...	99·63	—	0·37	Rumex acetosa	10
		Not limed	99·06	—	0 93	Rumex acetosa	
14	Complete Mineral Manure and double Nitrate of Soda	Limed (sun)	95·13	0·89	3·97	Taraxacum vulgare	14
		,, (shade)	93·16	5·84	0 99	———	
		Not limed	97·88	—	2·13	Taraxacum vulgare	
15	As plot 7 following double Nitrate of Soda, 1858-75	Limed ...	72·64	11·49	15·86	Achillea millefolium, Plantago lanceolata	15
		Not limed	60·95	18·20	20·84	Achillea millefolium, Centaurea nigra	
16	As plot 7 and single Nitrate of Soda	Limed ...	92·47	1·54	5·98	Achillea millefolium	16
		Not limed	83·35	5·98	10 68	Taraxacum vulgare	
17	Single Nitrate of Soda	Limed ...	67·23	1·80	30·96	Centaurea nigra	17
		Not limed	62·46	0·29	37·26	———	
18	Potash, Sulphate Soda, Magnesia, and double Sulphate of Amm. 1905 and since	limed 6788 lb.	78·05	—	21·95	Rumex acetosa	18
		,, 3951 lb.	81·28	—	18·72	Rumex acetosa	
		Not limed	87·66	0·14	12·20	Rumex acetosa	
19	Farmyard Dung in 1905 and every 4th year since, omitted in 1917 ...	limed 3150 lb.	84·98	9·38	5·63	Achillea millefolium, Ranunculus spp.	19
		,, 570 lb.	71·47	18·63	9·91	Centaurea nigra, Ranunculus spp.	
		Not limed	76·38	15·25	8·36	Ranunculus spp.	
20	Farmyard Dung in 1905 and every 4th year since (omitted 1917), each intervening year Sulphate Potash, Super., and Nitrate of Soda ...	limed 2772 lb.	86·32	4·66	9·02	Centaurea nigra, Achillea millefolium, Anthriscus sylvestris ...	20
		,, 570 lb.	78·70	15·30	6·01	Centaurea nigra	
		Not limed	86·80	4·51	8·70	Achillea millefolium, Centaurea nigra	

WHEAT. BROADBALK FIELD, 1921.

Plot.	Manurial Treatment.	Top Portion.						Bottom Portion.					
		Dressed Grain.		Offal Grain per Acre.	Straw per Acre.	Total Straw per Acre.	Proportion of Total Grain to 100 of Total Straw.	Dressed Grain.		Offal Grain per Acre.	Straw per Acre.	Total Straw per Acre.	Proportion of Total Grain to 100 of Total Straw.
		Yield per Acre. Bush.	Weight per Bushel. lb.	lb.	lb.	cwt.		Yield per Acre. Bush.	Weight per Bushel. lb.	lb.	lb.	cwt.	
2A	Farmyard Manure	24·8	65·4	215	2457	29·1	56·4	26·2	65·8	200	2587	31·4	54·8
2B	Farmyard Manure	27·0	64·8	252	2811	37·4	47·8	26·4	66·0	229	2853	37·5	47·0
3	Unmanured	10·4	64·0	103	712	8·7	78·5	8·0	63·3	97	462	6·9	77·7
5	Complete Mineral Manure	7·9	63·3	83	518	6·8	76·4	7·7	63·5	91	484	6·5	79·5
6	As 5, and Single Amm. Salts	14·9	64·3	162	1418	17·6	56·7	12·2	64·3	138	996	13·5	61·0
7	As 5, and Double Amm. Salts	19·5	65·3	232	2302	28·8	46·6	16·1	64·8	258	1833	23·5	49·6
8	As 5, and Treble Amm. Salts	17·9	65·6	251	2422	33·4	38·1	19·8	65·3	311	2242	30·5	46·9
9	As 5, and Single Nitrate of Soda	15·9	64·3	145	1756	20·5	50·9	14·0	63·5	135	1574	18·1	50·4
10	Double Amm. Salts alone	16·5	63·9	184	1584	17·9	61·6	12·1	63·5	186	1130	14·3	59·8
11	As 10, and Superphosphate	9·4	62·8	239	1488	18·4	40·3	5·8	62·0	247	1090	15·7	34·5
12	As 10, and Super. and Sulph. Soda ...	16·0	63·5	259	2024	23·6	48·2	10·4	63·3	237	1500	19·8	40·2
13	As 10, and Super. and Sulph. Potash ...	20·2	64·4	205	2382	27·8	48·3	11·1	63·9	201	1710	24·0	33·8
14	As 10, and Super. and Sulph. Magnesia ...	17·8	64·1	301	2020	24·5	52·4	11·1	63·5	249	1460	19·8	43·1
15	Double Amm. Salts in Autumn and Minerals	22·6	64·8	277	2408	29·9	52·0	14·2	64·3	197	1472	21·3	46·5
16	Double Nitrate and Minerals	24·4	65·0	248	2942	34·1	48·0	17·2	64·8	246	2300	29·5	41·3
17 } 18 }	Minerals alone, or double Amm. Salts alone in alternate years	8·6	62·9	78	524	7·5	73·9	10·1	63·1	135	772	9·9	69·8
		22·8	64·8	246	2252	26·7	57·4	20·3	64·8	210	2068	24·7	55·1
19	Rape Cake alone	16·3	64·1	244	1538	19·3	59·5	15.4	64·1	216	1554	20·1	53·3
20	Mineral Manure (without Super.) and Amm. Salts	10·9	63·9	210	1627	20·7	39·1	—	—	—	—	—	—

WHEAT. BROADBALK FIELD, 1922.

Plot.	Manurial Treatment.	Top Portion.						Bottom Portion.						71 year Average 1852—1922.	
		Dressed Grain.		Offal Grain per Acre.	Straw per Acre.	Total Straw per Acre.	Proportion of Total Grain to 100 of Total Straw.	Dressed Grain.		Offal Grain per Acre.	Straw per Acre.	Total Straw per Acre.	Proportion of Total Grain to 100 of Total Straw.	Dressed Grain per Acre.	Total Straw per Acre.
		Yield per Acre.	Weight per Bushel.					Yield per Acre.	Weight per Bushel.						
		Bush.	lb.	lb.	lb.	cwt.		Bush.	lb.	lb.	lb.	cwt.		Bush.	cwt.
2A	Farmyard Manure	32·9	61·2	241	2204	31·8	63·2	24·7	62·0	727	2010	32·0	63·0	28·4*	32·8*
2B	Farmyard Manure ... ... — ...	36·0	61·3	255	2296	35·2	62·4	29·5	61·7	603	2070	35·9	60·2	34·3	34·6
3	Unmanured	9·0	60·5	98	704	8·8	65·3	6·2	60·5	101	476	6·6	64·8	12·1	9·9
5	Complete Mineral Manure	10·5	61·1	94	820	10·2	64·4	8·3	60·8	106	598	9·1	60·1	13·9	11·7
6	As 5, and Single Amm. Salts	17·3	60·8	132	1386	17·4	60·5	11·7	61·2	132	858	11·7	64·3	22·3	20·7
7	As 5, and Double Amm. Salts	29·0	60·8	246	2290	30·1	59·6	13·1	61·1	470	1702	23·7	47·8	30·9	32·2
8	As 5, and Treble Amm. Salts	25·4	60·8	439	1954	37·4	47·3	16·5	59·9	339	1416	29·4	40·4	35·1	40·2
9	As 5, and Single Nitrate of Soda	24·8	58·9	180	1878	23·4	62·5	13·7	59·2	142	920	14·3	59·4	24·5†	24·7†
10	Double Amm. Salts alone	9·2	59·4	305	850	15·1	50·3	4·3	58·8	306	634	11·9	41·7	19·1	18·0
11	As 10, and Superphosphate	4·2	57·6	327	974	18·9	26·7	1·3	57·3	189	478	13·3	17·7	21·5	21·7
12	As 10, and Super. and Sulph. Soda	7·4	59·0	371	1114	20·4	35·4	3·3	57·5	307	756	17·6	25·3	27·6	27·2
13	As 10, and Super. and Sulph. Potash	24·4	60·7	232	1968	26·9	56·9	14·5	61·1	300	1456	21·2	49 7	29·8	31·0
14	As 10, and Super. and Sulph. Magnesia ...	4·7	57·4	318	716	16·4	31·9	7·6	58·0	358	762	19·4	36·8	27·3	27·2
15	Double Amm. Salts in Autumn and Minerals ...	14·3	60·4	277	1420	23·1	44·0	8 1	60·2	300	1220	20·8	33·8	28·4	28·7
16	Double Nitrate and Minerals	27·0	60·7	405	2147	33·1	55·2	18·0	61·0	441	1868	31·0	44·2	30·7†	35·8†
17	Minerals alone, or Double Amm. Salts alone in	21·1	59·8	242	1786	23·5	57·2	17·1	59·8	280	1568	22·6	51·4	28·6	28·6
18	alternate years	13·3	59·9	101	995	13·4	59·7	9·4	60·3	259	970	14·1	52·1	14·3	12·4
19	Rape Cake alone	14·5	58·9	377	1212	21·1	52·0	9·5	58·3	338	1326	20·9	38·0	22.0‡	22·7‡
20	Mineral Manure (without Super.) and Amm. Salts	20·8	60·3	302	1419	21·6	64·3	—	—	—	—	—	—	18·6§	19·8§

* 23 years only, 1900-1922. † 38 years only, 1885-1922. ‡ 30 years only, 1893-1922. § 15 years only, 1906-1922 (no crop in 1912 and 1914).

RED CLOVER grown year after year on rich Garden Soil, Rothamsted Garden.

Hay, Dry Matter, and Nitrogen per Acre, 1921 and 1922.

Year.	No. of Cuttings.	As Hay.	Dry Matter.	Nitrogen.	Seed Sown.
		lb.	lb.	lb.	
1921	2	307	256	7	1921, March 31st, re-sown
1922	2	2399	1999	61	1922, May 12th, mended
Averages:					
25 years, 1854—1878		7664	6387	179	
25 years, 1879—1903		3924	3270	101	
50 years, 1854—1903		5794	4829	140	
15 years, 1904—1918		2888	2407	70	
4 years, 1919—1922		2001	1668	51	

WHEAT AFTER FALLOW (without Manure 1851, and since).

Hoos Field, 1921 and 1922.

	1921.	1922.	Average 67 years 1856-1922.
Dressed Grain { Yield per Acre—Bushels	15·20	6·93	15·22
Dressed Grain { Weight per Bushel—lb.	64·5	60·4	59·6
Offal Grain per Acre—lb.	110	189	52
Straw per Acre—lb.	1082	686	—
Total Straw per Acre—cwt.	13·2	10·3	13·1
Proportion of Total Grain to 100 of Total Straw	73·5	52·5	—

AVERAGE WHEAT YIELDS *of* VARIOUS COUNTRIES

Country.	Mean Yield per Acre 1901-10. Bushels.	Country.	Mean Yield per Acre 1901-10. Bushels.
Great Britain	31·6	Denmark	41·3
England	31·7	Argentine	10·6
Hertfordshire	30·5	Australia	10·1
France	20·2	Canada	19·5
Germany	29·1	United States	14·3
Belgium	35·1	Russia—European	10·0

NOTE.—Figures for Great Britain, England and Hertfordshire are taken from the Board of Agriculture's "Agricultural Statistics," Vol. 46. Other figures from "Annuaire International de Statistique Agricole," 1910-12, and converted at the rate of 60 lb. per bushel.

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HOOS FIELD (formerly Potato Plots), 1921 and 1922. No Manure since 1901.

Plot.	Manuring given prior to 1901.	1921. WHEAT.						1922. BARLEY.					
		Dressed Grain.		Offal Grain per Acre.	Straw per Acre.	Total Straw per Acre.	Proportion of total Grain to 100 of Total Straw.	Dressed Grain.		Offal Grain per Acre.	Straw per Acre.	Total Straw per Acre.	Proportion of Total Grain to 100 of Total Straw.
		Yield per Acre.	Weight per Bushel.					Yield per Acre.	Weight per Bush.				
	Previous Cropping: Potatoes, 1876-1901; Barley, 1902 and 1903; Oats, 1904; Barley, 1905-1911; Oats, 1912; Barley. 1913 and 1914; Oats, 1915; Barley, 1916-19; Fallow, 1920.												
		Bush.	lb.	lb.	lb.	cwt.		Bush.	lb.	lb.	lb.	cwt.	
1	Unmanured	10·5	64·8	147	752	9·1	81·1	13·0	49·8	73	588	7·4	87·0
2	Unmanured 1882 to 1901, previously Dung only	17·4	65·1	219	1365	16·5	73·3	15·8	50·0	94	816	10·1	78·3
3	Dung 1883 to 1901	24·3	65·2	354	2061	24·6	70·2	21·6	49·9	89	933	11·3	92·0
4	Dung 1883 to 1901	26·9	65·3	276	2196	26·8	67.7	21·8	50·1	95	1044	12·6	83·9
	Previous Cropping: Potatoes, 1876-1901; Barley, 1902-1903; Oats, 1904; Plots 5, 7, 9, Cow Peas (failed), 1905; Plots 6, 8, 10, Red Clover, 1905; Red Clover, 1906-1911; Oats, 1912; Barley, 1913 and 1914; Oats, 1915; Barley, 1916-1919; Fallow, 1920.												
5	Ammonium Salts	18·6	65·5	298	1188	15·3	88·3	17·4	50·3	95	795	9·2	94·3
6	Nitrate of Soda	21·3	65·7	343	1629	20·3	76·6	17·8	50·2	93	816	9·6	91·5
7	Ammonium Salts and Mixed Minerals	24·1	65·5	226	1929	22·7	71·2	17·1	50·8	76	738	8·7	97·1
8	Nitrate of Soda and Mixed Minerals ...	25·2	65·7	270	1998	23·3	73·5	17·3	50·6	70	777	9·0	93·5
9	Superphosphate	26·9	65·8	232	2001	23·3	76·5	16·6	50·6	84	681	8·2	100·3
10	Mixed Minerals	26·0	65·9	216	1953	22·8	75·5	15·5	50·9	72	645	7·8	97·9

PERMANENT BARLEY PLOTS. Hoos Field, 1921, 1922.

PRODUCE PER ACRE.

Plot.	Manuring.	1921. Dressed Grain. Yield per Acre.	1921. Dressed Grain. Weight per Bushel.	1921. Offal Grain per Acre.	1921. Straw per Acre.	1921. Total Straw per Acre.	1921. Proportion of Total Grain to 100 of Total Straw.	1922. Dressed Grain. Yield per Acre.	1922. Dressed Grain. Weight per Bushel.	1922. Offal Grain per Acre.	1922. Straw per Acre.	1922. Total Straw per Acre.	1922. Proportion of Total Grain to 100 of Total Straw.	70 years Average Yield 1852—1922.† Dressed Grain per Acre:	70 years Average Yield 1852—1922.† Total Straw per Acre.
		Bush.	lb.	lb.	lb	cwt.		Bush.	lb.	lb.	lb.	cwt.		Bush.	cwt.
1 O	Unmanured	7·6	55·8	95	253	4·6	100·4	11·8	50·7	66	396	5·7	104·6	14 0	8·0
2 O	Superphosphate only	17·9	55·6	128	561	8·2	122·7	16·6	51·0	74	487	9·3	88·7	19·6	9·9
3 O	Alkali Salts only	13·0	56·4	114	440	7·5	101·3	11·9	49·8	55	459	8·0	71·9	15·0	8·8
4 O	Complete Minerals	16·7	56·3	125	630	9·5	99·8	15·1	52·0	74	608	9·0	85·4	19·8	11·1
5 O	Potash and Superphosphate ...	11·2	57·6	77	374	4·9	132·9	9·9	50·8	37	319	4·5	108·1	16·2	9·6
1 A	Ammonium Salts only	11·1	53·5	189	451	7·9	88 9	13·5	49·7	83	402	6·3	107·4	24·8	14·1
2 A	Superphosphate and Amm. Salts	27·1	54·8	396	1229	16·5	102·1	20·4	50·8	130	602	9·4	110·7	37·0	20·9
3 A	Alkali Salts and Amm. Salts ...	10·6	56·0	191	547	9·8	71·2	16·0	50·5	114	765	11·0	75·0	27·0	16·3
4 A	Complete Minerals and Amm. Salts	30·3	56·5	188	1411	18·4	92·1	30·7	51·5	90	921	13·1	114·2	40·6	24·0
5 A	Potash, Super. and Amm. Salts ...	22·7	57·9	85	1023	13·8	90·9	33·0	51·7	64	1205	14·4	109·8	34·9	22·2
1 AA	Nitrate of Soda only	7·9	53·3	215	457	8·2	69·7	14·1	50·3	109	517	8·8	82·9	25·3*	15·6*
2 AA	Super. and Nitrate of Soda ...	33·7	54·8	267	1441	17·9	105·2	30·6	51·9	88	957	13·7	109·7	39·9*	23·5*
3 AA	Alkali Salts and Nitrate of Soda	8·2	54·3	157	484	9·2	58·7	12·8	50·7	113	704	12·9	53·0	25·9*	16·8*
4 AA	Complete Minerals and Nitrate of Soda	33·2	56·6	171	1546	19·7	93·2	32·9	52·4	93	1260	17·1	94·6	39·2*	23·9*
1 AAS	As Plot 1 AA and Silicate of Soda	13·7	55·0	231	600	9·6	91·2	20·1	50·8	116	891	12·5	81·0	31·6*	18·7*
2 AAS	,, ,, 2 AA ,, ,,	33·0	55·3	243	1430	19·3	95·9	32·0	52·7	89	1100	14·5	109·1	41·0*	24·5*
3 AAS	,, ,, 3 AA ,, ,,	11·8	55·6	160	644	12·1	60·4	18·4	51·1	111	1161	15·4	60·9	32·9*	20·4*
4 AAS	,, ,, 4 AA ,, ,,	28·9	57·8	133	1342	19·6	81·9	36·8	53·2	87	1342	22·3	81·9	41·5*	26·0*
1 C	Rape Cake only	23·3	54·9	189	954	12·9	101·5	27·1	52·6	109	844	13·0	105·6	36·5	20·9
2 C	Superphosphate and Rape Cake	30·1	55·7	158	1139	15·0	109·2	33·8	51·8	74	974	13·6	119·9	38·8	22·3
3 C	Alkali Salts and Rape Cake ...	16·0	56·3	85	633	9·4	93·3	27·5	51·6	74	960	12·5	106 9	35·0	20·9
4 C	Complete Minerals and Rape Cake	18·1	57·1	75	673	10·6	93·5	34·2	52·2	70	1152	15·1	109·6	38·5	22·9
7—1	Unmanured (after dung 20 years, 1852—71)	11·0	56·0	107	394	7·5	85·6	17·7	52·1	72	631	9·0	98·1	24·0‡	14·1‡
7—2	Farmyard Manure	28·6	58·2	94	1509	20·4	76·7	31·4	52·0	99	1403	19·9	77·6	46·0	28·5
6—1	Unmanured	7·9	55·6	129	314	5·7	88·8	8·1	51·4	51	343	4·6	91·1	15·4	8·9
6—2	Ashes from Laboratory furnace ...	8·5	54·0	129	398	6·0	87·2	6·3	49·9	49	314	4·6	70·4	16·3	9·5
1 N	Nitrate of Soda only	8·4	52·5	184	490	7·6	73·2	13·7	51·0	95	616	9·3	76·3	30·0§	18·3§
2 N	,, ,, ,, ...	21·4	55·4	206	979	13·5	92·2	25·6	51·0	86	963	12·4	100·3	33·8§§	20·4§§

† 1912, all plots were fallowed. * 54 years, 1868—1922. ‡ 50 years, 1872—1922. § 69 years, 1853—1922. §§ 63 years, 1859—1922.